



National Water Reform 2024

Inquiry report



The Productivity Commission acknowledges the Traditional Owners of Country throughout Australia and their continuing connection to land, waters and community. We pay our respects to their Cultures, Country and Elders past and present.

The Productivity Commission

The Productivity Commission is the Australian Government's independent research and advisory body on a range of economic, social and environmental issues affecting the welfare of Australians. Its role, expressed most simply, is to help governments make better policies, in the long-term interest of the Australian community.

The Commission's independence is underpinned by an Act of Parliament. Its processes and outputs are open to public scrutiny and are driven by concern for the wellbeing of the community as a whole.

Further information on the Productivity Commission can be obtained from the Commission's website (www.pc.gov.au).

© Commonwealth of Australia 2024



With the exception of the Commonwealth Coat of Arms and content supplied by third parties, this copyright work is licensed under a Creative Commons Attribution 4.0 International licence. In essence, you are free to copy, communicate and adapt the work, as long as you attribute the work to the Productivity Commission (but not in any way that suggests the Commission endorses you or your use) and abide by the other licence terms. The licence can be viewed at: <https://creativecommons.org/licenses/by/4.0>.

The terms under which the Coat of Arms can be used are detailed at: www.pmc.gov.au/government/commonwealth-coat-arms.

Wherever a third party holds copyright in this material the copyright remains with that party. Their permission may be required to use the material, please contact them directly.

ISSN 1447-1337 (online)

ISSN 1447-1329 (print)

ISBN 978-1-74037-794-2 (online)

ISBN 978-1-74037-793-5 (print)

An appropriate reference for this publication is:

Productivity Commission 2024, *National Water Reform 2024*, Inquiry Report no. 105, Canberra

Publication enquiries:

Phone 03 9653 2244 | Email publications@pc.gov.au



Australian Government
Productivity Commission

Canberra Office

4 National Circuit
Barton ACT 2600

GPO Box 1428
Canberra City ACT 2601

Telephone 02 6240 3200

Melbourne Office

Telephone 03 9653 2100

www.pc.gov.au

28 May 2024

The Hon Dr Jim Chalmers MP
Treasurer
Parliament House
CANBERRA ACT 2600

Dear Treasurer

In accordance with section 11 of the *Productivity Commission Act 1998*, we have pleasure in submitting to you the Commission's final report into *National Water Reform 2024*.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Joanne Chong', with a long horizontal flourish extending to the right.

Joanne Chong
Commissioner

A handwritten signature in black ink, appearing to read 'Anne Poelina', with a stylized 'A' and 'P'.

Professor Anne Poelina
Associate Commissioner

Terms of reference

I, Senator the Hon Katy Gallagher, Acting Treasurer, pursuant to Parts 2 and 3 of *the Productivity Commission Act 1998* and Section 88 of the *Water Act 2007* (the Act), request the Productivity Commission (Commission) undertake an inquiry into the reform progress of Australia's water resources sector.

The Inquiry should advise on the progress of all Australian governments in achieving the objectives, outcomes and timelines anticipated under the 2004 Intergovernmental Agreement on a National Water Initiative (NWI) and where practicable on key aspects of water security for Australia, as set out below.

Background

Reform of the Australian water sector has been ongoing over several decades, reflecting the fundamental importance of water to all aspects of our society and environment, and the significant challenges involved in managing a shared natural resource impacted by climate change and periods of scarcity. A national approach to water reform started in 1994 through the landmark COAG water reform framework and has continued through subsequent initiatives such as the NWI (2004), *Commonwealth Water Act 2007* (the Act) and Murray-Darling Basin Plan 2012. The Australian Government has committed to renew the NWI. This inquiry provides an opportunity for the Commission to examine in more detail the issue of water security, as a key driver of national water reform.

Scope of the inquiry

In addition to the requirements in the Water Act, the scope of the inquiry should examine whether the national water reforms agreed in the NWI, along with any other subsequent national water reforms collectively adopted by Australian governments, are achieving their intended outcomes.

In undertaking the inquiry, the Commission should assess:

- progress in jurisdictional adoption of NWI principles, objectives and key outcomes and, where not adopted, issues that may influence implementation, and the opportunity costs of not doing so
- outcomes to date of the NWI and related water reform efforts, taking account of other reform drivers
- where practicable, implications for key water security and management challenges for Australia, including economic, environmental, social and cultural.

The Commission should provide recommendations:

- on actions that the parties to the NWI might take to better achieve the objectives and outcomes of the NWI
- to support all Australian governments in efforts to progress national water reform in light of current priorities, including water security and the involvement of First Nations communities in water management.
- on how the Australian Government can better utilise the Act as a framework for guiding national water reform policy.

In conducting the inquiry, the Commission should consider:

- the objectives provided for in clause 23 of the NWI

- any current Commonwealth, state or territory reform initiatives relevant to the Inquiry scope
- the perspectives and cultural rights of First Nations Australians.

Process

The Commission is to undertake a public consultation process including, where appropriate:

- establishing a stakeholder working group in accordance with section 89 of the Act
- inviting public submissions
- holding public hearings
- releasing a draft report to the public.

The Commission should consult broadly, including with Commonwealth, state and territory governments, relevant sectors and stakeholders and First Nations peoples.

Senator the Hon Katy Gallagher
Acting Treasurer

[Received 22 December 2023]

Disclosure of interests

The *Productivity Commission Act 1998* specifies that where Commissioners have or acquire interests, pecuniary or otherwise, that could conflict with the proper performance of their functions they must disclose those interests.

Commissioner Joanne Chong holds an honorary position at the University of Technology Sydney.

Professor Anne Poelina has the following disclosable interests:

- Chair, Martuwarra Fitzroy River Council
- Member, Murray-Darling Basin Authority's independent Advisory Committee on Social, Economic and Environmental Sciences
- Member, Interim First Nations Water Working Group
- Member of the Indigenous Advisory Committee
- holds several academic positions, Professor, Chair Indigenous Knowledges at the Nulungu Research Institute, University of Notre Dame; Adjunct Professor, College of Indigenous Education Futures, Arts and Society Charles Darwin University; Research Fellow at the Water Justice Hub, Australian National University.

Contents

Transmittal letter	iii
Terms of reference	iv
Acknowledgments	x
Overview	1
Key points	2
About the inquiry report	3
The National Water Initiative	4
How should the NWI be renewed?	6
The 2024 assessment of progress against the 2004 NWI	13
Recommendations and findings	21
NWI renewal advice	26
1. Governance for a renewed national approach to water reform	53
1.1 Benefits of national co-operation in water	54
1.2 The Commission's 2021 NWI governance renewal advice is still relevant	57
1.3 Greater knowledge sharing, effective coordination, and promotion of best practice	62
1.4 The role of the <i>Water Act 2007</i> (Cth)	63
1.5 Renewal advice	65
2. Water interests of First Nations peoples	67
2.1 Introduction	67
2.2 First Nations peoples' representation in water planning	71
2.3 Incorporating First Nations peoples' objectives and strategies for achieving them in water plans	78
2.4 First Nations peoples' access to water, including through native title rights to water	81
2.5 Renewal advice	89
3. Water security in a changing climate	95
3.1 What is water security?	96
3.2 Climate change poses a major risk to Australia's water security	98

3.3	Climate projections to inform water planning	103
3.4	Using the renewed NWI to manage the risks to water security from a changing climate	107
3.5	The water demands of transition to net zero	110
3.6	Planning to provide cost effective urban water services in a changing climate	113
3.7	Renewal advice	120
4.	Water access entitlements and planning frameworks	123
4.1	Water access entitlements	125
4.2	Water planning	129
4.3	Water for environmental and other public benefit outcomes	138
4.4	Addressing overallocated and overused systems	139
4.5	Assigning risks for changes in allocation	141
4.6	Interception	142
4.7	Integrating surface water and groundwater management	143
4.8	Renewal advice	145
4.9	Annex	146
5.	Water markets and trading	149
5.1	Removing unwarranted trade barriers	150
5.2	Publicly accessible and reliable water registers	156
5.3	Reducing transaction costs by improving water market information	159
5.4	Compliance with trade approval service standards	161
6.	Best practice pricing and institutional arrangements	163
6.1	Best practice pricing and regulation	165
6.2	Investment in new or refurbished infrastructure	175
6.3	Cost recovery for water planning and management activities	181
6.4	Environmental externalities of water use	182
6.5	Release of unallocated water	183
6.6	Separation of water management from service delivery	184
6.7	Performance benchmarking	184
6.8	Findings	185

7. Integrated management of water for environmental and other public benefit outcomes	187
7.1 Identification of specific environmental and public benefit outcomes	189
7.2 Management and institutional arrangements	193
7.3 Water recovery for the environment	208
7.4 Findings and renewal advice	211
7.5 Annex	214
8. Water resource accounting	217
8.1 Water accounts	218
8.2 Environmental water accounting	221
8.3 Water metering and measurement	223
8.4 Compliance and enforcement	230
8.5 Finding and recommendation	234
9. Urban water reform	235
9.1 Urban water service quality	236
9.2 Water reuse, end use efficiency, water sensitive urban design and innovation	249
9.3 Findings	253
10. Knowledge and capacity building	255
10.1 Priority setting and coordination of knowledge generation	256
10.2 Knowledge generation	257
10.3 Capacity building	259
10.4 Overall assessment	262
10.5 Annex	262
11. Community partnerships and adjustment	271
11.1 Community partnerships	272
11.2 Community adjustment assistance	280
11.3 Renewal advice	282
Appendices	285
A. Public engagement	287
B. Assessment of progress ratings and indicators	293
References	295

Acknowledgments

The Commissioners express their appreciation to the staff who worked on the inquiry report – Assistant Commissioner Jared Dent who managed the inquiry, and the team members: Shane Chisholm, Paul Gardner, Catherine McCombe, Phil Heaphy, Krista Clift, Cristy Alevizos, Cameron Van-Lane, Sally Harvey, Sebastian Broadhurst, Debasish Das, Ritaja Das, and Bowen Tan.

Overview

Key points

- * The 2004 National Water Initiative (NWI) has served Australia well as a foundation for water management. But a renewed and updated NWI will help governments navigate growing water security challenges.**

 - Climate change is making rainfall as a water source increasingly less reliable.
 - Demand for water is growing and changing.
- * Planning for water security should be a greater focus of a renewed NWI, in the face of an increasingly variable and changing climate.**

 - Jurisdictions need to plan for threats to water quality and availability from an increased risk of flooding, storms, bushfires and sea level rise, as well as drought.
 - Governments also need to collectively model and plan for the water demands of the transition to net zero emissions.
 - All options need to be on the table and transparently assessed, to ensure water security is achieved at least cost to the Australian community and to sustain the underlying health of water systems.
- * A renewed NWI should improve and expand on the existing agreement while retaining its foundations.**

 - A recommitment to the core principles of the NWI will provide a consistent authorising environment for jurisdictions to implement and continue to improve on best-practice.
 - The current advice for renewing the NWI is consistent with advice provided in the Productivity Commission's 2021 National Water Reform Inquiry report.
 - A renewed NWI requires modernised and additional objectives that reflect community expectations for effective, efficient and equitable delivery of water services.
- * A renewed NWI should include both an objective and a new element, recognising First Nations peoples' reverence and cultural responsibility for water and the continued involvement and participation of First Nations peoples in water management.**

 - The Committee on Aboriginal and Torres Strait Islander Water Interests should continue to lead the development of this new content in a renewed NWI.
 - Governments should ensure alignment with their commitments under the National Agreement on Closing the Gap.
- * Many of the discrete actions under the NWI are complete, and most jurisdictions continue to make progress implementing their remaining and ongoing 2004 NWI commitments. However, gaps remain.**

 - Western Australia and the Northern Territory have not implemented statutory perpetual water rights.
 - Fully independent economic regulation of water utilities has not been adopted by all states and territories. In Western Australia, Queensland and the Northern Territory, independent economic regulators do not have the power to set water prices.
 - Jurisdictions are in the process of developing action plans and strategies to include First Nations peoples in water planning and decision-making processes, but implementation is in the early stages.

About the inquiry report

This inquiry responds to the Australian Government's request for the Productivity Commission to undertake its third triennial assessment of jurisdictions' progress towards achieving the objectives and outcomes of the 2004 National Water Initiative (NWI).

The Commission was asked to make recommendations:

- on actions that the parties to the NWI might take to better achieve the objectives and outcomes of the NWI
- to support all Australian governments in efforts to progress national water reform in light of current priorities, including water security and the involvement of First Nations communities in water management
- on how the Australian Government can better utilise the Water Act as a framework for guiding national water reform policy.

Given the short amount of time that the Commission has been given to complete this inquiry (five months), only items 1 and 2 are covered in detail in this report. Item 3 is best considered as part of the Australian Government's planned 2027 review of the *Water Act 2007* (Cth).¹

This report is structured as follows: it starts with a brief motivation for and description of the NWI. Then it discusses the case for reform of what is now a 20-year-old agreement, highlighting climate change and population growth. The subsequent sections of the overview, and chapter 1 of the report, outline how the NWI can be improved based on updated renewal advice that the Commission first provided in 2021 (PC 2021b), and additional findings and recommendations from our 2024 assessment.

Improvements to the NWI should include a broader focus on First Nations peoples' water interests, as well as improvements to water security by taking a long-term, integrated approach to water planning and service delivery. The overview briefly covers these topics, and they are discussed in chapters 2 and 3 respectively.

The rest of the report provides the Commission's assessment of progress of jurisdictions against the 2004 NWI and makes recommendations for how parties might better achieve its objectives.

Conduct of the inquiry

This inquiry commenced on 22 December 2023. The Commission sought information from the Australian, state, and territory governments, and put out a call for public submissions on 5 January 2024. An interim report was published on 4 April 2024, along with a call for further submissions.

Over the course of the inquiry, the Commission received 96 submissions, six brief comments and conducted 49 consultations including with representatives from jurisdictional water agencies, water regulators, water sector peak bodies, academic institutions, industry associations and First Nations peoples and organisations – Appendix A). The Commission also met three times with a stakeholder working group.

The report and assessment of progress draws on a broad range of sources including information provided directly by governments, other independent reviews and inquiries, academic and policy papers, input from the stakeholder working group, and submissions to this inquiry.

The Commission thanks the state and territory governments, and the Australian Government, for their cooperation. We thank all participants for their contributions to the inquiry and acknowledge the time and effort spent contributing not only to this inquiry, but also to other previous as well as current government processes related to national water reform.

¹ The Commission's response to this item in the Terms of Reference is in section 1.4 (chapter 1).

The National Water Initiative

Water is essential to the wellbeing of Australian communities, the environment and the economy. It is in the interests of all Australians that water is managed productively, efficiently and sustainably.

The NWI laid strong foundations for water management

Recognising this, and facing challenges of increasing demands on water resources, in 2004, the Council of Australian Governments (COAG) agreed to the NWI,² in part to build on the principles articulated in COAG's 1994 Water Reform Framework.

The NWI established reform objectives and outcomes with the overall aim of supporting a nationally compatible, market, regulatory and planning based system of managing water resources that optimises economic, social and environmental outcomes. The Parties agreed to implement the NWI in recognition of:

the continuing national imperative to increase the productivity and efficiency of Australia's water use, the need to service rural and urban communities, and to ensure the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction.³

As the Commission wrote in 2021, most jurisdictions have largely achieved their 2004 NWI commitments. And because of this, national water reforms to improve water resource management and water services delivery, have resulted in material benefits to the Australian people and to the environment (PC 2021b, pp. 1–4).

That said, areas for improvement remain. Our assessment is that several key problems identified by the Commission in 2021 remain unaddressed, reflecting that until recently the national water reform process had stalled.

There are compelling reasons to update the NWI now

The 2004 NWI has served Australian water users and water management well. While the NWI's fundamental principles remain sound, the agreement is two decades old and there is a need to modernise it to reflect the contemporary context and its challenges.

Supply (rainfall) is less reliable ...

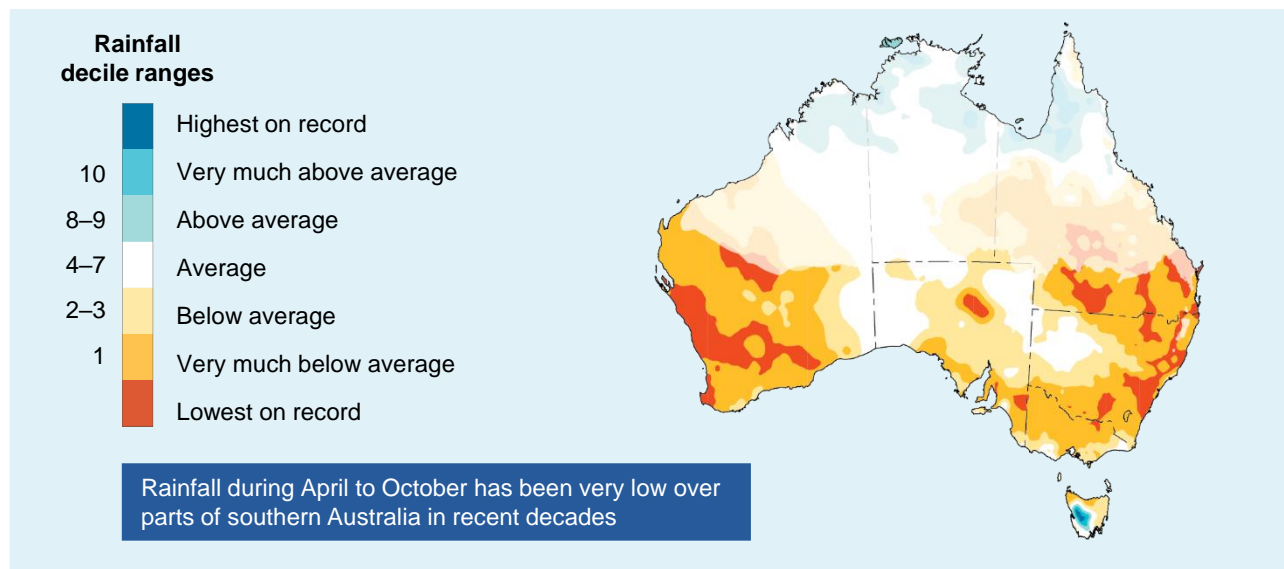
Most of southern Australia has seen a decline in rainfall in the last two decades compared with the longer-term trend between 1900 and 2000 (figure 1). Combined with that, the prevalence of extreme weather events – short, and intense, but variable rainfall events, bushfires, drought and heat events – has increased. Rising temperatures leading to higher evaporation will put additional pressure on dam water storages and reduce the rates of groundwater recharge. These trends are driven by climate change and are forecast to accelerate further as the climate continues to warm (BOM 2024d). A warming climate and falling rainfall will impact the availability of water.

² Tasmania and Western Australia did not become signatories to the NWI until 2005 and 2006, respectively.

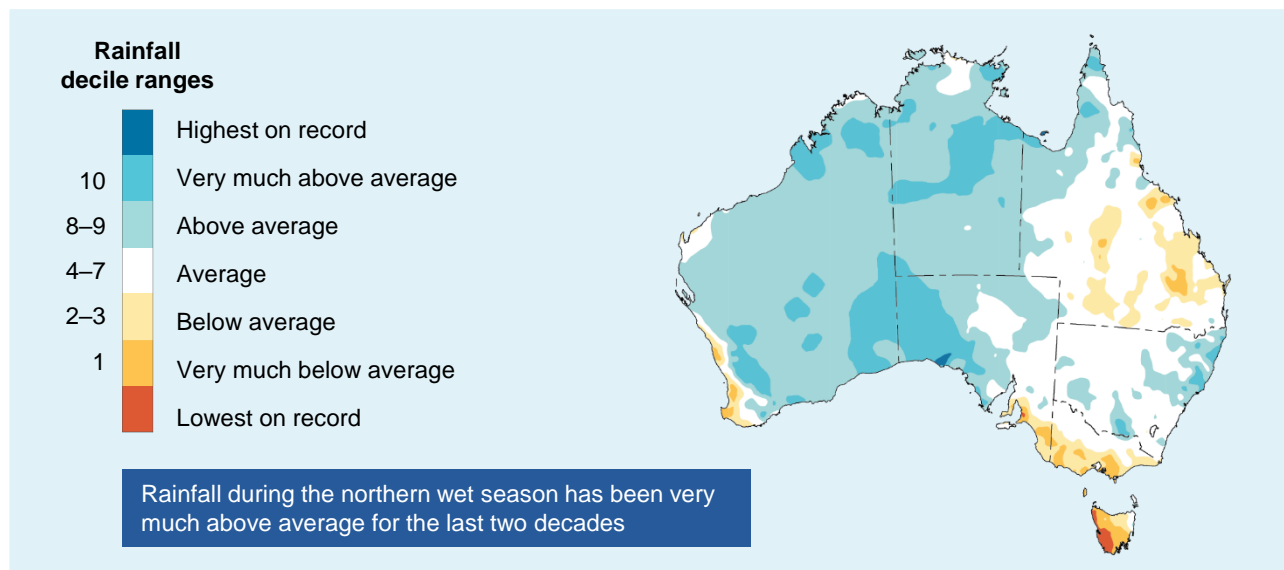
³ NWI paragraph 5.

Figure 1 – Australia’s rainfall pattern is changing

a) April-October long-term^a change



b) October-April long-term^a change



a. Rainfall deciles in the period 2000–2022, compared to the 100-year average rainfall record for Australia for the period 1900–2000.

Source: BOM 2022.

and demand for water is growing and changing

Australia’s growing population is putting increasing pressure on water service systems and management, particularly in major urban centres (chapter 3). Higher temperatures resulting from climate change are also likely to drive an increase in per capita water demand (e.g. to cool buildings and irrigate parks and gardens).

Furthermore, there is increasing recognition of broader community needs and expectations with regards to water. High quality, secure, and integrated water services are essential to functioning communities.

With all governments signing onto the National Agreement on Closing the Gap, including its commitments to priority reforms and explicit water-related targets, the shortcomings in the original NWI are stark, including the lack of recognition of First Nations peoples' water interests.

Our understanding of water science has improved, and so has our understanding of what best practice water management across Australia should look like.

How should the NWI be renewed?

The Australian, state and territory governments are negotiating to renew the NWI in the form of a new intergovernmental agreement on water. Chapter 1 of this report discusses this process, including the Commission's views on how a renewed NWI is needed to reinvigorate water reform that benefits the broader Australian community, and to avoid undoing decades of progress in water management. These views are summarised below.

Cooperation benefits everyone

A renewed commitment to water reform, in the form of a renewed NWI should, like the 2004 agreement did, benefit the wider Australian community.

As the Murray–Darling Basin Authority explained:

... the NWI gives all stakeholders a common language to talk about water reform. A key part of a refresh is to ensure that key concepts that underpin water management and planning are contemporary, clear, and readily applicable to the current and future needs of water management (sub. 36, p. 2).

In 2021, the Commission comprehensively reviewed the NWI and provided detailed advice for a renewed NWI. Overall, that advice was to build on the foundations of the NWI, rather than start again from scratch. This inquiry has confirmed the continued relevance of that advice and extended it in some areas.

A renewed commitment to cross-jurisdictional cooperation will increase certainty and help to ensure that the evolution towards sustainable and equitable management of water that the NWI encouraged, continues on a national scale. It will promote best practice to be developed and shared, reduce duplication and improve efficiencies and outcomes.

The fundamentals should be retained

The Commission has heard that jurisdictions broadly agree that a renewed NWI should include priorities focusing on climate change and First Nations interests, and that there have been constructive cross-jurisdictional discussions about these areas.

The Commission has also heard some jurisdictions do not wish to retain some of the core NWI commitments in the new agreement. This is typically because existing, often long-standing policy settings are at odds with these commitments.

There is a resultant risk that, for consensus to be reached between the parties, the new agreement may represent a weaker commitment to some of the fundamentals of water policy than the NWI. This could have negative implications for longer-term water security because an erosion of the authorising environment for implementation could lead to backsliding – a future risk even for those jurisdictions who have already progressed further in meeting their commitments against the NWI.

A comprehensive new agreement would improve and expand on the 2004 NWI

A summary of the Commission's recommendations for a renewed NWI follow, with our complete renewal advice at the end of this overview. The 2021 report provides more detail.

Modernised objectives and agreement structure

The NWI is based on 10 objectives, and underneath the objectives, are eight elements that detail actions and commitments for parties to the NWI to implement.

The Commission recommends retaining this broad structure, but with an updated goal and overarching objectives of a new agreement to reflect the modern context (renewal advice 3.1 and 3.2).

The current NWI objectives are focussed primarily on water resource management. While this remains important, there also needs to be a focus on water service provision.

The Commission proposes a revised framework of objectives for a renewed NWI that elevates water service provision – the outcome of good management – that is 'effective, equitable and efficient'. Central to this is the concept of a basic level of service, under which all governments commit to provide universal access to safe and reliable drinking water, to support broader public health outcomes.

Within this context, the Commission recommends new additional objectives for the renewed NWI that cover water quality, supply management, infrastructure, and community expectations (renewal advice 3.3).

Figure 2 illustrates the Commission's proposed renewed NWI structure and objectives.

The Commission also proposed new and revised objectives to cover the shortcomings of the 2004 NWI (renewal advice 3.3).

- Processes for water planning, sharing and management that are focused on adaptation in a world characterised by uncertainty, climate change, and increasing physical scarcity of water.
- Improved recognition of First Nations peoples' aspirations, desire to participate and engage in water management and their cultural responsibility for rivers and groundwater systems.
- Better integration of environmental water protections with natural resource management activities.

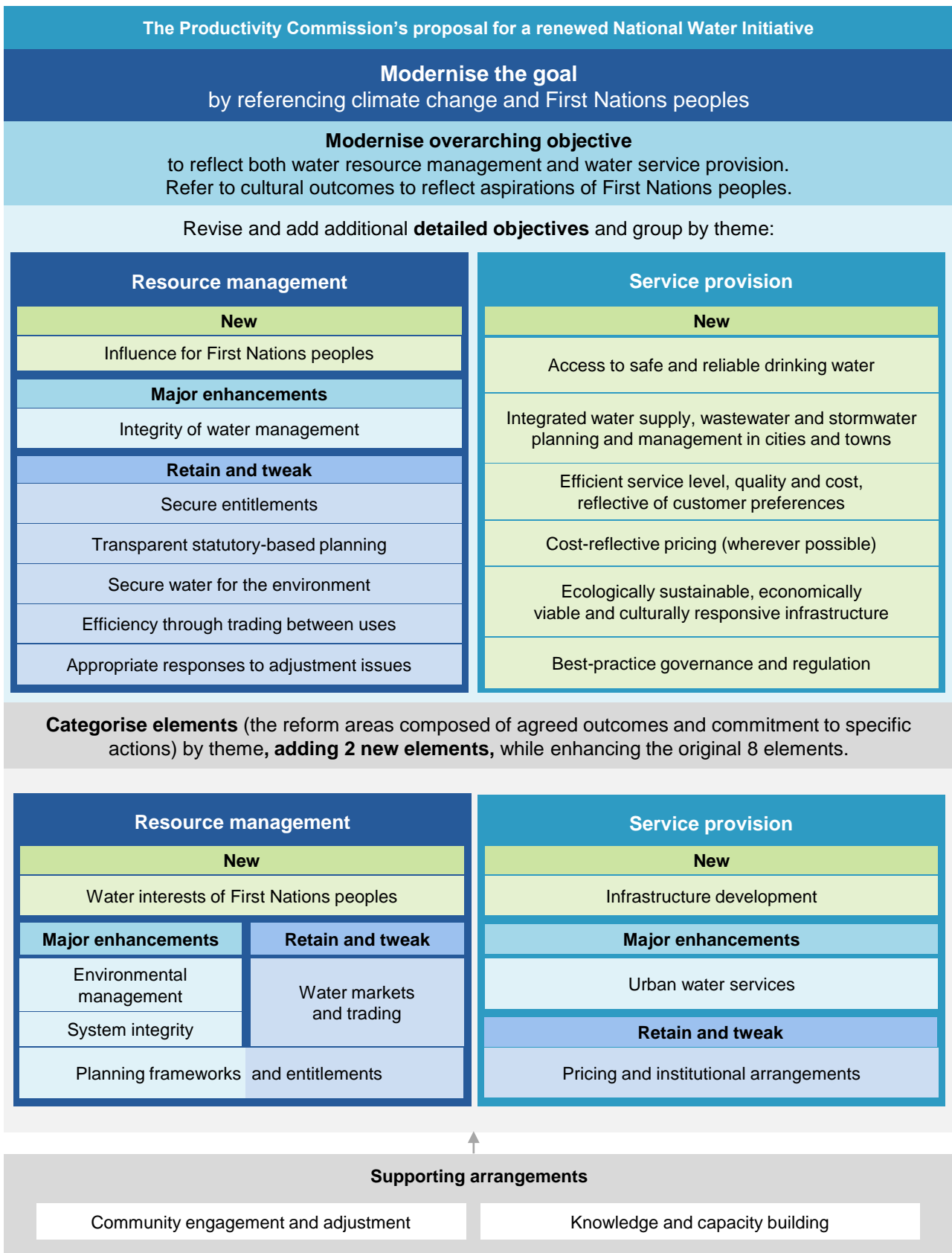
New and enhanced agreement elements

The objectives of the NWI describe 'what' will be achieved. The elements of the NWI outline 'how' the objectives will be achieved.

The existing NWI elements remain relevant and should be retained in substance, although they should be renewed to reflect the contemporary context, and added to, to support the new objectives.

Figure 2 also illustrates the Commission's recommendations for new elements for a renewed NWI, and how they relate to the proposed objectives.

Figure 2 – A renewed NWI needs to build on the 2004 agreement



Source: Adapted from PC (2021b, pp. 46, 49–50, 52–53, 55–56).

Effective governance arrangements

Australians' trust in governments' commitment to sustainable and equitable water management has been tested over the past decade. Erosion of governance institutions (particularly those specific to the NWI, such as the National Water Commission, which was formally abolished in 2015), poor water management in the face of drought, fires and floods and de-prioritisation of water reform have all resulted from a lack of nationally coherent policy and planning, in some cases resulting in poor outcomes for Australian communities.

Strengthened governance and institutional arrangements are a necessary condition to reinvigorate reform. The Commission proposes clear and transparent arrangements for governance of a renewed NWI, including:

- ongoing leadership by ministers through the water ministerial council
- rolling three-year action plans to ensure a commitment to continuous improvement and progress
- independent and transparent assessment of progress
- clear roles and responsibilities for oversight, management and renewal of the agreement, potentially via a reinvigorated National Water Reform Committee (NWRC) process, and specific responsibilities for the Commonwealth
- the incorporation of First Nations peoples' interests directly into the governance of the agreement
- greater coordination of joint work in areas of collective interest.

Chapter 1 of this report expands on the Commission's recommended governance arrangements for a renewed NWI. They are illustrated in figure 3.

An enhanced commitment to the participation of First Nations peoples in water management

The NWI does not adequately recognise the water interests of First Nations peoples

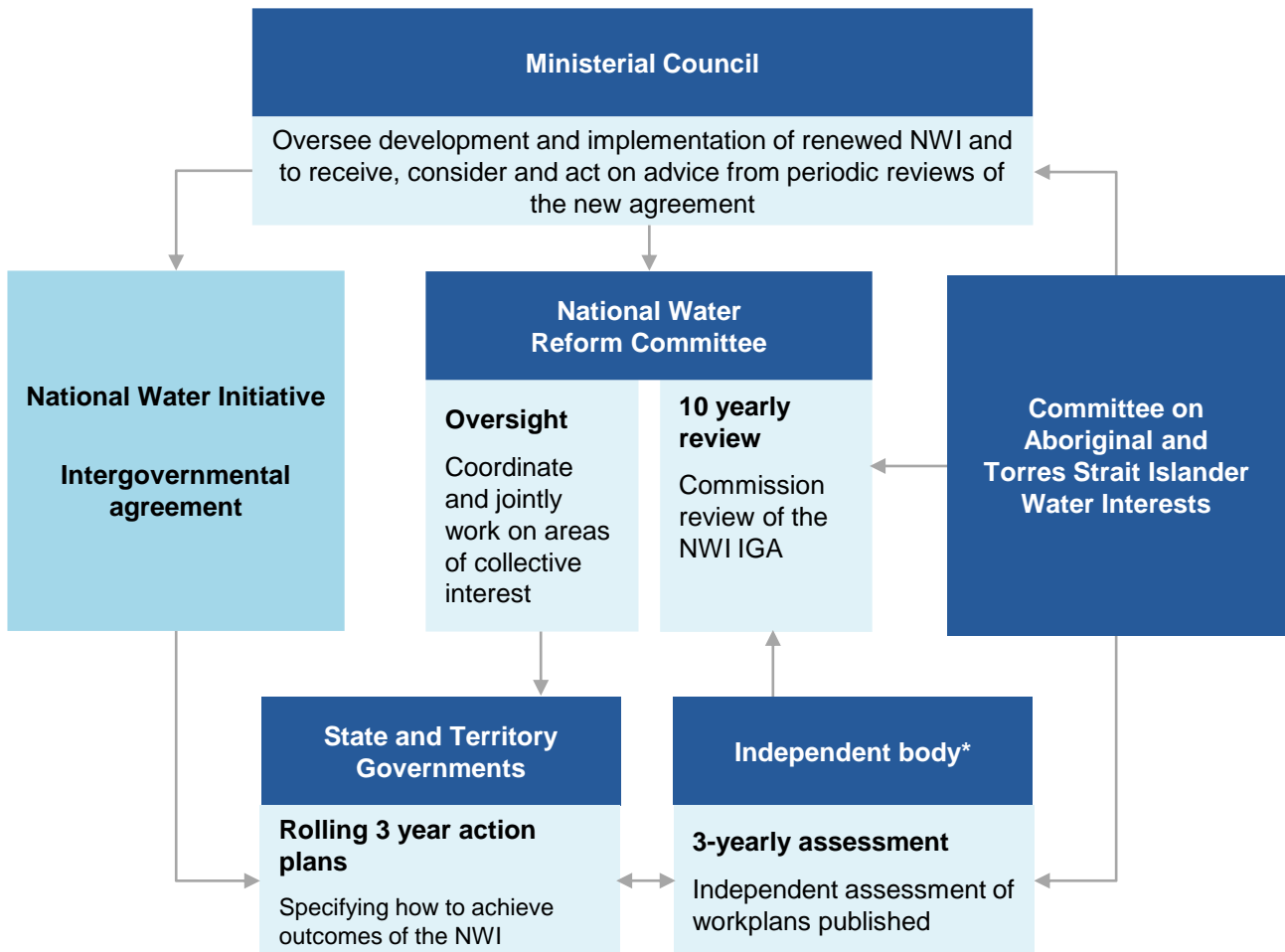
The NWI has limited focus on the water interests of First Nations Australians. Element 1 of the NWI (Water Access Entitlements and Planning Framework) focuses on access to water resources via planning processes for water allocations for narrowly defined 'cultural purposes' only, and for incorporation of social, spiritual and customary objectives – and strategies for achieving them – in water plans, wherever they can be developed.⁴ The NWI does not specifically recognise how water access contributes to achievement of First Nations peoples' economic objectives.

The Commission's 2021 report noted the NWI's shortcomings and pointed out that even with this lack of ambition, 17 years later the NWI actions had not been met (PC 2021a, pp. 42–44). In 2020 governments signed the National Agreement on Closing the Gap, committing to implementing its four priority reforms, including reform one – formal partnerships and shared decision-making. Despite this, engagement with First Nations peoples by governments continues to be criticised as a box ticking exercise, characterised by short notice and lack of information which makes meaningful involvement in water planning and management decision-making processes difficult. As the Dharriwaa Elders' Group stated:

Too often, the attitude is that if we can't meet their timeframes and paradigms our solutions are not considered (sub. 47, p. 3).

⁴ NWI paragraph 52.

Figure 3 – Renewed NWI governance arrangements



*This function is currently performed by the Commission under the *Water Act 2007* (Cth).

Source: Adapted from PC (2021b, pp. 59–66).

Engagement is steadily improving, but there is still much to do

That said, all jurisdictions are planning, or are in the process of implementing, initiatives that better identify cultural outcomes in water plans and are taking actions to deliver on First Nations social, spiritual and customary objectives. Some are more progressed than others with implementation, in partnership with First Nations peoples.

The Commission reiterates its 2021 renewal advice 3.1, 9.1 and 9.2 that First Nations peoples’ interests in water should be elevated to be part of the overarching goal of a renewed NWI, and interests be addressed through a dedicated objective and element.

The Commission supported the establishment of a Committee on Aboriginal and Torres Strait Islander Water Interests (CAWI) in 2020 to guide and advise government on these specific NWI renewal issues. The Commission understands that CAWI is closely involved in negotiations to renew the NWI, including drafting of a renewed objective, and has regular discussions with the Australian and jurisdictional water ministers and the NWRC. Some jurisdictions have commented that drafting of First Nations content for the new agreement has significantly progressed because of CAWI’s clear focus and commitment over the past three years. In addition, several inquiry participants supported CAWI’s continued advisory role in NWI renewal.

CAWI has published an Insights Paper (CAWI 2023a) outlining its ambition for First Nations peoples' water interests, and the Committee continues to build its reputation and profile as a strategic and influential First Nations voice on water issues.

The Commission supports CAWI's continuing involvement in the negotiations to develop a renewed NWI and as part of the ongoing water reform governance architecture (figure 3).

First Nations peoples' water ownership

On the issue of sourcing water for First Nations peoples, the Commission reiterates its 2021 renewal advice 9.3. Where agreement is reached between state and territory governments and Traditional Owners that consumptive access to water is an effective way to support the economic development of First Nations communities, access is provided by:

- sourcing water within existing water entitlement frameworks
- ensuring adequate supporting arrangements (such as training and business development) are in place to enable First Nations communities to maximise the value of the resource for their needs and uses
- programs designed with First Nations communities.

The Commission recognises that in relation to reissuing this renewal advice, little progress has been made by governments to increase First Nations peoples' water ownership despite policy commitments and (some) increased funding. The Commission also recognises that water can be a driver of economic development through holding water entitlements for consumptive purposes, or to underpin health of Country.

Chapter 2 of this report discusses these various issues in more detail, and also assesses jurisdictions' progress against the First Nations elements of the 2004 NWI.

Water security in a changing climate

Australia is the world's driest inhabited continent, and a changing climate will reduce the reliability of water supply and increase the unpredictability and frequency of extreme weather events (BOM 2024d). In light of these issues, governments and water planners need to take proactive steps to address future water security, including water quality for Australia. Chapter 3 discusses these issues, which are also summarised below.

Addressing water security requires engaging with risk

There is no common definition of water security. Definitions are typically explained as broad goals such as referring to achieving reliable access to an adequate quantity and quality of water for a range of purposes (see for example UN Water 2013, p. 1). Whilst aspirational definitions are important to ensure ambitious directions are set, a practical, working definition of water security for planning purposes needs to articulate specific outcomes, and the risks that make achieving those outcomes difficult or costly.

To better incorporate water security within a renewed NWI, jurisdictions should agree a shared understanding or common definition of water security that sets out what achieving water security in Australia looks like (recommendation 3.1).

The NWI has many tools to help water planners address water security ...

In a drying and warming climate characterised by increasing uncertainty, the trade-offs between different water uses are becoming starker. In this situation, adhering to the fundamentals of the NWI is important to help address planning for water security. NWI-consistent statutory entitlements and water allocation plans, based on up-to-date science and effective community engagement, help to ensure these trade-offs and values are clearly

understood by all stakeholders (including by communicating the same information, and its relevance, to all parties), and addressed when making water planning decisions. NWI-consistent trading rules allow water to be moved to its highest value use. And statutory water protections for the environment and other uses can support long-term intergenerational equity rather than a focus solely on today's water needs.

... but it can be further enhanced

The NWI focuses on managing the risks associated with drought and overallocation. This partly reflects that it was negotiated in 2004 during the Millennium Drought, which severely affected the southeast and southwest of the country, urban and rural alike. It was also a period where in some jurisdictions, the first tranche of statutory water sharing plans to address overallocation were being negotiated with rural water users.

But despite the focus on drought in the NWI – which was further enhanced in 2017 in the form of a specific climate change and extreme events module – significant management shortcomings exist around the country. This is evidenced by inadequate water plans, compliance failures and incomplete water recoveries, which, during drought, put extreme pressure on landscapes and communities (PC 2021b, p. 33).

The Commission's 2021 renewal advice 3.3 and 3.4 said that water plans should include provisions to deal with water scarcity caused by drought, including priorities for water sharing and clear triggers to deal with extreme drought.

While significant progress has been made on modelling and projecting the impacts of climate change on water availability, there is a need for jurisdictions to expand and improve how they incorporate the results of these efforts into water plans. The Commission reiterates its renewal advice 6.2 from 2021 that water plans:

- consider likely changes in water availability due to climate change
- include clear processes and triggers for rebalancing between environmental and consumptive use
- include clear provisions for allocating the risks associated with climate uncertainty.

Since 2021, an increased frequency and higher unpredictability of extreme events (BOM 2024d), including flooding associated with storm weather and cyclones suggests that specific attention is warranted to address risks to water security – including water quality – from flooding, storms and bushfires, in addition to drought. Jurisdictions should consider all forms of extreme weather events in implementing the Commission's renewal advice (recommendation 3.2).

Water for net zero

The transition to net zero carbon emissions will impact water usage across Australia. The United Nations Expert Group on Water and Climate Change presented preliminary figures to COP28 in November 2023, indicating that by 2030 clean energy mitigation measures alone are estimated to require 900 teralitres of fresh water globally per year (UN Water Expert Group on Water and Climate Change 2023, p. 1). For comparison, global freshwater consumptive demand by agriculture, industry and domestic use in 2014 was 4000 teralitres (IGBP 2015). However, little attention is currently being paid to this aspect of Australia's climate change response.

A range of zero-emission technologies for energy generation exist with more becoming viable as technology improves. All possible solutions have water demands, some more than others (UN Water Expert Group on Water and Climate Change 2023). These demands are likely to become significant as Australia's energy system transitions to new sources. But not all climate change responses or mitigation will cost water – some measures to reduce emissions will also save water.

Attention needs to be paid to the water planning and modelling aspect of climate change management to ensure Australia will have sufficient water to achieve its net zero transition (recommendation 3.3).

Transparency and openness to consider all options will underpin value for money for water users

Investing in new, climate-resilient water infrastructure is not the only driver of pressure on retail water prices. Communities across Australia will also need to invest, for example, in maintaining and upgrading ageing water infrastructure. Estimates suggest nationwide capital expenditure on water service infrastructure is likely to double to over \$10 billion annually by 2027 (WSAA, sub. 15, p. 3).

This means that efficient investment, informed by rigorous benefit cost analysis, with transparent assessment of costs, benefits and risks under different scenarios, remains important. But where investment decisions in water infrastructure continue to be characterised by a lack of benefit cost analysis, achieving desired outcomes incurs higher than necessary costs. Government subsidies for water infrastructure projects are typically inconsistent with cost recovery principles under the NWI.

State and territory governments have developed water strategies to take a longer-term view to addressing anticipated challenges to water management, including taking an integrated approach to ensuring urban water security. This also requires coordination with broader urban planning to address land use for climate change response such as urban green and blue spaces that also require water. The development of water strategies is important to adapt to climate change and other pressures, and provides an opportunity to identify cost effective options for meeting water security objectives.

Under future climate scenarios and increased uncertainty, that may mean decreased reliability of rainfall-dependent supply measures such as dams and groundwater systems, Australian governments need to consider a diversified portfolio of water supply options. Policy bans should be avoided. They constrain options, potentially resulting in outcomes that are not lowest cost or most efficient. All potential supply and demand options must be considered at different scales and combinations, including desalination, purified recycled water, managed aquifer recharge, scarcity pricing, water conservation and rural-urban trade.

The 2024 assessment of progress against the 2004 NWI

A general overview of the Commission's assessment of progress by jurisdictions against the objectives, elements and actions of the 2004 NWI follows. The detailed assessment is contained in the chapters of this report (chapters 2, 4-11, and appendix B contains the assessment framework).

General summary of assessment

Jurisdictions are making progress in some areas

The following are aspects of the NWI against which jurisdictions continue to make gains, improving their practices and better conforming to the objectives of the NWI.

- Water planning processes and instruments are continuing to be developed and revised. Most jurisdictions are incorporating more sophisticated knowledge and are including or developing climate change projections.
- Some progress has been made in water security planning. New South Wales and Victoria have created comprehensive water security plans for some regions, guided by detailed climate and water demand modelling.
- The amount of engagement with First Nations peoples in the water planning process is increasing, although the quality of that engagement is variable.
- Water plans in general include more detailed and measurable environmental and public benefit outcomes.

- Data, accounting, monitoring and reporting of water is becoming increasingly more sophisticated and user-friendly (e.g., automated reporting via telemetry), with many new tools, dashboards and reports being released that can assist water users to make more efficient decisions.
- There has been significant improvement in compliance and enforcement activities, with most jurisdictions now closely aligned with the National Compliance Framework.
- Most jurisdictions have taken action to build water resource management capacity, and New South Wales and Queensland are undertaking initiatives to support skills and training at water utilities.

But key problems identified by the Commission in 2021 remain unaddressed

Several jurisdictions still do not meet some – often fundamental – objectives of the NWI.

- Statutory, long-term, water entitlements in Western Australia and the Northern Territory have not been legislated for. This reduces confidence, increases transaction costs and investment risk, threatens environmental outcomes and risks political interference in decision making.
- Several jurisdictions do not have a clear, legislatively defined risk assignment framework to guide potential future reductions in the availability of water for consumptive use. This negatively affects investor confidence and risks inequitable outcomes if the cost of reallocation due to climate change is borne by taxpayers, and not water users.
- Queensland continues to allow exemptions from water entitlements for associated water for mining and petroleum industries, which can undermine the integrity of the entitlements system, adversely affect environmental outcomes and reduces transparency.
- In Western Australia, Queensland and the Northern Territory, independent economic regulators do not have the power to set prices. Opaque cross subsidies exist where beneficiaries of water use do not bear the costs. Where price signals do not reflect full costs, investment decisions may be distorted towards higher water consumption than would be efficient or ecologically sustainable (finding 6.1).
- In some remote communities, access to quality water supplies in a manner consistent with the *Australian drinking water guidelines* remains problematic, particularly as a result of chemical health exceedances (finding 9.1). Other remote and regional areas experience aesthetic concerns, associated with the acceptability of water to the consumer in terms of colour, taste and odour. Exceeding acceptability standards may lead to consumers seeking alternative sources that are less safe (WHO 2017, p. 28).
- There remains limited national coordination and prioritisation of knowledge and capacity building activities to support water management.
- Monitoring and evaluation of community assistance programs is still lacking. Without this, the effectiveness of assistance programs to address social impacts, for example, in agricultural areas in which voluntary water purchase programs might occur, is difficult to assess for both policy makers and those likely to be affected by those policies.

And in other areas there remains more to be done

- First Nations peoples are under-represented in water planning and management decision-making processes, and engagement by governments is often perceived as not meaningful. Governments are not meeting their commitments made under the National Agreement on Closing the Gap, including establishing formal partnerships and sharing decision-making. First Nations peoples' access to water, including ownership, remains low according to available data. Monitoring, reporting and evaluation of First Nations peoples' engagement outcomes and water ownership is limited.
 - With respect to meaningful engagement, the Commission heard that government agencies are often well intentioned in making their many requests to engage with First Nations groups and peoples, but

often do not co-ordinate their activities. This can cause duplication and consultation fatigue amongst First Nations peoples and groups.

- There is limited and inconsistent reporting, monitoring and transparent accounting for environmental water outcomes in most jurisdictions (finding 7.2). Where it does occur, reporting often focuses on the amount of water delivered, rather than the environmental outcomes that were sought or achieved (e.g., a wetland inundated to facilitate a bird or fish breeding event).
- Progress in rolling out AS4747 compliant non-urban water metering, which when complete, would facilitate accurate measurement of water supply and demand – a fundamental requirement of good water management – is many years behind schedule (finding 8.1). Governments' lack of practical implementation planning for this meter rollout is eroding trust by water users in water regulators and in other metered users.
- There remains room for improvement in the comprehensiveness, accessibility and ease of use of water registers (finding 5.1).
- While some have noted improvements in community engagement, many participants remain dissatisfied with jurisdictions' efforts to include the wider community in decision-making processes.

Comments on jurisdictions

The Commission makes the following observations on progress made by jurisdictions since our last inquiry, and areas for continued policy focus relating to the 2004 NWI commitments. These should be read in conjunction with the general issues identified above, and our findings, recommendations, and NWI renewal advice.

New South Wales

In contrast to the last assessment period, which was characterised by drought in much of New South Wales, the current period has seen extreme flood events along the New South Wales coast and parts of the Murray–Darling Basin.

The NSW Government has continued to progress a range of water policy reform commitments. It released a 20-year, state-wide water strategy, the Greater Sydney and Lower Hunter water security plans, and nine regional water strategies. It has developed new approaches to climate modelling to support water allocation and security planning, as well as drought preparedness and emergency response (in line with the Commission's 2021 report recommendations) and is relatively advanced in this area compared to many other jurisdictions.

The NSW Government has amended its legislative framework for water management to improve licencing of floodplain harvesting. Compliance and enforcement efforts have been enhanced, and the 3Cs (customers, costs and credibility) framework was developed to increase efficiency of water service providers and address key challenges like climate change and a growing population.

In the next three-year NWI assessment period, New South Wales should:

- obtain accreditation for its remaining eight water resource plans in the Murray–Darling Basin
- complete its planned rollouts of floodplain harvesting licences and AS4747 metering
- establish accurate, numeric long-term average annual extraction limits in water sharing plans for unregulated river systems
- continue its efforts to establish an agreement with the ACT Government to enable cross border trade between the two jurisdictions.

Victoria

Like New South Wales and South Australia, parts of Victoria, especially along the Murray River and its tributaries, experienced major to extreme flood events during this assessment period.

Water management in Victoria continues to be guided by the 2016 *Water for Victoria* policy statement. Over the past three years, the Victorian Government has completed the *Water is life: Traditional Owner access to water roadmap* to increase Traditional Owners' participation in water planning and decision-making and provide more water entitlements. It has also completed several strategic planning instruments to guide long-term water security and supply, climate change adaptation and protection of waterways – these include the *Central and Gippsland region sustainable water strategy*, the *Greater Melbourne urban water and system strategy: water for life*, the *Water cycle climate change adaptation action plan 2022–26*, the *Groundwater management 2030* roadmap and the fourth iteration of community/government partnered *Regional catchment strategies*.

The Victorian Government has established a 'place of take approvals' framework in declared (unbundled) water systems to make water users' approvals to take water more consistent and clarify river diverters' entitlements to have water delivered during river rationing or shortfall events. It has also approved a new rule for efficient management of Goulburn to Murray inter-valley trade and improved the Victorian Water Register to enhance water market information and transaction efficiency.

In the next three-year NWI assessment period, Victoria should:

- clearly establish a specific risk assignment framework
- keep all options on the table in managing urban water supplies, particularly in removing explicit or implicit barriers to the use of purified recycled water for drinking water supplies, and to urban-rural water trade.

Queensland

Whereas drought conditions prevailed in much of Queensland in the last assessment period, above average rainfall and several major flooding events in many regions have characterised this period. Reflecting this, the Queensland Government has focussed on managing these extreme events, and the subsequent recovery effort.

The Queensland Government has completed several strategic planning instruments for water security and supply, including the *Queensland water strategy*, the *Queensland water planning science plan 2020–2030* and the *Water resource management regulatory strategy 2022–24*. Infrastructure investment has included the Rookwood Weir being completed. Two First Nations water reserves on Minjerribah (North Stradbroke Island) have been established.

The Queensland Government launched a non-urban water measurement policy in 2022 (supported by legislation in 2023) to strengthen measurement, metering and reporting of non-urban water take (including the measurement of overland flow water take). It has also launched a WaterIQ dashboard to enhance water user information.

In the next three-year NWI assessment period, Queensland should:

- finalise and implement its First Nations Water Strategy
- progress its current program of approved water security infrastructure projects, focusing on cost effective investments
- continue its Urban Water Risk Assessment program to understand drinking water quality, water supply security and water and sewerage service delivery risks across remote and regional Queensland
- expand independent economic regulation for urban providers and replace capital grant funding for regional urban providers with transparent community service obligation payments.

Western Australia

Western Australian water policy is focused on adapting to increasing challenges of climate change. Prominent in the southwest region was the commencement of the *Gnangara groundwater allocation plan* which seeks to achieve a 10-year staged reduction in consumptive groundwater use. The WA Government is

proceeding with a third desalination plant at Alkimos – absent a publicly released benefit-cost analysis – to enhance water security for communities and industries in Perth and its surrounding areas.

Outside of the southwest region, the WA Government is in the process of licensing a greater proportion of water resources for domestic, agricultural and commercial use. Water planning is being extended, but many regions remain outside water allocation plan areas.

In December 2023, the WA Government withdrew a package of proposed water reform legislation that would have made water licensing and planning activities consistent with the NWI. As a result, Western Australia lacks statutory water entitlements and plans, and water planning in the state continues to be based on out-of-date, 110-year-old legislation.

In the next three-year NWI assessment period, Western Australia should:

- introduce NWI-consistent water legislation
- strengthen independent economic regulation frameworks to align water service pricing with cost recovery principles
- increase the transparency of information on prices, costs and subsidies for irrigation services.

South Australia

During this assessment period, parts of South Australia experienced above average rainfall, with major flood events for the River Murray and the Lower Lakes across 2022-23. Reflecting this, flood response management and recovery has been a priority for the SA Government.

The SA Government has implemented a range of planning instruments for long-term water security and supply, including the state *Water security statement 2022*, the *Urban water directions statement*, the *Barossa water security strategy* and completed *Annual water security updates* in 2023 and 2024.

The SA Government has also enhanced its climate modelling and planning, completing a guide to climate projections for risk assessment and planning, and the *Climate change science and knowledge plan for South Australia 2022*. It has also updated its compliance and penalty regime to enable the use of funds generated from water penalties to purchase water to offset the impact of water theft.

In the next three-year NWI assessment period, South Australia should:

- continue water security planning and investment activities in line with its *Water security statement*
- progress unbundling of remaining water entitlements, where feasible
- review grandfathering provisions to encourage greater uptake of the AS4747 metering standard.

Tasmania

Tasmania has relatively abundant water resources relative to population and land area (12% of Australia's freshwater in less than 1% of the total land area of Australia (NRE Tas 2021, p. 1)), and its water resources are under-developed compared to the Murray–Darling Basin. Over the last three years Tasmania did not experience significant flooding.

The Tasmanian Government has improved aspects of its water planning and management framework by commencing implementation of its *2021 Rural water use strategy* (RWUS) in consultation with its Rural Water Roundtable participants – water managers, environmental managers and industry peak bodies. Key RWUS achievements include a new Groundwater Risk Assessment Tool to support groundwater management decisions, completing phase one of incorporating contemporary climate change projections into Tasmania's water management framework, and setting up a Water Managers and Data Custodians Working Group to improve collaboration and sharing of water resource, river health and water quality information.

Further reforms planned or ongoing include a new state-wide water quality monitoring program, and reviews of the Natural Resources and Environment Department Tasmania's surface water and groundwater monitoring networks and the state's water use accountability framework.

In the next three-year NWI assessment period, Tasmania should:

- address under-pricing by the state-wide water service provider
- increase transparency of information on prices, costs and subsidies for irrigation services
- publicly report compliance and enforcement activities and implement actions from the review of its water accountability framework under the RWUS
- specify cultural and spiritual outcomes for First Nations communities in water plans
- specify and implement risk sharing provisions between licence holders and government, based on the NWI risk assignment framework.

Northern Territory

The Northern Territory's water resources are under-developed outside Darwin and its surrounds. Over the last decade the NT Government has worked to extend water planning and licensing to cover more of its water resources, and it is in the early stages of allocating water for domestic, agricultural and commercial use.

The NT Government has completed its first *Territory water plan*, which commits to a range of measures to enhance NWI-consistent water management. Legislative reforms have incorporated the minerals and petroleum industries and the Darwin rural area into the water licensing framework. The NT Government made an external appointment to the position of Controller of Water Resources to ensure that water allocation planning is separate from decisions about individual licensing and compliance. The NT Government has also enhanced its compliance and monitoring arrangements and started public reporting on these activities. The Power and Water Corporation has improved the detail of water quality data for the regions and communities it services.

The Commission assessed some processes for water planning in the Northern Territory as not NWI compliant. In particular, that water allocation plans are not binding on decision makers and that there is an absence of statutory protection for water allocations for the environment.

In the next three-year NWI assessment period, the Northern Territory should:

- progress its planned safe drinking water legislation and continue to improve water quality in remote communities
- strengthen the voice of First Nations peoples in water management and enhance access to water for Aboriginal peoples within its Strategic Aboriginal Water Reserves
- more clearly specify environmental and cultural outcomes in its water allocation plans, ensuring these outcomes are informed by high quality engagement and science.

Australian Capital Territory

The Australian Capital Territory (ACT) lies wholly within the Murray–Darling Basin. The primary policy instruments for managing water resources within the ACT are the ACT *Water Resources Act 2007*, the ACT's *Water resource plan* developed as a requirement of the Murray–Darling Basin Plan, and the ACT *water strategy 2014–44: striking the balance*.

The ACT Government has commenced a process of reviewing components of its water policy and legislative framework to ensure they are contemporary and encourage continuous improvement. The most significant outcomes from these efforts to date are:

- completion of a comprehensive review of the ACT water sector

- establishment of the Office of Water to lead water policy and planning in the ACT.

At an operational level, the ACT Government has put in place arrangements to recover sufficient water entitlements to meet its sustainable diversion limit set under the Murray–Darling Basin Plan.

In the next three-year NWI assessment period, the ACT should continue its efforts to establish an agreement with the NSW Government to enable cross border trade between the two jurisdictions.

Australian Government

The Australian Government is leading negotiations for a renewed NWI with the states and territories.

The Australian Government has implemented legislative reform with the passage of the *Water Amendment (Restoring Our Rivers) Act 2023* (Cth) to, amongst other things, reset Basin Plan implementation timelines and offer a greater range of water recovery options. It has also strengthened provisions in the *Water Act 2007* (Cth) to better support and fund First Nations peoples' role in water management and their ownership of water entitlements.

The Australian Government has pursued water market reforms to enhance transparency and confidence in market operations. It prepared and is implementing the Water Market Reform Roadmap in response to the findings and recommendations of the Australian Competition and Consumer Commission's 2021 Murray–Darling Basin water markets inquiry, and released the *Australian Government strategic water purchasing framework*. It also broadened the scope of the *National Water Grid investment framework*. While the investment criteria are clear, the way in which they are collectively assessed (and weighed, in arriving at a final decision) is not.

In the next three-year NWI assessment period, the Australian Government should:

- articulate its strategic vision for national water policy
- coordinate across jurisdictions on water policy matters of shared interest, and support collaborative innovation and knowledge sharing efforts through the NWRC to facilitate best practice water management
- ensure that new or refurbished water infrastructure projects are compliant with the NWI as a condition of Australian Government funding (and pre-conditioned, to encourage adherence to commitments agreed in a renewed NWI)
- continue its policy and investment efforts to rebalance already overallocated surface water and groundwater systems and avoid overallocation in 'at risk' systems.

Recommendations and findings

Water security in a changing climate



Recommendation 3.1

Incorporate a shared understanding of water security priorities in the renewed NWI

Parties should develop a shared understanding or common definition of water security that includes setting out what outcomes are to be achieved, recognising the risks to water security will differ between jurisdictions and within jurisdictions – which will be a matter for each party to transparently assess and communicate.



Recommendation 3.2

Consider all extreme climate events in water planning

Over the past decade, climate change has been associated with an increase in extreme weather events, which disrupt and damage water supply and infrastructure. Where the NWI Climate Change and Extreme Events Module focused on the risks from drought, greater focus should also be given to other events, such as flooding, storm, and bushfires.

In implementing the Commission's renewal advice 6.2 regarding water planning for climate change (including that historical climate outcomes may not be indicative of future outcomes), governments should adopt the principles set out in the National Water Reform report 2021, focusing on this broader range of events.



Recommendation 3.3

Water for net zero

All Australian governments should collectively model and plan for changed water demand as a result of necessary climate change mitigation measures. All solutions will have water demands, in terms of both quality and quantity that need to be estimated and planned for.

Findings should be integrated into both net zero strategies and sustainable water strategies to ensure sufficient water is available to enable Australia's transition to net zero emissions.

Water markets and trading



Finding 5.1

Further improvements can be made to trade registers to provide necessary information to market participants

Most state and territory governments have implemented water registers that comply with the NWI. But further improvements, such as ensuring that water registers include current entitlement and allocation information, real time (or recent) trade data, and that registers are freely accessible by the public, and ideally, easy to search, would increase the efficacy of registers in supporting trade in water entitlements.

Best practice water pricing and institutional arrangements



Finding 6.1

Some governments have moved away from NWI commitments to deliver cost-reflective and consumption-based pricing

Some jurisdictions have maintained or strengthened pricing regulation to focus on the long-term interests of end users, such as the Victorian Essential Services Commission's application of the PREMO water pricing framework (performance, risk, engagement, management, outcomes) and the New South Wales Independent Pricing and Regulatory Tribunal adopting a 3C's approach (customers, costs, credibility).

In some other jurisdictions, NWI pricing arrangements have been significantly eroded or remain well short of best practice. Jurisdictions that lacked independent economic regulation in 2021 have not taken steps to improve water pricing regulation. Further, a number of jurisdictions have weakened independent regulation through:

- applying discounts or price caps to independently determined consumption-based prices.
- issuing ministerial directions that affect the decision-making processes of independent regulators.
- not using water price monitoring or review powers to determine if greater price regulation is needed.



Finding 6.2

Some government decision making for major water infrastructure is not fully compliant with the NWI

The NWI requires governments to be satisfied that infrastructure investments are economically viable and ecologically sustainable. To be consistent with these principles, investments should be rigorously assessed, comparing all options available to meet identified needs. Ideally, this would also involve a transparent, independent assessment of proposals.

This is currently not being achieved by all parties to the NWI, and the commitment to these principles appears to be waning:

- A significant proportion of major infrastructure developments funded by governments since 2021 have not been subjected to a transparent assessment of the costs and benefits of the proposal, or to independent scrutiny of business cases.
- Further, a number of successfully funded investment projects – including those funded under the Australian Government’s National Water Grid program – were funded even where the assessed costs of the project outweighed the estimated benefits to the community.

Integrated management of water for environmental and other public benefit outcomes



Finding 7.1

Environmental and other public benefit outcomes are inconsistently specified

There remains a lack of specificity about environmental outcomes defined in water plans, their level of detail and indicators.

Other public benefit outcomes continue to be undefined or defined only at a high level. While the achievement of environmental outcomes can also contribute to other public benefit outcomes, such as recreational opportunities, amenity benefits and public health, the Commission has found no clear long-term performance indicators specified linking these outcomes.



Finding 7.2

Reporting on environmental outcomes is overall inadequate, particularly for planned environmental water

Jurisdictions generally report on how much environmental water was delivered, and there is reasonable reporting of outcomes by some environmental water holders. However, there is very little reporting on:

- what both held and planned environmental water achieved in terms of outcomes
- the counterfactual – that is, what would have happened if the water had not been delivered, and,
- whether the environmental water allocations are sufficient to achieve environmental outcomes specified in water plans.

In many jurisdictions it remains unclear how reporting arrangements for environmental water subsequently feed back into their water planning process and support adaptive management.



Finding 7.3

Independent review of environmental outcomes is absent in many jurisdictions

There is no consistent basis for independent audit of whether environmental and public benefit outcomes from environmental water have been achieved, the adequacy of water provision for these objectives, or the performance of environmental water managers. While most jurisdictions have built-in reviews of their water management plans, these are not always undertaken in a timely manner or by an independent body.

Water resource accounting



Finding 8.1

Jurisdictions are not projected to meet their metering installation commitments

Most states or territories are not on track to meet their commitment to have all new and replacement meters AS4747 compliant and have all water entitlements metered by July 2025. This undermines the ability of states to conduct proper measurement of watering limits and increases the risk of unreported water use and overextraction.

The private benefits for water users to upgrade their water meters to AS4747 standard are low and therefore not a sufficient incentive to upgrade.



Recommendation 8.1 Improving the rollout of AS4747 meters

To better allow water users and the public to benefit from the improved AS4747 standard, jurisdictions should take steps to accelerate their rollouts.

Jurisdictions should:

- report annually on non-urban water users' compliance with the AS4747 metering standards
- actively engage with non-urban water users to improve understanding of their metering compliance requirements
- set a higher bar when approving interim standard or grandfathered water meters
- for both interim and grandfathered meters, water users should be required to actively prove their meter is accurate to within $\pm 5\%$ as is the requirement in Victoria, New South Wales and the Australian Capital Territory.

Urban water reform



Finding 9.1 Some regional and remote areas still do not have access to safe drinking water supply

There continue to be drinking water quality issues in some remote areas of Australia caused by exceedances in the chemical health standards outlined in the *Australian Drinking Water Guidelines*. In addition, exceedances of aesthetic parameters such as colour, palatability have led to acceptability issues. This is leading to a loss of confidence in the water supply amongst the community in these areas.



Finding 9.2 There continues to be a lack of consistency and transparency in relation to the publication of drinking water quality data

The detail, consistency and availability of drinking water quality reports continues to vary for regional and remote areas.

There have been improvements to the publication of data across all *Australian Drinking Water Guidelines* standards for the regions and communities serviced by Power and Water Corporation in the Northern Territory. Also, from July 2024 water service providers with under 10,000 connections will now report on the water quality risk management guidelines used as part of the National Performance Report.

Further development is required to centralise the reporting of drinking water quality indicators, such as percentage of the population where microbiological compliance was achieved, percentage of the population where chemical compliance is met, and the number of boil water alerts issued.

NWI renewal advice

This section contains the Commission's advice on what should be included in a renewed NWI. It is divided into the Commission's recommended elements of a renewed NWI (figure 2).

Most of this advice is drawn directly from the National Water Reform report 2021 and has not substantially changed because, as this inquiry demonstrates, it remains relevant. This section also includes new and revised advice from this inquiry.

NWI renewal: a refreshed intent

NWI renewal advice 3.1: A modernised goal

UPDATED IN 2024

The overarching goal of the National Water Initiative remains sound but should be modernised through reference to mitigation of and adaptation to climate change and recognition of the importance of water in the lives of First Nations peoples. Suggested wording follows:

The Parties commit to this renewed National Water Initiative in recognition of the continuing national imperative to increase the productivity and efficiency of Australia's water use, to service the changing needs of rural, urban and First Nations communities and to ensure the health of river and groundwater systems and their surrounding landscapes whilst adapting to a changing climate.

In committing to this agreement, the parties recognise First Nations peoples' reverence and ongoing cultural responsibility for rivers and groundwater systems and their desire to participate in all significant processes and decisions informed by this Initiative.

NWI renewal advice 3.2: Modernised overarching objectives

UPDATED IN 2024

The National Water Initiative has a strong focus on water resource management. A renewed agreement should give greater emphasis to water service provision, and this should be reflected in the overarching objective. The objective should also include reference to cultural outcomes to recognise the aspirations of First Nations peoples, where cultural outcomes may be inclusive of economic development outcomes. Suggested wording follows.

The overarching objectives of the Parties in implementing this agreement are to:

- optimise economic, environmental, social and First Nations peoples' cultural outcomes through best practice management of Australia's water resources. In the process, this will provide certainty for investment, water users, the environment and First Nations peoples
- enable entitlement holders, communities and the environment to contend with climate variability and adapt to a changing climate
- ensure effective, efficient and equitable provision of water services that meet the needs of customers and communities in a changing climate.

NWI renewal advice 3.3: Modernised objectives

UPDATED IN 2024

Full implementation of this agreement will result in:

A — a nationally consistent planning, market and regulatory based system of **managing surface and groundwater resources** for rural, urban and remote use that:

- optimises economic, environmental, social and cultural outcomes
- enables entitlement holders, communities and the environment to contend with climate variability and adapt to a changing climate.

by achieving the following:

1. clear, nationally consistent statutory systems for secure water access entitlements
2. transparent, statutory based water planning that:
 - (a) is risk based, matching the level of management with the level of water extraction and complexity in a system
 - (b) includes all sources of water, recognises connectivity between surface and groundwater and takes into account water quality
 - (c) clearly identifies the agreed environmental, cultural and other public benefit outcomes to be met through the water planning process
 - (d) includes agreed processes for water sharing and management during periods of water scarcity
 - (e) includes clear pathways to an agreed and improved balance between the environment and consumptive water use in overallocated or overused systems

NWI renewal advice 3.3: Modernised objectives

UPDATED IN 2024

- (f) includes clear triggers and processes for reviewing the balance between water for the environment and consumptive use, such as in response to the effects of climate change
- 3. statutory water provisions for the environment which are integrated with complementary natural resource management to achieve agreed environmental outcomes and, where this does not compromise environmental outcomes, managed to also achieve cultural and social benefits
- 4. effective and enduring pathways to enable First Nations peoples to strengthen their influence in water planning and natural resource management that affect Country and access to water consistent with the 2020 National Agreement on Closing the Gap
- 5. the capacity to trade water between uses to promote efficiency within the physical, ecological and social constraints of water systems in an open, transparent water market with a level of regulation that is proportional to the maturity of market development
- 6. a fit-for-purpose system of water metering, measurement and accounting, coupled with effective compliance, that promotes water user and community confidence in the integrity of water management and water markets
- 7. clarity on the assignment of risk arising from future changes in the availability of water for the consumptive pool and how future adjustment should be managed.

B — effective, efficient and equitable **provision of water services** that meets the needs of customers and communities in a changing climate by achieving the following:

- 1. access to safe and reliable drinking water, including in remote communities
- 2. clear objectives for the level and quality of water services which reflect customer preferences
- 3. in cities and towns:
 - (a) integrated planning and management of water supply, wastewater and stormwater services
 - (b) efficient water services that deliver outcomes, including urban amenity and liveability, in line with customer preferences and willingness to pay
- 4. cost-reflective pricing of water services (including water supply, wastewater disposal and stormwater management) wherever possible, with transparent funding support through community service obligation payments targeted at bridging the cost of providing safe and reliable drinking water and service affordability in regional and remote communities
- 5. institutional arrangements that
 - (a) ensure the separation of policy setting, service delivery and regulation with clear roles for each
 - (b) incentivise water service providers to be efficient and innovative, and to deliver services in ways that are cost-effective and in the interests of their customers
- 6. processes that ensure that water infrastructure developments and major refurbishments are ecologically sustainable, economically viable and culturally responsive.

NWI renewal advice 3.4: Overarching principles

UNCHANGED FROM 2021

In achieving the objectives outlined in previous advice, governments should agree to the following principles and seek to apply them across all key areas of water policy, planning and operations.

1. Capacity to contend with droughts, floods and shocks, and to adapt to a changing climate, is strong.
2. Regulation, governance and management are fit for purpose.
3. All decisions are based on the best available evidence and information.
4. Innovation and continuous improvement are encouraged, and adaptive management is required.
5. Communities are engaged effectively before decisions that impact them are made.
6. Communities are provided with sufficient information to enable effective engagement.

NWI renewal advice 3.5: Elements of a renewed agreement

UNCHANGED FROM 2021

The goal, objectives and principles should be delivered through the following elements:

Water resource management

1. Water access entitlements and planning frameworks
2. Water markets and trading
3. Environmental management
4. First Nations peoples' interests in water
5. System integrity

Water services provision

6. Pricing and institutional arrangements
7. Urban water services
8. Infrastructure development

Supporting arrangements

9. Community engagement, and adjustment
10. Knowledge, capacity and capability building

NWI renewal advice 3.6: An updated statement of interactions

UPDATED IN 2024

The current paragraph of the National Water Initiative covering interactions with other key initiatives needs to be brought up to date. Suggested wording follows:

Other initiatives with a significant water focus, subject to separate agreements by the Parties, include the *Water Act 2007* (Cth), the 2012 Murray–Darling Basin Plan, the Murray–Darling Basin Agreement and the 2020 National Agreement on Closing the Gap. Also relevant are the Australian Government’s commitments under the Paris Agreement, national and jurisdictional frameworks for emissions reduction, climate change mitigation and adaptation; and environmental planning laws. These play an important and complementary role in improving the management of water in Australia. Continued linkages to the National Water Quality Management Strategy will also complement achievement of the objectives of this agreement. And the agreement should be the major policy vehicle for pursuing the water-related goals endorsed as part of the United Nations 2030 Agenda for Sustainable Development.

Building in good governance for a renewed NWI

NWI renewal advice 4.1: Governance arrangements for a renewed NWI

UPDATED IN 2024

A strengthened governance architecture that transparently reflects the presence of national water policy leadership and ensures confidence in reform effort, needs to be included in a renewed agreement.

To that end:

- water ministers should convene periodically to oversee development of a renewed National Water Initiative, and to receive, consider and act upon advice that comes out of any periodic review of the new agreement
- the new agreement should clearly link desired outcomes to its objectives and limit prescriptive actions, instead setting out principles for best practice, and fit-for-purpose policy approaches to achieving outcomes
- each jurisdiction should commit to preparing publicly available three-year rolling action plans setting out how they aim to achieve the outcomes set out in the renewed agreement
- three-yearly assessment of the adequacy of these action plans should continue, with public reporting on jurisdictional progress against them, their adequacy in implementing the outcomes of the agreement, and the effectiveness of the agreement, as per the functions the Productivity Commission currently performs under the *Water Act 2007* (Cth)
- a requirement for a comprehensive review of national water policy every 10 years should be written into the agreement
- the National Water Reform Committee should provide transparent ongoing collective oversight of the agreement, initiating policy advice and guidance, if need arises, and commission the 10 yearly reviews of the agreement

NWI renewal advice 4.1: Governance arrangements for a renewed NWI

UPDATED IN 2024

- the National Water Reform Committee should commission joint projects in each action plan cycle on areas of mutual interest, to share learnings on best practice water management, enhance efficiencies and reduce duplication of effort
- the Australian Government should coordinate, via the National Water Reform Committee, the development of a monitoring, evaluation and reporting framework and plan for the new agreement.

Water resource management – a fit-for-purpose framework

NWI renewal advice 5.1: Fit-for-purpose water resource management

UNCHANGED FROM 2021

Embedding the concept of fit-for-purpose water resource management in a renewed National Water Initiative would support governments in thinking about the level of effort and resources to devote to the different facets of water resource management across different water systems and across time.

Water entitlements and planning

NWI renewal advice 6.1: Managing water use under the entitlements framework

UNCHANGED FROM 2021

In renegotiating the National Water Initiative, jurisdictions should recommit to the key outcomes and actions related to water access entitlements, which have been fundamental to the integrity of water management and a necessary prerequisite for water trading and markets. This includes ensuring that entitlements are statutory-based, that they provide a perpetual or an open-ended share of the consumptive pool, and that they are separate from land.

Entitlements and access rights frameworks should be fit for purpose – acknowledging that fixed-term or other types of entitlements may be appropriate in some relatively undeveloped systems. However, as systems are being developed, fully NWI-consistent entitlements frameworks should be put in place.

To improve on the entitlements and access rights framework, jurisdictions should:

- remove the special provision for minerals and petroleum industries in water access and planning arrangements to support better incorporation of these industries into water access entitlements frameworks that apply to other consumptive users
- establish a process to determine whether alternative water sources (including stormwater and recycled water) can be incorporated into water access entitlements frameworks, and the extent to which current management arrangements for alternative water sources create barriers to investment
- adopt a risk-based approach to managing significant interception activities under water access entitlements frameworks with the expectation that these activities would be fully incorporated into entitlements frameworks in at least all fully and overallocated systems. In developing systems, a risk-based approach would include fit-for-purpose measurement and accounting of interception activities, and monitoring of the ongoing efficacy of the use of interim measures.

NWI renewal advice 6.2: Water planning

UPDATED IN 2024

In renegotiating the National Water Initiative (NWI), state and territory governments should ensure that water planning provisions are maintained and enhanced.

Priorities to improve water planning are to:

- better specify measurable and well-informed cultural and environmental outcomes
- improve engagement with Traditional Owners and communities, including for governments to meet their commitments to priority reforms under the National Agreement on Closing the Gap and to develop partnerships for shared decision-making.
- include principles to frame the process for assessing and reflecting the relative values placed by communities on environmental, social and economic outcomes to inform the trade-offs that have to be made in water planning. This process should be transparent, evidence-based and involve effective engagement with stakeholders.

NWI renewal advice 6.2: Water planning

UPDATED IN 2024

- include principles for independent review of water plans. While the review processes would be determined by jurisdictions, the NWI could set out principles for reviews to promote their need to be robust and fit for purpose, focused on achieving the greatest net benefit and how to apply effective stakeholder engagement.
- better take account of connectivity between systems.

Jurisdictions should continue to have discretion as to whether a plan is necessary and the effort put into its preparation, in accordance with paragraph 38 of the NWI. However, where a plan is not prepared for a water region, a renewed NWI should provide greater guidance on how contingent allocation frameworks are developed to be fit-for-purpose and appropriately manage the risk of overuse. In addition, where a water plan is not prepared, jurisdictions should:

- publish a transparent justification of why the costs of a plan outweigh the benefits; and
- set a clear trigger for developing a plan when circumstances change.

Processes to better account for climate change are also required, including that:

- water plans include priorities, actions and rules that cover drought conditions, as well as mechanisms for dealing with more extreme scenarios, including clear triggers, roles and responsibilities for actions and a hierarchy of uses
- water quality issues are better incorporated into water planning, particularly in drought scenarios
- water planning processes in relatively undeveloped and developing water systems take climate change into account in ways that manage the risk of less water
- as water plans reach the end of their planning cycle, review processes promote improved water use and system operation to lessen risks in meeting the agreed environmental and consumptive objectives
- a process for rebalancing between environmental and consumptive uses as a result of climate change is developed. Rebalancing due to climate change should occur when there is sufficient evidence that the expected benefits will outweigh the likely costs. Where this occurs, governments should ensure that a water plan review assesses the feasibility of the objectives of the plan, sets new objectives that are realistic under climate change (including environmental, cultural and consumptive objectives), selects the most cost-effective option for meeting them and agrees a pathway to transition to the new balance. The process requires effective community partnerships and engagement, must be informed by the best available environmental, social and economic data and should be transparent
- there are clear provisions for allocating risk, with water access entitlement holders continuing to bear the risks to the consumptive pool arising from climate change and periodic natural events (as reflected in paragraph 48 of the NWI)
- climate modelling is undertaken at the system scale, based on the best available data and subject to ongoing reviews and refinements. The models and information should be made publicly available and be subject to independent peer review or accreditation.

Water trading and markets

NWI renewal advice 7.1: The role and application of water trading and markets

UNCHANGED FROM 2021

A renewed National Water Initiative should emphasise that the purpose of water trading and markets is as a tool within a water resource management framework to increase efficiency.

There is no guaranteed supply of water by location, time and quality. For given users, and trade-offs in the values people place on availability, markets can play an important role in allocating water efficiently.

The diversity of water system hydrology – regulated and unregulated surface water, groundwater and conjunctive (surface and groundwater) systems – coupled with other economic and institutional pre-conditions mean that the establishment of market arrangements need to suit their context. They need to be fit for purpose.

NWI renewal advice 7.2: Leading practice governance, regulatory and operational arrangements

UNCHANGED FROM 2021

Recommitting to the original National Water Initiative water trading and market principles would support the objective that arrangements facilitate the efficient operation of markets, where system and water supply considerations permit.

Reshaped principles covering governance, regulatory and operational arrangements for water markets and trading would provide stronger foundations for developing markets.

- Roles and responsibilities of key parties involved in governance are clearly defined, and the parties' activities are effectively coordinated.
- Institutional arrangements are monitored and evaluated to ensure they remain in step with the level of a market's development.
- Trade is regulated to maximise overall community benefit (efficiency).
 - Arrangements protect against negative third-party impacts of water trades on other water users and the environment.
 - The boundaries of water markets should be shaped by hydrology; trade between locations or sectors should not be limited by artificial administrative impediments.
 - Regulatory consistency and compatibility apply where it is hydrologically feasible for interstate trade to occur.
 - Where the changing of trading rules is necessary and well justified, the communication of these changes should be clear, timely and accessible to the market.
 - Where broader management and administrative decisions (such as processes for determining seasonal allocations) impact on water availability and therefore market dynamics, these processes should be transparent, and their impacts well understood.
- Market access is open to all participants.

NWI renewal advice 7.2: Leading practice governance, regulatory and operational arrangements

UNCHANGED FROM 2021

- Development of an appropriate mix of tradeable water products is enabled.
- Water market operations optimise transaction costs, including both monetary (for example, trade approval fees) and non-monetary (for example, from trade approval processing times and regulation of trade related services).
- Jurisdictions could also consider integrating water trade monitoring with system management in highly developed systems. Such a role could focus on the long-term operation of the market within the water resource management system. In a changing climate, shared resources and connected systems will require consideration of the interaction between resource availability, system constraints and water trade; and the identification of risks as these interactions change.

NWI renewal advice 7.3: Information to support efficient water markets

UNCHANGED FROM 2021

In efficient water markets:

- registers of all water access entitlements and trades are publicly accessible, timely and reliable
- basic trade data – including on prices (clearly specifying reasons for zero-price trades), volumes, dates, locations and product types – are publicly available
- publicly-provided non-trade information covers market rules and the quality and accessibility of water resources.

Environmental management

NWI renewal advice 8.1: Best-practice environmental objectives and outcomes

UNCHANGED FROM 2021

Environmental objectives and outcomes agreed in water plans should be guided by criteria on the identification of key environmental assets (including dependent downstream estuaries and near-shore marine environments) and the values communities place on those assets.

- Waterways or water-dependent ecosystems should be considered high environmental priority if they have one, or more, of the following characteristics:
 - formally recognised significance (under Australian or state government legislation, or local planning instruments where enabled by legislation)
 - the presence of highly threatened or rare species and ecological communities (under Australian or state government legislation)
 - high naturalness values (for example, aquatic invertebrate communities or riparian vegetation)
 - vital habitat (for example, drought refuges or important bird habitats and key sites for connectivity).
- Environmental objectives and agreed environmental outcomes should then:
 - be set through a collaborative, stakeholder and community process that considers the relative community value of outcomes
 - be based on good scientific, objective and on-the-ground knowledge
 - clearly identify any risks and potential environmental trade-offs under different climate scenarios (including average and dry years)
 - be transparent, logical and easily understood by stakeholders
 - be specific and defined well, enabling clear long-term performance indicators to be set and monitored.

NWI renewal advice 8.2: Integrated management

UNCHANGED FROM 2021

The management of environmental water should be integrated with complementary waterway management at the local level by ensuring that consistent management objectives govern both the use of environmental water and complementary waterway management activities.

NWI renewal advice 8.3: Waterway oversight

UNCHANGED FROM 2021

Where not in place, state and territory governments should establish a formal institutional oversight responsibility for wetland and waterway management that provides an interface between the management of waterways and environmental water.

The roles and functions of a waterway manager should include:

- undertaking collaborative planning processes that result in clearly articulated environmental objectives, targets and priorities
- ongoing collaboration with Traditional Owners
- ongoing environmental risk assessment
- providing input to water planning processes on environmental priorities and impacts
- oversight of natural resource management actions to achieve agreed objectives
- working with the system manager to achieve agreed environmental outcomes
- facilitating on-ground delivery of environmental water management
- monitoring and reporting on environmental outcomes and risk management
- evaluation where environmental outcomes were not achieved
- providing opportunities for community participation, to facilitate change and awareness of waterway issues
- communicating policy changes to stakeholders.

NWI renewal advice 8.4: Review processes for outcomes

UPDATED IN 2024

Jurisdictions should commit to a long-term, consistent national approach to monitoring environmental outcomes delivered from both planned and held environmental water. Clear processes should be established for reviewing progress on environmental outcomes, understanding their feasibility given climate induced changes in water availability and other factors (such as sea level rise and increased temperatures), ascertaining whether environmental water flows and allocations are sufficient to meet environmental objectives and determining if and when management objectives should be revisited within planning review processes.

To support this, there should be adequate resourcing of long-term monitoring programs that report against well-defined environmental outcomes indicators. These indicators should be determined by the best possible environmental science, including Indigenous Cultural Knowledges.

NWI renewal advice 8.5: Objectives and priority setting for held water

UNCHANGED FROM 2021

The overarching objective for environmental water managers managing held environmental water is to make decisions on where, how and when environmental water should be used (or whether it should be traded or carried over) based on the best use for the environment over the long term.

Criteria for prioritising environmental watering should be embedded in a renewed National Water Initiative and include the:

- extent and significance of environmental benefit
- likelihood of success
- longer-term benefits
- urgency of watering needs
- feasibility of the action
- environmental or third-party risks
- cost effectiveness of the watering action
- efficiency of water use
- additional cultural, economic, social and Traditional Owner benefits.

Objectives for seasonal environmental watering under different climate scenarios should be embedded in a new National Water Initiative such as:

- avoid critical loss, maintain key refuges and avoid catastrophic loss during drought scenarios
- maintain river functioning and high-priority wetlands and manage dry-spell tolerances during dry scenarios
- improve ecological health and resilience and recruitment opportunities for key species during average climate scenarios
- restore key floodplain and wetland linkages and enhance recruitment opportunities for key species during wet scenarios.

NWI renewal advice 8.6: Transparent trade strategies

UNCHANGED FROM 2021

Environmental water holders should have in place transparent and publicly reported trading and carryover strategies and reporting statements for entitlements and allocations that show the best use of water to contribute to environmental outcomes as opportunities arise.

Revenue from trading should be held in a dedicated, ring-fenced account with the ability to be carried over and devoted to activities that enable the best use of environmental water over time. And use of this revenue should be publicly reported.

NWI renewal advice 8.7: innovative market approaches

UNCHANGED FROM 2021

Environmental water holders should work with system managers and consumptive entitlement holders to pursue innovative market approaches.

NWI renewal advice 8.8: Capacity to vary entitlement portfolio

UNCHANGED FROM 2021

Environmental water holders should be enabled to vary their entitlement portfolio over time to match ecological requirements in a changing climate.

Environmental water entitlement trading should occur as part of a long-term environmental water portfolio management strategy. Governments should develop clear guidelines on the criteria for trading environmental water entitlements including cost-benefit analysis, consideration of possible consequential adjustments to catchment sustainable diversion limits and environmental provisions in water plans, a formal approvals process and publicly reported trade activity.

NWI renewal advice 8.9: Actively pursue public benefit outcomes

UNCHANGED FROM 2021

Environmental water holders should:

- give explicit consideration to other public benefit outcomes including cultural and social outcomes, where they do not compromise environmental outcomes
- improve collaboration and communication with Traditional Owners on cultural water decision making and outcomes in environmental water planning processes
- report on any instances where specific cultural outcomes were unable to be delivered because they were incompatible with agreed environmental outcomes
- build on their knowledge of the potential for environmental water to achieve shared community benefits under drying climate scenarios.

NWI renewal advice 8.10: Independent managers and auditing

UPDATED IN 2024

Where governments own significant held environmental water that can be actively managed, they should ensure that decisions on the use of this water are made by independent bodies at arm's length from the agencies directly responsible for water allocation and planning.

Jurisdictions should commit to independent auditing, on at least a five-yearly basis, of the achievement of environmental outcomes resulting from both planned and held environmental water, including the adequacy and use of environmental water to achieve outcomes.

Where jurisdictions have independent environment commissioners or agencies with regular state-of-the-environment reporting, such as Victoria and the Australian Capital Territory, such auditing is ideally placed within the scope of their activities.

NWI renewal advice 8.11: The system manager's role in environmental management

UNCHANGED FROM 2021

Water system managers should be obligated to use their best endeavours, while protecting third-party interests, to achieve agreed outcomes.

State and territory governments should report and evaluate system managers' efforts at facilitating the achievement of agreed environmental and other public benefit outcomes.

NWI renewal advice 8.12: Commitment to adaptive management

UNCHANGED FROM 2021

In planned environmental water systems, state and territory governments should:

- establish mechanisms to ensure that adaptive management is implemented consistently and explicitly in practice
- ensure adequate monitoring, evaluation and reporting efforts on agreed environmental outcomes, and report openly about instances where these outcomes are not achieved.

Environmental water holders should:

- use the results of monitoring, evaluation and research to improve water use as part of an adaptive management cycle and ensure that this is adequately resourced
- publicly report on environmental water use, the outcomes of watering events, the achievement of ecological outcomes, and monitoring of objectives.

Securing First Nations peoples' interests in water

NWI renewal advice 9.1: A new element designed in partnership with First Nations people

UPDATED IN 2024

The renewed National Water Initiative (NWI) should include both an objective and a new element dedicated to First Nations peoples' access to water and the involvement and participation of First Nations peoples in water management. The Commission advises that the Committee on Aboriginal and Torres Strait Islander Water Interests should continue to lead development of the new NWI element.

In developing the new element, the Committee should:

- ensure alignment between commitments under the National Agreement on Closing the Gap and new NWI content
- continue to engage with First Nations groups
- report directly to water ministers.

The National Water Reform Committee should also support the Committee on Aboriginal and Torres Strait Islander Water Interests to lead the development of a monitoring, evaluation and reporting framework for this new element.

NWI renewal advice 9.2: Improving cultural outcomes using existing frameworks

UPDATED IN 2024

In developing a new National Water Initiative element, the Committee on Aboriginal and Torres Strait Islander Water Interests should consider content that ensures that:

- cultural objectives are explicitly identified and provided for in water plans and progress in achieving those objectives is regularly monitored and reported publicly
- environmental water holders seek to deliver cultural outcomes whenever consistent with their ecological obligations
- natural resource managers incorporate cultural objectives into river and wetland plans and work with Traditional Owners in on-ground management programs to achieve them
- Traditional Owner engagement in water planning, environmental water management and natural resource management is of high quality and fostered through the development of long-term relationships (NWI renewal advice 6.2, 8.3 and 8.9).

NWI renewal advice 9.3: Improving access for economic development

UPDATED IN 2024

In developing a new National Water Initiative element, the Committee on Aboriginal and Torres Strait Islander Water Interests could consider content that ensures that, where agreement is reached between state and territory governments and Traditional Owners that consumptive access to water is an effective way to support the economic development of First Nations communities, access is provided by:

- sourcing water within existing water entitlement frameworks, such as by purchasing water on the market or as part of transparent processes for assigning unallocated water
- ensuring adequate supporting arrangements (such as training and business development) and information provision (e.g. about the costs of accessing, holding and trading water) are in place to enable First Nations communities to access water, and maximise the value of the resource for their needs and uses
- actively involving First Nations communities in program design.

The provision of water by governments to First Nations communities would be supported by:

- governance arrangements for such water developed in partnership with First Nations groups
- regularly monitoring and publicly reporting on the inland waters target under the National Agreement on Closing the Gap.

Where governments invest in new water infrastructure, particularly in undeveloped areas, governments should consider whether reserving a share of any new water rights for Traditional Owners would be consistent with plans for future community development and assist in meeting targets set under the National Agreement on Closing the Gap.

Ensuring the integrity of water resource management

NWI renewal advice 10.1: Building system Integrity through a renewed element

UNCHANGED FROM 2021

A renewed National Water Initiative would be strengthened by acknowledging that ensuring the integrity of water resource management requires more than robust water accounting. To build integrity into system management, consideration should be given to broadening the water resource accounting element. The provision of credible and reliable information, and robust institutional processes, would provide assurance that:

- entitlement holders are operating in line with their rights and that water use is consistent with established rights and water plans
- water systems are being managed to best effect for all users.

The provision of information regarding the broader water context is also needed to improve understanding of key water resource challenges and potential risks, enabling entitlement holders, industry and communities to better plan for the future.

NWI renewal advice 10.2: Ensuring the integrity of water use

UNCHANGED FROM 2021

To ensure the integrity of water use, a renewed National Water Initiative would be strengthened by requiring fit-for-purpose:

- metering and measurement of surface water and groundwater take and reporting on use
- registers that realise their potential benefits for water resource management and support compliance and enforcement systems as well as critical functions in supporting trade
- compliance and enforcement systems, including a focus on proactive regulation to increase entitlement holders' awareness of their obligations.

Inclusion of leading-practice compliance principles would also strengthen the agreement. Compliance framework requirements from the Murray–Darling Basin Compliance Review provide good foundation principles, but consideration should be given to augmenting them with requirements consistent with leading-practice governance.

NWI renewal advice 10.3: Ensuring the integrity of water system management

UNCHANGED FROM 2021

To ensure the integrity of water resource management, a renewed National Water Initiative would need to require water system managers to:

- adopt a risk-based approach to developing and maintaining information and data collections necessary for effective water system management. These collections should include information about how much water is in a system, where it is, how much is extracted (including by interception activities), how much is carryover, and who gets what and when
- ensure that information and data sources are publicly available, and information is accessible and effectively communicated. Where multiple agencies are responsible for a system's management, collaboration is needed to ensure that data and the language used for reporting are consistent and that information is accessible from a single online source
- implement quality assurance processes for information and data sources to enhance the credibility of information, including independent audits for fully developed and regulated systems
- ensure information about their decisions, operations and performance is transparent and that public concerns and information requests are responded to expediently.

Stakeholder engagement would improve information provision and help system managers determine if available information adequately demonstrates to the public that water systems are being managed to best effect.

NWI renewal advice 10.4: Ensuring information on the broader water context aligns with users' needs

UNCHANGED FROM 2021

In renegotiating a renewed National Water Initiative, jurisdictions should commit to providing information on the broader water context that meets the needs of system participants (including water planners, managers, users and communities).

The scope of national water accounts should be reviewed. In undertaking these reviews, stakeholders must be engaged to ensure useful and meaningful information is reflected in accounts in the future.

A renewed National Water Initiative should acknowledge the utility of national water accounts and require their regular publication and avoidance of unnecessary duplication of effort in their preparation.

Provision of water services

NWI renewal advice 11.1: Maintain key principles of service delivery

UNCHANGED FROM 2021

Jurisdictions should maintain the core principle of cost-reflective, consumption-based pricing in a renewed National Water Initiative, with cost recovery from users. Jurisdictions should also update and recommit to the *National Water Initiative Pricing Principles* to provide guidance on achieving those pricing requirements, with direct reference to the pricing principles included in a renewed NWI.

Similarly, jurisdictions should maintain institutional separation of water resource management, standard setting and regulatory enforcement from service delivery.

NWI renewal advice 11.2: Principles for best-practice Independent economic regulation

UNCHANGED FROM 2021

The following national best-practice principles would improve the quality and consistency of independent economic regulation of water service providers.

- Regulatory decisions are guided by the objective of promoting the long-term interests of customers.
- Utilities have incentives to innovate and improve their efficiency.
- Regulatory decision-making processes include effective customer and community engagement.
- Prices reflect the full efficient cost of service provision.
- Regulatory decisions consider the long-term financial viability of utilities.
- Regulatory processes facilitate effective competition in potentially contestable parts of the industry.
- Regulatory processes are transparent to allow scrutiny.
- Regulatory frameworks are adaptable and flexible.

NWI renewal advice 11.3: Improving pricing and service outcomes

UNCHANGED FROM 2021

The National Water Initiative should include a framework to guide where different models of economic oversight can be applied, based on context. All large providers should be subject to best-practice independent economic regulation, unless a transparent analysis of regulatory costs and benefits shows that economic regulation imposes significant net costs. Where costs do outweigh benefits, jurisdictions should agree to a consistent assessment framework to inform decisions concerning the type of economic regulation to apply, based on the risk (and potential impact) of a provider exercising market power, and the cost of regulation.

Jurisdictions should commit to light touch independent economic oversight for small regional and remote urban water providers.

NWI renewal advice 11.4: Performance monitoring and reporting

UNCHANGED FROM 2021

Water service provider performance monitoring and reporting should be maintained under a future NWI with agreed objectives. Monitoring and reporting should aim to:

- increase transparency of service delivery
- enable performance comparisons to support continuous improvement by providers
- feed into economic oversight
- contribute to state and territory government policy decisions and performance oversight
- underpin regular assessments of progress of NWI implementation.

Urban water services

NWI renewal advice 12.1: Best-practice urban water system planning

UNCHANGED FROM 2021

Updating the *National Urban Water Planning Principles* and formally embedding them within the National Water Initiative would establish a standard for best-practice urban water system planning. A renewed National Water Initiative should include the following principles:

- Integrated management of water supply, wastewater and stormwater is embedded in urban water planning and management systems.
- Planning decisions align with system objectives for levels of water security, service quality, the environment and urban amenity.
- System objectives are discovered through a transparent and consultative approach and approved by governments in line with customer and community preferences.
- Urban water planning connects water planning across different scales and with land-use planning.
- All supply options are considered and their relative merits subject to a rigorous, consistent and transparent assessment of costs and benefits.
- Roles and responsibilities in the planning and management process are clearly assigned between relevant governments, utilities and other planning entities.
- Governments enable effective coordination between utilities, regulators, developers and land-use planners.

To support efficient service delivery by smaller providers, jurisdictions should consider developing national guidelines for both long-term system planning and contingency planning for regional and remote water systems.

NWI renewal advice 12.2: Improving pricing and service outcomes

UNCHANGED FROM 2021

In updating the *National Water Initiative Pricing Principles* (NWI renewal advice 11.1), jurisdictions should:

- develop improved, practical guidance on funding stormwater management and incorporating stormwater into pricing frameworks
- recommit to the principle that developer charges are cost reflective.

NWI renewal advice 12.3: Improving pricing and service outcomes

UPDATED IN 2024

All water and wastewater service providers, including those with fewer than 10,000 connections, should be subject to jurisdictional monitoring and public reporting.

Through the National Water Initiative, jurisdictions should recommit to independent, public and annual reporting of key pricing and service quality indicators at a national level for all major water and wastewater service providers (consistent with the objectives outlined in NWI renewal advice 11.4).

NWI renewal advice 12.4: Ensuring access to a basic level of service

UNCHANGED FROM 2021

A renewed National Water Initiative should include a commitment by state and territory governments to each develop a definition of, and to ensure access to, a basic level of water services for all Australians. At a minimum, this would include safe and reliable drinking water. The definition of 'safe' could be nationally consistent, while the definition of 'reliable' will vary according to local circumstances.

Cost-reflective user charges should remain the default arrangement, but some regional and remote services in high-cost areas will require operational subsidies to maintain a basic level of service to all customers. Any subsidies to those areas should be provided as transparent community service obligation payments. Payments to local government-owned providers should be:

- designed to ensure access to a basic level of service in those communities where such service provision would otherwise be unviable
- adequate to ensure a basic level of service is considered affordable
- based on credible data on efficient service costs, subject to a degree of independent oversight, following state or territory government involvement in system planning
- calculated in a predictable fashion to provide a reliable source of funding
- conditional on ongoing operational improvements, such as improvements to utility governance, better service outcomes (based on performance monitoring), compliance with guidelines for system and contingency planning, or for pursuing collaboration.

NWI renewal advice 12.5: Governance of regional and remote services

UNCHANGED FROM 2021

A renewed National Water Initiative should contain agreed principles for governance of regional and remote water services where local governments retain ownership of utilities. Financial separation should be maintained, with utility finances ring-fenced from local government finances. Clear roles for state and local governments during extreme events should be defined.

NWI renewal advice 12.6: Monitoring and reporting on regional and remote service quality

UNCHANGED FROM 2021

Monitoring and reporting of water quality and service outcomes in remote First Nations communities should be coordinated with the development of data collection required to measure progress against the community infrastructure target under the National Agreement on Closing the Gap.

Water reform in rural Australia

NWI renewal advice 13.1: Helping communities deal with adjustment pressures

UPDATED IN 2024

Inclusion of guiding principles in a renewed National Water Initiative would clarify how governments can respond to any significant community adjustment pressures resulting from policy-induced reductions in water availability.

- The socioeconomic impacts of any major potential policy change be assessed to identify possible community needs. Effective community partnerships and engagement are critical to understanding the wider context.
- Generally-available measures targeting the welfare and skills of individuals, and regional development planning and initiatives to leverage community capabilities and competitive advantages are usually the most appropriate responses to adjustment pressures.
- In rare circumstances, it may be appropriate to take additional steps to address adjustment issues if policy changes that are beneficial to the wider community impose increased risk of permanent disadvantage for groups of individuals. Where generally-available measures will be inadequate, more support could improve the efficiency of the adjustment process by addressing impediments to change.
- Where further support is warranted:
 - assistance programs should be integrated with regional development strategies and frameworks
 - options for further support need to be considered on a case-by-case basis and consider all factors affecting a community (not just changing water availability) and the chosen option should be the one that delivers the largest benefits relative to costs

NWI renewal advice 13.1: Helping communities deal with adjustment pressures

UPDATED IN 2024

- measures that are likely to build adaptive capacity and secure employment or business opportunities should be the focus, and targeted to the most vulnerable individuals (those at risk of permanent disadvantage)
- industry assistance and subsidies should be avoided
- a commitment should be made to public monitoring and evaluation of the effectiveness of any assistance.

Government investment in major water infrastructure**NWI renewal advice 14.1: A new water infrastructure element**

UNCHANGED FROM 2021

In renegotiating the National Water Initiative, jurisdictions should develop an element to guide investment in water infrastructure.

The new element should restate the high-level requirements for all infrastructure to be assessed as economically viable and ecologically sustainable prior to the commitment of funding, with cost recovery from users as the norm, and add a further requirement that infrastructure development processes are culturally responsive to the interests of Traditional Owners.

The new element should also include:

- an agreed framework to guide government investment in major water infrastructure, incorporating project selection and assessment processes and clear roles and responsibilities for governments and service providers
- principles for cost sharing (including government subsidies) and allocating water from new developments.

NWI renewal advice 14.2: Assessment criteria for water infrastructure

UPDATED IN 2024

As part of the new infrastructure element, jurisdictions should agree to criteria on how major projects can demonstrate adherence to the NWI requirements for infrastructure.

Economic viability should be demonstrated by a benefit–cost ratio (at least) greater than one, determined through a transparent and rigorous cost–benefit assessment, with:

- an assessment of a range of options, including non-infrastructure options where these can meet the investment objective, and selection based on the highest expected net benefit
- transparency supported by publication of business cases as a matter of course (except where commercially sensitive data limits publication, in which case the business case should be reviewed by a qualified independent body)
- use of entitlement pre-sale to limit optimism bias
- robust estimates of social and distributional impacts.

Ecological sustainability should be demonstrated through environmental and social impact approvals, and compliance with a high-quality and NWI-consistent water plan that:

- establishes the environmental water provisions necessary to meet agreed environmental outcomes under a changing climate
- sets out the social, economic and cultural outcomes sought from the water plan
- clearly defines the expected reliability of water rights, taking into account the likely impacts of climate change
- is developed with robust community engagement to reflect community values.

Criteria for culturally responsive infrastructure development should be determined through the process led by the Committee on Aboriginal and Torres Strait Islander Water Interests. At a minimum, culturally responsive infrastructure processes would:

- incorporate deep engagement with the Traditional Owners of affected areas (both at the infrastructure site and downstream) as part of business case development
- comprehensively identify and manage impacts on cultural heritage in affected areas.

Costs should be recovered from users as the norm, with any government funding provided through a transparent subsidy. This should be limited to situations where:

- substantial public benefits associated with water infrastructure impose additional costs that are best borne by governments
- an equity argument exists (for example, to support access to an essential service in high-cost regional town water systems where the cost of supplying a basic level of services is considered unaffordable).

Governments should not subsidise major water infrastructure for strategic objectives, such as regional development, without first demonstrating that the project is the most effective means of addressing that objective. This requires alignment with broader high-quality and long-term strategic regional planning processes.

- Jurisdictions should maintain the principle supporting use of market mechanisms for allocating water, although they should consider allocating a share of new entitlements in undeveloped systems to Traditional Owners.

NWI renewal advice 14.3: Institutional arrangements

UNCHANGED FROM 2021

A new water infrastructure element should clarify relevant institutional roles and responsibilities underpinning government investment in major water infrastructure, if and when it occurs.

- State and territory governments should have primary responsibility for proposing (and overseeing) government involvement in major water infrastructure developments in their jurisdictions.
- Any Australian Government funding should not exceed the contribution of the relevant state or territory government.
- Independent infrastructure advisory bodies should transparently review the business cases of major projects.

Community engagement**NWI renewal advice 15.1: Community engagement framework**

UPDATED IN 2024

Australian governments should recommit to best practice, cost-effective engagement with their communities on all water matters. To achieve this, a renewed National Water Initiative should develop a community engagement framework focused on:

- continuously improving and sustaining government engagement effort across all aspects of water resource management and water service provision
- coordinating engagement actions between all levels of government, particularly in multijurisdictional activities
- ensuring that engagement effort and its resourcing are fit-for-purpose taking into account the scale of proposed change or reform, its sensitivities and its impacts
- ensuring that governments are clear about the purpose of their engagement, the role of communities in decision making, and transparently report on how communities' views have informed decisions
- improving the effectiveness of community engagement through enhancing:
 - water information accessibility and comprehensibility
 - community water literacy.

This framework should adopt the characteristics of inclusiveness, timeliness, partnership, respect, access to information, transparency, responsiveness and continuous improvement as a best-practice foundation for effective community engagement and information provision practice in water resource management and water service provision.

Knowledge, capacity and capability building

NWI renewal advice 16.1: Effective knowledge generation

UNCHANGED FROM 2021

Commitment to a culture of evidence-based decision making, innovation and continuous improvement will underpin successful implementation of a renewed National Water Initiative. Inclusion of the following principles in a renewed National Water Initiative would bring that to effect.

- Knowledge building priorities are identified through processes that involve all jurisdictions and draw on input from the research community and research users.
- Governments invest in knowledge generation activities that align with identified priorities and serve the public good.
- Investments are streamlined through effective coordination between jurisdictions.
- Utilities are empowered to invest efficiently in knowledge generation.
- Strong, durable partnerships between decision makers and knowledge generators are developed and actively managed.
- Decision makers have the capability and capacity to use knowledge effectively in making evidence-based decisions.
- Water utility staff have the capacity and capability to discharge their functions.

1. Governance for a renewed national approach to water reform

Key points

- ✳ **Governments should renew their commitment to national water reform, starting by building on the sound foundations of the National Water Initiative (NWI).**
 - A national approach provides a broad and consistent authorising environment for jurisdictions to implement and continue to improve on best-practice water management.
 - Greater coordination under a renewed NWI would improve efficiency and consistency and result in more widely shared benefits of learning among jurisdictions.
- ✳ **A renewed NWI should retain the core NWI principles that underpinned the realisation of benefits flowing from a nationally-compatible, market, regulatory and planning based system of managing water resources to balance and optimise economic, social, cultural and environmental outcomes.**
- ✳ **A renewed NWI needs to be sufficiently flexible, to allow governments to have discretion in designing tailored action plans for achieving agreed outcomes, to deal with particularities in their respective jurisdictions.**

Added flexibility needs to be paired with public, measurable objectives and strong governance and accountability frameworks to ensure that hard-won benefits of 30 years of water reform are not lost.
- ✳ **A strengthened and reinvigorated governance architecture for a renewed NWI requires national water policy leadership to empower and drive reform. The Productivity Commission's 2021 renewal advice on governance of a renewed NWI remains relevant.**
 - To signal the importance of water reform, ownership of the renewed NWI should sit with water ministers. They should meet regularly to oversee development of a renewed NWI, and to receive, consider and act upon advice that comes out of any periodic review of the renewed NWI.
 - The National Water Reform Committee, on behalf of governments, should provide transparent, on-going, collective oversight of implementation, initiating policy advice and guidance as the need arises, and commission 10-yearly reviews of the renewed NWI.
 - There needs to be three-yearly assessment of the adequacy of and progress against jurisdictions' action plans, as per the functions the Commission currently performs under the *Water Act 2007* (Cth).

1.1 Benefits of national co-operation in water

Responsibility for water management rests with state and territory governments. But a co-operative, national arrangement across the federation based on shared interests is also needed. The alternative, with every jurisdiction operating in isolation, would risk ad hoc, reactive, potentially costly responses.

A national approach strengthens the authorising environment for water management for each jurisdiction. It facilitates sound decision-making that reflects and balances community preferences to achieve sustainable use of the nation's surface and groundwater resources. In this way, a national approach enhances the overall wellbeing of the Australian community.

In design and conception, the original National Water Initiative (NWI) helped drive toward such an outcome. A renewed NWI should be used to confirm a continuing joint commitment to the best possible water future for Australia and would represent the continuation of a journey towards a cohesive and enduring national approach to water policy that began in earnest with the Council of Australian Governments' water reforms in the 1990s and the 2004 NWI.¹

The core principles of the NWI should be retained and built on

The NWI provides a broad authorising environment, or policy 'scaffold', for jurisdictions to build towards best-practice water management. And as the Productivity Commission found in its 2021 review, even though not all jurisdictions have implemented all of the NWI, the benefits reaped so far are clearly apparent (PC 2021b, pp. 29–31).

It was on this basis that the Commission recommended in 2021, and still recommends in 2024, that a renewed national approach to reform should build on the content of the NWI. A renewed NWI can add additional 'layers' informed by 30 years of learnings and encourage advancement to better practice in the future.

The core NWI principles benefit communities, economies and the environment in every jurisdiction. They include:

- secure, perpetual water access entitlements
- statutory protections of water for the environment and other public benefits
- sustainable levels of extraction
- a user-pays pricing framework supported by independent economic regulation
- a framework for assigning risks from changes in water availability.

When these principles are embedded in legislation they provide for, amongst other things: sustainability of environmental systems to underpin uses and interests now and into the future; transparent, fair and consistent (including across state borders) business environments within which water users and service providers can invest and interact with confidence and certainty; efficiency of pricing and investment so that those who benefit from water provision are appropriately charged for it and to support the financial sustainability of water service provision; and the tools so water can be rebalanced fairly and transparently as supply, and our scientific understanding of complex water systems, changes.

¹ The *Water Act 2007* (Cth) and the 2012 Murray–Darling Basin Plan have been other key milestones.

A principles-based approach can be flexible and fit for purpose

A renewed NWI that is principles-based and flexible would respond to jurisdictions' criticisms that not all the elements of the original NWI are relevant to all jurisdictions at a point in time, and that the NWI allows insufficient discretion to allow 'fit-for-purpose' tailoring of actions to deal with water management particularities in each jurisdiction (PC 2021b, p. 62).

Fit-for-purpose implementation means that, across the diverse range of water systems in Australia, the level of effort expended by jurisdictions to manage them should balance the expected costs and benefits of different management outcomes. However, while flexibility is important, it should not be used as a reason to avoid (politically) difficult reform.

With this in mind, the Commission in 2021 argued for a clear specification of outcomes in a renewed NWI linked to the principles, with flexibility for jurisdictions to implement and transparently define fit-for-purpose activities in their action plans. The outcomes and objectives need to be specific enough to be translated into action plans, so that it is practically feasible to assess how and to what extent jurisdictions' actions translate into outcomes.

A renewed NWI that builds on and reinforces the existing principles, with clear accountability, was overwhelmingly endorsed by participants in this inquiry.² One participant preferred only nationally agreed high-level objectives for water reform, rather than a comprehensive new national agreement (VFF, sub. 89, pp. 3–5).

Dilution of the fundamentals could threaten the benefits of water reform

The NWI is being renewed

The Australian, state and territory governments are currently negotiating to renew the NWI. The renewed NWI is expected to be discussed and ratified later in 2024, at a ministerial council meeting of all water ministers. This would be the first such meeting in over 10 years.

To inform the NWI renewal process the Department of Climate Change, Energy, Environment and Water (DCCEEW) released a discussion paper on 28 March 2024 (DCCEEW 2024d). The DCCEEW paper sought public views on proposed objectives and desired outcomes that might be included in a new national water agreement, and what elements of the NWI should be included in the proposed agreement (DCCEEW 2024d, p. 5).

The Commission is not a party to negotiations for a renewed NWI, but we have heard that jurisdictions broadly agree that climate change and commitments to First Nations peoples need to be strengthened in a new agreement. The DCCEEW paper includes objectives and outcomes relating to these issues, in line with the Commission's 2021 renewal advice (DCCEEW 2024d, pp. 13–15).

The Commission also heard that some jurisdictions do not wish to retain some of the core NWI commitments in the renewed NWI or do want to retain outcomes that represented compromises in 2004. These jurisdiction-specific negotiating positions are a result of NWI commitments being at odds with, or inconsistent

² ACCC, sub. 11 and 82; ATSE, sub. 5 and 68; Aurecon, sub. 28; AWA, sub. 43; Cotton Australia, sub. 91; DEG, sub. 47; EA, sub. 34; EDO, sub. 50; Heather Ferguson and Carl Stephens, sub. 19; HiPCo, sub. 1; IA, sub. 9; IGWC, sub. 80; LVW, sub. 21; MDBA, sub. 36; Murray Irrigation, sub. 90, NFF, sub. 32 and 70; NIC, sub. 51 and 84; NLC, sub. 38; NSWALC, sub. 60; NSWIC, sub. 16 and 88; RGA, sub. 37 and 86; SACOSS, sub. 23; Sydney Water, sub. 41; Urban Utilities, sub. 65; WaterNSW, sub. 55 and 85; WRA, sub. 49; WSAA, sub. 15 and 81; WSCA, sub. 45; WTA, sub. 35.

with, existing, often long-standing policy settings. Submissions to this and previous inquiries have highlighted some of these.

- A lack of full and independent economic regulation in several jurisdictions (e.g. ACCC, sub. 11, p. 6)
- No statutory entitlements for water separate to land in Western Australia and the Northern Territory (e.g. EDO, sub. 50, pp. 9, 20)
- Exemptions from the entitlements framework for minerals and petroleum industries in Queensland (e.g. NFF, sub. 32 attachment, p. 23).

The Commission notes that these commitments are not explicitly included in the relevant objectives in the DCCEE paper (DCCEE 2024d, pp. 12, 19).

A renewed NWI weaker than the existing one would risk hard-won progress and result in opportunity costs to users, ratepayers, and the environment

There is a resultant risk that, for consensus to be reached between the parties, the renewed NWI could represent a weaker commitment to the fundamentals of water policy than the original. This potential outcome would have negative implications for longer-term water security.

A key risk of an erosion of the authorising environment for implementation is backsliding, including in those jurisdictions which have already progressed further in meeting their commitments against the NWI. For example, NWI-compliant jurisdictions that currently efficiently allocate the full cost of water provision to users or otherwise apply transparent community service obligations, may face pressures to unwind these practices if they are no longer strongly embedded as commitments in a new national water agreement. This would result in overall more costly and less equitable and sustainable water services.

A renewed NWI weaker than the existing one would leave no driver for jurisdictions that have not yet met their NWI commitments 20 years on, to do so in the future. For example, in December 2023, the WA Government withdrew a package of proposed new water management legislation, stating:

The current laws are workable, and therefore legislative change is not required when there are other immediate, practical avenues to improve water security. (McGurk 2023)

There are clear opportunity costs borne by the communities in a jurisdiction (such as Western Australia, for example) with a government that does not adopt NWI-consistent water entitlement and planning mechanisms or lacks fully independent economic regulation of water services.

With respect to the former, the Commission heard from several inquiry participants that the implications include risks of overallocation of resources that puts environmental and First Nations' outcomes at risk.³ The consequences of a lack of independent economic regulation of water services, including price setting, have been assessed in previous Commission National Water Reform inquiries. Without independent economic regulation, there is a significant risk that the provision of water services will be more costly overall.

³ Alex Gardner, sub. 46, pp. 2–3; DEG sub. 47, pp. 4–5; EDO sub. 50, pp. 19–20; KLC, sub. 59, p. 2; Michael Bennett and Alex Gardner, sub. 74; MFRC, sub. 75, p. 9; Terri Janke and Company, sub. 18, p. 9.

1.2 The Commission's 2021 NWI governance renewal advice is still relevant

In 2021, the Commission provided detailed renewal advice on the governance structures needed to ensure ownership, accountability and transparency in a renewed NWI (PC 2021b, pp. 59–66). This inquiry has validated that advice. The advice draws on the *OECD Principles on water governance* (box 1.1).

The Commission's proposed governance structure is in Figure 1.1 and is summarised in subsequent sections.

Box 1.1 – Dimensions of leading practice water governance

Drawing on the *OECD Principles on water governance*, the Commission has identified the following as desirable characteristics for governance of a renewed NWI.

- Oversight and policy leadership commensurate with the complexity of the water policy challenges inherent in climate change, population growth and more frequent extreme events.
- Clear assignment of roles and responsibilities for implementation and progress.
- Arrangements for interjurisdictional coordination and cooperation mechanisms to monitor and evaluate the policy context and enable adaptation of the agreement as conditions change.
- Frameworks and mechanisms that hold parties to the agreement accountable including:
 - periodic independent assessment of implementation
 - implementation actions and outcomes to be described in rolling work plans
 - transparent performance reporting.
- Promotion of regular, informed and outcome-oriented stakeholder engagement.

Source: PC (2021b, p. 61); OECD (2015).

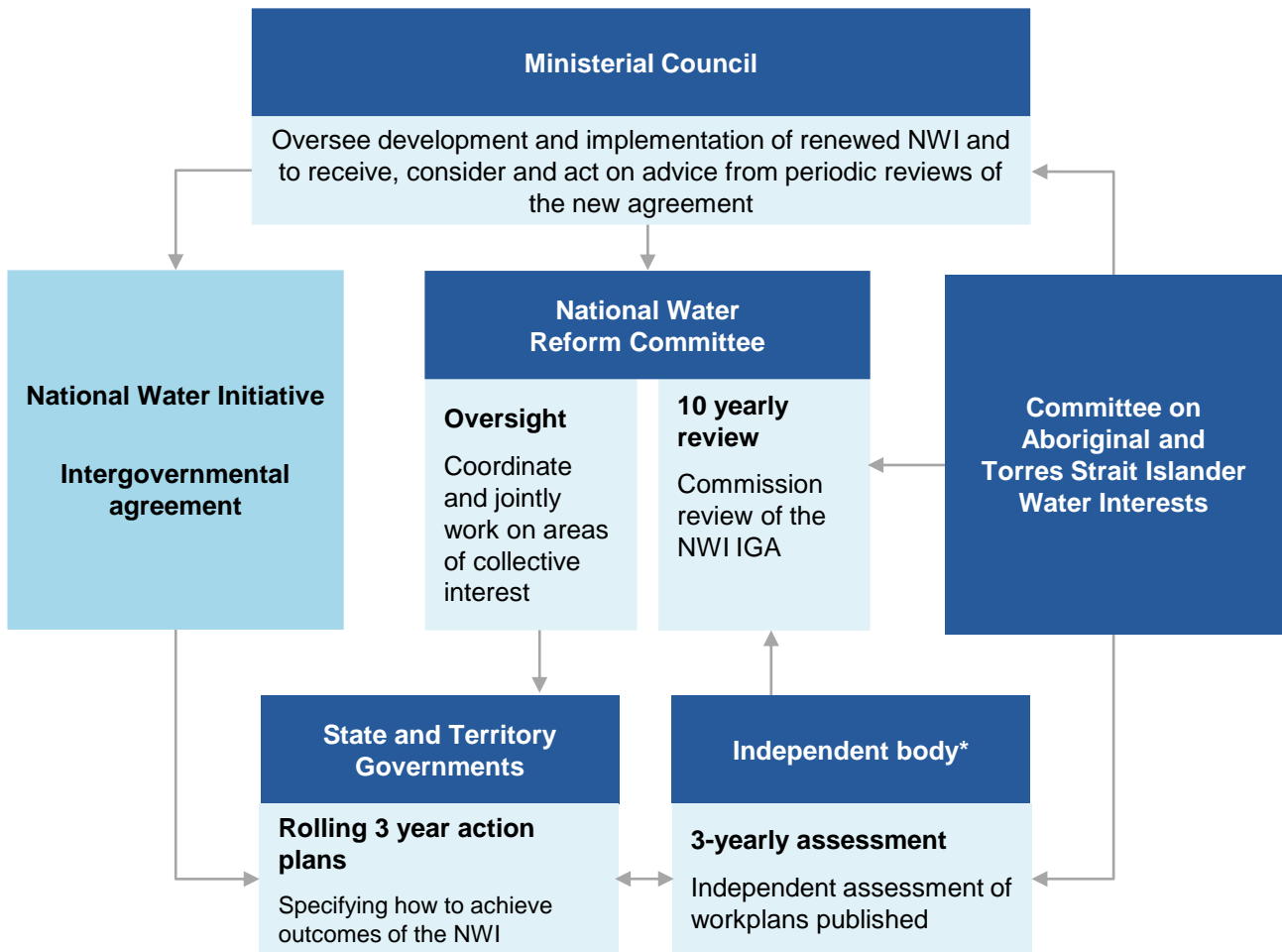
Policy leadership and collective ownership

As demonstrated in the years following 2004, robust governance arrangements were a central driver of progress, including by ensuring that governments remained focused on delivering their commitments and guiding reform. Those drivers have been missing for much of the past decade following the Australian Government's decision in 2013 to disband the ministerial council responsible for water and to subsequently abolish the National Water Commission (NWC, the body responsible for, amongst other things, accrediting and publicly assessing progress against jurisdictional NWI implementation plans) in 2015.

The absence of regular ministerial meetings deprioritises the importance of water reform. It increases the likelihood that policy decisions will be reactive, in response to a crisis. Instead, proactive water reform builds water security in anticipation of issues that we know will put pressure on resource quantity and condition and service delivery, including climate change and population growth.

Continued attention to reform is essential to facilitate long-term planning and decision making well in advance of, and even to help prevent, the next water security crisis. To this end, the Commission reiterates its 2021 renewal advice that water ministers come together at periodic intervals, at least annually, to oversee development of a renewed NWI, and to receive, consider and act upon advice that comes out of periodic reviews of the renewed NWI.

Figure 1.1 – Proposed governance structure for a renewed NWI



*This function is currently performed by the Commission under the *Water Act 2007* (Cth).

Source: Adapted from PC (2021b, pp. 59–66).

Rolling jurisdictional action plans

The Commission suggests that each jurisdiction commits to preparing publicly available three-year rolling action plans specifying how they aim to achieve the outcomes set out in the renewed NWI.

The renewed NWI should ensure that the objectives can be translated into action plans that are suitable for the circumstances of each jurisdiction by:

- clearly linking desired outcomes to the objectives for the renewed NWI
- being drafted and communicated in a clear and transparent manner that builds community understanding of, and confidence in, its objectives and intended outcomes
- including a transparent performance reporting framework focused on public accountability for progress towards the achievement of its objectives and outcomes (box 1.2).

Box 1.2 – Monitoring, Evaluation, Reporting and Learning

For accountability and learning purposes and to help build community trust in jurisdictions' actions under a renewed NWI, the Australian Government, working with the National Water Reform Committee (NWRC) and the Committee for Aboriginal and Torres Strait Islander Water Interests (CAWI), should coordinate the development of a monitoring, evaluation, reporting and learning (MERL) framework and plan. The role of CAWI in monitoring, evaluation and reporting is addressed in chapter 2.

This framework and plan would ideally be developed before, or at least concurrently with the development of jurisdictional action plans, such that the MERL framework is embedded in their design. The benefits of a systematic, transparent approach to MERL would be multifaceted. It would:

- underpin, and make transparent and consistent, the independent assessment of progress against the action plans
- assist jurisdictions to understand whether their action plans are effective (and to update them, if they are not) in terms of achieving intended outcomes
- facilitate sharing and communication of learnings across jurisdictions.

Some examples of guides to developing a MERL framework include the Better Evaluation initiative (Better Evaluation nd), the Commonwealth Evaluation Toolkit (Treasury 2023), and the Commission's *Indigenous evaluation strategy* (PC 2020b).

Periodic and independent assessment of progress and effectiveness reviews

The adequacy of, and progress against, action plans should be independently assessed on at least a three-yearly basis, and the assessment published. The assessment should cover whether actions are leading to stated outcomes and objectives. The Commission currently has the equivalent function for the 2004 NWI.

Consistent with current arrangements, the organisation undertaking the assessment could also make recommendations on how to improve the renewed NWI. And in line with good practice, a comprehensive review of the renewed NWI should be commissioned every 10 years.

The responsible organisation needs to be demonstrably independent of government. It should also have both the capacity and capability to undertake public inquiries, including a clear mandate (more on this below), the ability to request and compel information and documents, legislative backing to produce public assessment reports so parties to the renewed NWI continue to be accountable, an ability to self-commission assessment work (including beginning and end date, with legislative safeguards to require regular reporting) and be adequately resourced.

Ongoing collective oversight of the renewed NWI and its implementation

An entity needs to be assigned responsibility for the oversight of the renewed NWI and its implementation.

Many participants in this inquiry were in favour of re-establishing the NWC to perform this function.⁴

The National Water Commission (NWC) provided independent, evidence-based advice to the Federal government thereby supporting it in setting a well-informed national direction and position on water. This advice and a clear national position have been missing since the NWC was abolished and has meant that water is not being considered adequately in relation to government actions and discussions regarding responses to climate change. (AWA, sub. 43, p. 2)

The Australian Academy of Technological Sciences and Engineering (ATSE) called for the creation of an independent NWC with significantly wider powers of oversight and assessment, and that reports directly to the Prime Minister and to National Cabinet:

The creation of a contemporary National Water Commission (NWC) to drive the reform process ... will require evolved governance structures to empower it in times of crisis and enable it to operate with the social license required with changing community expectations. It will require the authority to issue public assessments of reform progress, or lack of it. An NWC requires effective policy, jurisdictional coordination and governance to encompass urban water, environmental and ecosystem outcomes and industrial needs. As the NWC will require buy-in from all levels of government, it is proposed that it should report to the Prime Minister and to National Cabinet. (ATSE, sub. 5, p. 2)

However, other participants opposed the creation of 'any new bodies that do not address clear gaps in function, particularly without first assessing the effectiveness of current bodies', or the creation of additional bureaucracy and reporting in water management (Alastair Watson, sub. 17, p. 1; NFF, sub. 32, pp. 3–4 and sub. 70, pp. 5–6; VFF sub. 89, p. 6).

Under the Australian Constitution, the Commonwealth has no jurisdiction over water within states. As the NWI is an interjurisdictional agreement, the Commonwealth has little direct ability to hold states to account. As such, the entity given responsibility for this oversight function requires authorisation by, and should be representative of, the parties to the renewed NWI. While this could be a new Commonwealth statutory agency, its establishment and clear mandate would need to be recognised and supported by all parties to the renewed NWI.

In 2021, the Commission did not see a compelling need for an independent entity to oversee a renewed NWI, and recommended that:

- water ministers oversee the development and evolution of a renewed NWI
- ongoing day-to-day oversight should be performed by the NWRC (a committee of senior officials from the Australian Government and each state and territory government) on behalf of ministers, with the ability to elevate issues requiring ministerial leadership.

In this current inquiry process, the Commission received criticism of the NWRC by the Australian Water Association (sub. 43, p. 3) and the Australian Competition and Consumer Commission (ACCC). The ACCC argued that NWI governance is too heavily reliant on 'state water ministers and the National Water Reform

⁴ ACCC; sub. 11, p. 8; ASSC, sub. 25, p. 4; ATSE, sub. 5, p. 2, and sub. 68, pp. 3–4; AWA, sub. 43, p. 2; DEG, sub. 47, p. 6; EA, sub. 34, p. 5; ECNT, sub. 54, p. 18; HiPCo, sub. 1, p. 7; IA, sub. 9, p. 2; LGAQ, sub. 66, p. 18; Lifeblood Alliance, sub. 67 attachment, p. 2; Melissa Ball, sub. 13, p. 1.

Committee' that there is no clear timetable for discussions and limited ability for public comment on the NWRC's work, and that the NWRC lacks transparency (sub. 82, p. 6).

The Commission has reiterated and strengthened the advice regarding the transparency of the NWRC, as such transparency is necessary to underpin community and stakeholder confidence in government. Regular ministerial involvement is still crucial to reprioritising water reform and providing an imprimatur to the NWRC to progress that work.

Within the scope of this inquiry the Commission has not assessed the overall merits nor possible functions or models of an NWC or other such independent body (relative to current or other arrangements). The Commission considers that in 2024, given current institutional arrangements, the NWRC is the most appropriate body to provide collective oversight of a renewed NWI.

Formalise First Nations' representation directly into the governance structure for a renewed NWI

In 2021, the Commission stated that much more needs to be done to include First Nations peoples' interests in water in jurisdictional planning and the management of water.

The Commission's renewal advice included supporting the establishment of CAWI to, amongst other things: develop a new NWI objective and element; report directly to water ministers; and ensure that parties to the NWI engage with First Nations peoples to achieve meaningful water outcomes with respect to cultural and economic outcomes.

The Commission understands that CAWI is closely involved in negotiations to renew the NWI including regular discussions with the Australian and jurisdictional water ministers and the NWRC. CAWI has published an *Insights paper* (CAWI 2023b) outlining its ambition for First Nations water interests. It continues to build its reputation, profile and visibility as a strategic, influential and representative First Nations voice on water issues (CAWI 2023a, p. 1).

The Commission reiterates its renewal advice from 2021 and supports CAWI's continuing participation in the negotiations to develop the renewed NWI and as part of the ongoing national water reform governance architecture.

Role for Commonwealth leadership

The Australian Government is playing a leading role in driving the negotiation of a renewed NWI, in line with its 2022 election commitment. Despite limited jurisdiction over water matters, the Australian Government must play a strong leadership role for implementing a renewed NWI by providing active support for the institutions discussed above (figure 1.1), being clear on the matters of national policy interest that it is seeking to include in a renewed NWI, coordinating knowledge and best practice (see below) and working with jurisdictions to improve their planning and capabilities.

Participants in this inquiry highlighted that national policy leadership about priorities is a critical element of water reform that is currently absent (AWA, sub. 43, p. 14; David Shearman, sub. 10, p. 6; Sydney Water, sub. 41, p. 15). National goal-setting with clear and agreed policy priorities will support all jurisdictions to improve their water management activities. As Sydney Water stated:

We believe that greater national leadership via the NWI, and Ministerial commitment to a NWI that has a greater focus on climate change action will make NSW's water planning, review and auditing functions more timely, better resourced and more effective. (Sydney Water sub. 41, p. 13)

There is also a role for the Commonwealth to ensure effective, open and coordinated opportunities for participants and stakeholders (from outside government) to engage in the renewal of the NWI. A number of participants in this inquiry were critical of the concurrence between the Commission's review process of the NWI, and the Australian Government's consultation on renewal of the NWI.⁵ For example, the National Irrigators' Council said:

It is imprudent of the Department of Climate Change, Energy, Environment, and Water to concurrently run a separate departmental process whilst the Productivity Commission executes its statutory duties. (sub. 84, p. 1)

The Commission in 2021 also considered that there is an opportunity for the Australian Government to use its investment resources to encourage uptake of best practice water management approaches, and timely implementation of a renewed NWI. Such an approach could be implemented by appropriately conditioning the provision of Australian Government water-related infrastructure and program investments, for example, as is done for shared infrastructure investments under the National Water Grid Fund (chapter 6).

1.3 Greater knowledge sharing, effective coordination, and promotion of best practice

The Commission noted in 2021 that a further benefit of having a strong and empowered entity to oversee the renewed NWI would be an enhanced capacity for the parties to coordinate and jointly work on issues of collective interest (PC 2021b, p. 64). The NWRC has a number of subcommittees and working groups comprised of experts from across the jurisdictions, currently working on a renewed NWI, that could be given a mandate to coordinate knowledge sharing.

As is apparent from the Commission's assessment, there are many areas of water management that could benefit from better coordination, to improve efficiency, reduce duplication and share the benefits of learning amongst jurisdictions.

- **Knowledge and capacity building.** The Commission heard from several inquiry participants and jurisdictions that there is a lack of a coordinated national strategic plan for water research. This undermines jurisdictions' water management efforts due to a lack of a clear evidence base for decision making. There are also issues around the dissemination of water information to users (ACCC, sub. 11, p. 3; ATSE, sub. 5, p. 4; MDBA, sub. 36, p. 7; NFF, sub. 32, pp. 2–3). These issues are discussed further in chapter 10.
- **Environmental water management.** The Commission has found that there would be value in a clear national framework for reporting on outcomes of environmental water management, as well as better coordinated efforts to audit the performance of environmental water managers to deliver those outcomes (LCAQ, sub. 66, p. 14; Susan Young et al. sub. 63, p. 5; Sydney Water, sub. 41). These issues are discussed further in chapter 7.
- **Compliance and monitoring.** Greater information sharing could support compliance efforts between jurisdictions to reduce unauthorised water take. The delays in introducing monitoring and measuring of water extraction could have been avoided had jurisdictions prioritised transparent reporting and consistent implementation (AWA, sub. 43, p. 16). These issues are discussed further in chapter 8.

⁵ AMEC, sub. 92, p. 3; ATSE, sub. 68, p. 1; Murray Irrigation Ltd., sub. 90, p. 2; NIC, sub. 84, p. 1; NSWIC, sub. 88, p. 6; RGA, sub. 86, p. 1; WSAA, sub. 81, p. 1.

- **Water quality management, testing, data collection, guidelines standards** including review of the *National water quality management strategy* could be enhanced through greater national coordination (NHMRC, sub. 6 attachment, p. 8; NSWIC, sub. 88, p. 30; Sydney Water, sub. 41, p. 23). These issues are discussed further in chapter 9.

As the Commission stated in 2021, in renewing the NWI, jurisdictions should recommit to a principle of effective coordination of knowledge building activities (PC 2021b, p. 215). The NWRC could play a greater role in coordinating research efforts across jurisdictions. The NWRC and its subcommittees should work with existing agencies that currently undertake or could undertake some of the functions mentioned here, such as CSIRO, the Inspector-General of Water Compliance (IGWC), the National Measurement Institute, and potentially the announced, but not yet established national Environmental Protection Agency.

1.4 The role of the *Water Act 2007* (Cth)

The terms of reference for this inquiry asked the Commission to provide recommendations on how the Australian Government could better utilise the Commonwealth *Water Act 2007* (the Act) as a framework for guiding national water reform policy. The Commission is not providing formal recommendations in response to this item for a number of reasons.

Practically, the time constraints of this five-month inquiry prevented the Commission from addressing this item and making recommendations in the interim report. This meant we could not have meaningfully sought public feedback – an integral part of any Commission inquiry – prior to the final report being published (three participants with contrasting views raised this aspect of the terms of reference – they are summarised in box 1.3).

Substantively, in terms of sequencing, as the Australian Government has limited constitutional standing in water management,⁶ the Commission considers that further development of national water reform policy via national agreement with the states and territories is required before questions pertaining to utilisation of the Act can be usefully considered.

As discussed, the Australian Government is currently leading a process to renew the NWI, which – if completed – will set out the collectively agreed policy objectives and outcomes of national water reform. It is premature to assess how best the Act could complement any agreed outcomes, or even if a legislative response is the most appropriate way to ‘action’ the Commonwealth obligations under a new national water agreement given the Act is currently focused almost exclusively on issues relating to the Murray–Darling Basin.⁷

These issues should be considered, amongst many others, as part of the review of the Act, for which the Australian Government recently deferred completion until 2027 (Water Act, s 253(1)). In the time until the next review, the Australian Government could usefully articulate its own vision and strategic plan for national water policy, akin to 2007’s *A National Plan for Water Security* (Australian Government 2007). This plan could then guide an assessment of which matters sought to be addressed through a renewed NWI are of national interest, and ahead of a consideration of how those matters can be most effectively actioned (e.g., through an enhanced Act, or national funding etc).

⁶ Under the Constitution the states are primarily responsible for water management (the ‘reasonable use of the waters of rivers for conservation or irrigation’). The Constitutional basis of the Act is a combination of various Commonwealth legislative powers and a small set of referred powers from Murray–Darling Basin state and territory jurisdictions.

⁷ Beyond the Murray–Darling Basin, the national aspects of the Act relate primarily to water information and enable the Bureau of Meteorology to collect and publish water information and water accounting data on a national scale.

Box 1.3 – Submissions on the Water Act

The Ricegrowers' Association of Australia supported the view that policy certainty and collective agreement is required before Commonwealth legislation should be considered:

... we also note the PC is seeking feedback on how the Australian Government can better utilise the *Water Act 2007* (Cth) as a framework for guiding national water reform policy. In short, we don't believe that it can; and given it no longer has Federal bipartisan support, we don't believe that it should ...

... For national reform to be truly successful, it must be underpinned by policy certainty. In particular, this is critical for allowing all communities and industries dependent on water to securely plan for their futures.

Given its strong susceptibility to political whims, and the strong unilateral power it provides the Commonwealth, the Act is a highly unsuitable vehicle for supporting any collective national water reform effort. (sub. 37, p. 5)

The IGWC also noted the limited constitutional power of the Commonwealth in respect of water management, and recommended:

ensuring that issues of governance, accountability and consequence are clearly set out and in a way that is able to be enforced. (sub. 80, p. 11)

In contrast, the Business Council for Sustainable Development advocated for a transformative approach in national water reform, suggesting that two of the tools available to Australian governments to achieve such an outcome are to:

... leverage the *Water Act 2007* to establish a robust framework for sustainable water management, integrating insights from global best practices

and:

... adapt the *Water Act* to contemporary challenges, including technological advancements and evolving environmental conditions. (sub. 7, p. 5)

1.5 Renewal advice

NWI renewal advice in chapters 3, 4 and 5 of the Commission's National Water Reform 2021 inquiry report remains relevant. The Commission extends some of that advice below.

NWI renewal advice 4.1: Governance arrangements for a renewed NWI

UPDATED IN 2024

A strengthened governance architecture that transparently reflects the presence of national water policy leadership and ensures confidence in reform effort, needs to be included in a renewed agreement.

To that end:

- water ministers should convene periodically to oversee development of a renewed National Water Initiative, and to receive, consider and act upon advice that comes out of any periodic review of the new agreement
- the new agreement should clearly link desired outcomes to its objectives and limit prescriptive actions, instead setting out principles for best practice, and fit-for-purpose policy approaches to achieving outcomes
- each jurisdiction should commit to preparing publicly available three-year rolling action plans setting out how they aim to achieve the outcomes set out in the renewed agreement
- three-yearly assessment of the adequacy of these action plans should continue, with public reporting on jurisdictional progress against them, their adequacy in implementing the outcomes of the agreement, and the effectiveness of the agreement, as per the functions the Commission currently performs under the *Water Act 2007* (Cth)
- a requirement for a comprehensive review of national water policy every 10 years should be written into the agreement
- the National Water Reform Committee should provide transparent ongoing collective oversight of the agreement, initiating policy advice and guidance, if need arises, and commission the 10 yearly reviews of the agreement
- the National Water Reform Committee should commission joint projects in each action plan cycle on areas of mutual interest, to share learnings on best practice water management, enhance efficiencies and reduce duplication of effort
- the Australian Government should coordinate, via the National Water Reform Committee, the development of a monitoring, evaluation and reporting framework and plan for the new agreement.

2. Water interests of First Nations peoples

This chapter considers progress since 2021 in achieving the National Water Initiative (NWI) objectives and outcomes relating to First Nations peoples' water interests. However, before beginning the assessment, a reflection on the changed context for reform is necessary.

2.1 Introduction

The context for water reform has changed

As the overview to this report makes clear, the NWI has limited focus on the water interests and rights of First Nations Australians. This means that a backwards looking assessment, required under this inquiry's terms of reference and included in this chapter, has limitations. Much has changed since the NWI was agreed in 2004. The need for reform and renewal of the NWI was clear to the Productivity Commission in 2021, and it remains clear in 2024.

There is now greater recognition by Australian governments that First Nations peoples have been dispossessed of their lands and waters. This dispossession has limited the opportunities for First Nations peoples to determine when, where and how they use water and has significant implications for their economic, emotional, cultural and spiritual wellbeing (PC 2023a, p. 154). This has been recognised by the Victorian Government.

Australia's First Nations peoples have been treated as bystanders in the management, allocation, and ownership of water and water landscapes. (Victorian DELWP 2022c, p. 13)

Australia has endorsed the *United Nations Declaration on the Rights of Indigenous Peoples* that states, amongst other things, that:

Indigenous peoples have the right to maintain and strengthen their distinctive spiritual relationship with their traditionally owned or otherwise occupied and used lands, territories, waters and coastal seas and other resources and to uphold their responsibilities to future generations in this regard. (Article 25)

Indigenous peoples have the right to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired. (Article 26:1)

The 2020 *National Agreement on Closing the Gap* (box 2.1) includes the outcome that Aboriginal and Torres Strait Islander peoples maintain distinctive customs, cultural, spiritual, physical and economic relationship with their land and waters. The Closing the Gap agreement, including governments' commitments to priority reforms and explicit water related-targets, further highlight the stark shortcomings of the original NWI, particularly the lack of recognition of First Nations peoples' water interests and rights.

First Nations peoples have deep knowledge about how to manage water and improve river health, from thousands of years caring for rivers, waterways and wetlands (PC 2023a, p. 154).

The rivers are the veins of Country, carrying water to sustain all parts of our sacred landscape. The wetlands are the kidneys, filtering the water as it passes through the land. First Nations Peoples have rights and a moral obligation to care for water under their law and customs. These obligations connect across communities and language groups, extending to downstream communities, throughout catchments and over connected aquifer and groundwater systems. (MLDRIN, NBAN and NAILSMA 2018, p. 3)

There has been a steady increase in advocacy by First Nations peoples and groups seeking enduring access to, and ownership of, water and its management (DCCEEW 2023e, p. 1). This includes publication of the *National Cultural Flows Research Project* in 2017. The project presented case study sites that consider cultural flows in different cultural, social, economic and ecological settings. These were used to develop an evidence-based framework and principles to inform the development of new approaches to water management that incorporate aspects of First Nations governance and capacity building (MLDRIN, NBAN and NAILSMA 2024).

First Nations peoples have made it clear they aspire to much greater access to, and control over, water resources. Those aspirations have been clearly articulated and supported in submissions to the Commission's current and previous National Water Reform inquiries.

The failure of current laws to recognise the relationship of First Nations people to water and give expression to First Nations' rights in water must be urgently rectified. (KLC, sub. 59, p. 3)

It is of urgent importance to build First Nations institutional capacity in water rights and interests, and that the National Water Reforms support First Nations peoples' mechanisms to engage in advocacy across regional and national forums. (ILSC, sub. 52, pp. 4–5)

It is recommended that a renewed NWI commit the Australian Government, states and territories to uphold standards of self-determination for First Nations people to be leaders in, and make decisions about, water as it affects their lives. Legislation should expressly protect this right. (Terri Janke & Co., sub. 18, p. 7)

In 2024 there is clearer recognition by governments, industry and community groups that more needs to be done to achieve the water interests of First Nations peoples, and that national agreements like the NWI – despite its limitations – can and should be used to guide the achievement of those outcomes.

The NWI has implemented a uniform water management system with an open market structure, thus providing a transparent route for involving our First Nations people in water governance and ownership. This can be achieved through collaborative planning processes, decision-making procedures, or utilizing the available markets to secure water rights for their specific purposes, recognizing that entitlement and usage conditions remain the same regardless of who owns water and what it is for. (NIC, sub. 51, p. 3)

The NWI must also strengthen requirements for partnership and power sharing arrangements to support First Nations influence in water landscapes. This could include a requirement for legislative recognition of First Nations' procedural rights in the management of environmental water, and commitment to advance co-management or power sharing arrangements. (Lifeblood Alliance, sub. 67, attachment, p. 26)

The Commission's advice in 2021 regarding First Nations aspirations in a renewed NWI – which is reiterated and strengthened in this inquiry (section 2.5) – will, if implemented, elevate the water interests and rights of

First Nations peoples into the overarching goal of a renewed NWI. It will centre First Nations peoples in water management decision-making to realise their aspirations for water ownership in line with their ongoing cultural responsibility for rivers and groundwater systems.

Box 2.1 – The National Agreement on Closing the Gap and the United Nations Declaration on the Rights of Indigenous Peoples

In 2020, all governments, along with the Coalition of Aboriginal and Torres Strait Islander Peak organisations, signed the National Agreement on Closing the Gap (the Agreement). The central pillars of the Agreement are four Priority Reforms.

- Priority Reform 1 – Formal partnerships and shared decision making.
- Priority Reform 2 – Building the Aboriginal and Torres Strait Islander community controlled sector.
- Priority Reform 3 – Transforming government organisations so they work better for Aboriginal and Torres Strait Islander People.
- Priority Reform 4 – Improving and sharing access to data and information to enable Aboriginal and Torres Strait Islander communities to make informed decisions.

The Agreement includes targets and indicators that support the cultural wellbeing of Aboriginal and Torres Strait Islander peoples in several areas, including land and waters. One outcome sought is that ‘Aboriginal and Torres Strait Islander People maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters’ (Australian Governments and the Coalition of Peaks 2020, p. 34). A new target is being designed to measure:

... progress towards securing Aboriginal and Torres Strait Islander interests in water bodies inland from the coastal zone under state and territory water rights regimes. ... [t]he target would include data development to identify a nationally consistent measure for inland waters encompassing, for example, water entitlements, water rights and water allocation plans. (DAWE 2022, p. iii)

A separate target will also be developed for service provision for First Nations communities (chapter 9).

In addition, in 2009, Australia endorsed the United Nations Declaration on the Rights of Indigenous Peoples (the Declaration). Articles 25 and 26 state that Indigenous peoples have rights to waters that they have traditionally owned, including the right to own, use and develop those resources. The Declaration makes specific mention of Free, Prior and Informed Consent as a prerequisite for any activity that affects their ancestral lands, territories and natural resources (UN 2007).

The process of implementing the Declaration revolves around three key elements:

- understanding the local context
- understanding First Peoples’ legal and customary rights
- identifying and respecting First Peoples’ decision-making.

Source: Australian Governments and the Coalition of Peaks (2020, pp. 34 and 36); UN (2007); Wensing et al. (2023, p. Appendix C, 3).

The Commission's assessment of actions under the NWI





Under the NWI, jurisdictions agreed that water access entitlements and planning frameworks (element 1) would recognise the needs of First Nations peoples¹ in relation to water access and management. Specifically, NWI parties committed to the following 'First Nations Access' actions:

- including First Nations representation in water planning, wherever possible (NWI paragraph 52 i))
- incorporating First Nations social, spiritual and customary objectives — and strategies for achieving them — in water plans, wherever they can be developed (NWI paragraph 52 ii))
- providing for the possible existence of native title rights to water in water planning processes (NWI paragraph 53)
- accounting for water allocated to native title holders for traditional cultural purposes (NWI paragraph 54).





The Commission has assessed the progress of jurisdictions against the NWI actions outlined in the current agreement. However, in doing so the Commission reiterates the limitations of the 2004 NWI actions, and in undertaking the 2021–2024 progress assessment has reflected contemporary expectations of what constitutes meaningful engagement, including alignment with governments' commitments under the National Agreement on Closing the Gap.

A summary of the Commission's assessment framework (appendix B) and progress against it is in table 2.1. The notes to the table indicate which assessment items relate to which NWI actions.

Table 2.1 – Assessment summary: First Nations peoples' water access and representation under the NWI

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
First Nations representation in water planning processes^c	Largely achieved 	Partially achieved 	All states and territories engaged with First Nations peoples in water planning processes between 2021 and 2024 though some states, for example those in the Murray–Darling Basin, engaged more than others.
Water plans will incorporate First Nations social, spiritual and customary objectives and strategies for achieving these objectives^d	Partially achieved 	Partially achieved 	Some states and territories made progress toward identifying First Nations objectives and strategies to improve them in water planning, environmental watering and natural resource management, though evidence of tangible outcomes between 2021 and 2024 appears limited.

¹ The 2004 NWI refers to Indigenous Access.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Water planning processes will provide for the possible existence of native title rights to water in the catchment or aquifer area^e	Partially achieved 	Partially achieved 	States and territories' planning processes do provide for the existence of native title rights. More needs to be done to provide First Nations peoples access to water.
Water allocated to native title holders for traditional cultural purposes will be accounted for^f	Partially achieved 	Partially achieved 	States and territories do have processes to account for native title rights in water planning. Some jurisdictions are creating alternative policies to recognise native title rights in water.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraph 52 i) **d.** NWI paragraph 52 ii) **e.** NWI paragraph 53 **f.** NWI paragraph 54.

2.2 First Nations peoples' representation in water planning

Summary of actions under the NWI

Under paragraph 52 i) of the NWI, parties committed to provide for First Nations peoples' access to water resources, in accordance with relevant Commonwealth, state and territory legislation, through planning processes that ensure 'inclusion of Indigenous representation in water planning, wherever possible'.

Previous findings (2021)

In 2021, the Commission found that all jurisdictions had made progress in establishing processes to increase representation of First Nations peoples in water planning activities, but further improvements should be made to ensure engagement is effective and meaningful, and that monitoring and reporting against objectives is undertaken (PC 2021a, p. 43).

The report also highlighted that in 2020 all governments signed the National Agreement on Closing the Gap (the Agreement; box 2.1). Of particular relevance to water reform is that the Agreement includes the outcome that 'Aboriginal and Torres Strait Islander people maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters', and that a target for inland waters be developed (PC 2021b, pp. 123–124).

Assessment (2024)

Although many jurisdictions have committed to various action plans and strategies to include First Nations peoples in decision making processes, little has changed since 2021. Meaningful involvement by First Nations peoples in water planning is limited and monitoring and reporting against engagement outcomes and objectives is still lacking.

Engagement by governments is often perceived as not meaningful and has been criticised as a box ticking exercise, characterised by short notice and insufficient provision of necessary preparatory materials to allow

for considered involvement by First Nations peoples in water planning and management decision-making processes. The Dharriwaa Elders Group (DEG) noted that:

Many staff in government water agencies do not have the long-term water policy or ecological knowledge DEG has, nor the power needed to effect change – yet they have been tasked with progressing the governments’ priorities to engage Aboriginal communities.

Some are respectful senior public servants who are very knowledgeable, however they are not routinely building into their processes the time and resources to allow DEG and other [Aboriginal Community Controlled Organisations] to respond or contribute to policy. Too often, the attitude is that if we can’t meet their timeframes and paradigms our solutions are not considered. (sub. 47, p. 3)

First Nations peoples report instances in which governments have failed to adequately engage Traditional Owners or have disregarded community concerns in water planning processes (CLC, sub. 44, pp. 22-24; NLC, sub. 38, pp. 3-4).

Four years after all Australian governments signed up to the National Agreement on Closing the Gap (box 2.1), which included a commitment to ‘a fundamentally new way of developing and implementing policies and programs that impact on the lives of Aboriginal and Torres Strait Islander people’ (Agreement Article 4), jurisdictions continue to fall well short of this commitment in water planning policy. As the Commission’s 2024 review of progress on Closing the Gap highlighted, ‘the commitment to shared decision-making is rarely achieved in practice’ (PC 2024, p. 2). Chapter 11 of this report discusses community partnerships and engagements more broadly, including further examples of First Nations peoples’ dissatisfaction with water planning engagement processes.

In Australia, emerging river management frameworks including rivers as legal entities and place-based approaches, have provided for more local voices to be represented in water planning and management (box 2.2).

Box 2.2 Emerging river management frameworks

Rivers as legal entities

Since 2017, rivers around the world have become legal persons, legal subjects, living persons, and/or living entities. This transfiguration from legal object to legal subject renders the river visible, and legible, to the law in ways it has not been before, and often brings with it new legal rights and powers.

To date, the impact on water law has been relatively minor: new river persons have never yet received any legal rights to the water flowing between their banks ... (O’Donnell 2022)

For example, in 2017 the Victorian state government passed legislation which recognised the Birrarung/Yarra River as ‘one living and integrated entity’. However, the Birrarung has not received any legal rights of its own, and without legal rights, the legal status as a living entity is largely symbolic.

In 2016, the Martuwarra Fitzroy River Council, a body comprised of the Traditional Owners and native title holders of the Martuwarra Fitzroy River catchment recognised the river as a living being, with a right to life. State law in Western Australia has not (yet) incorporated this status of the river as a living being, which leaves the rights of the river currently unenforceable outside the jurisdiction of Traditional Owners (O’Donnell 2021, pp. 645, 650).

Box 2.2 Emerging river management frameworks

Place-based management approaches

Place-based water management approaches are aligned with the National Agreement on Closing the Gap priority reforms, in particular, Reform 1 – formal partnerships and shared decision-making and Priority Reform 3 – transforming government.

'Place' as a frame of reference can provide a focus point for government, as interventions planned, funded and coordinated centrally by government are often not enough to deal with complex challenges. It can help to:

- support civic engagement by enabling communities to apply local skills and strengths, and have a sense of ownership over decisions
- think holistically and systematically by helping to understand how systems impact on people's lives and bring together players from different portfolios and sectors to develop solutions
- support preventative, cost effective-responses by building resilient communities and targeting investment based on what works locally. (Victorian Government 2020, p. 2)

As noted in the introduction, the Commission considers that the context for water reform has changed. The bar for what is considered meaningful engagement with First Nations peoples and organisations is higher than it was in 2021, and considerably higher than in 2004. As such, while the Commission assessed that overall this outcome is 'largely achieved' in 2021, it considers that this outcome is now only partially achieved. This is a result of the lack of meaningful progress in this area, combined with the considerably higher standards expected by communities, and that governments have committed themselves to meeting. These higher standards are described in a submission from the Kimberley Land Council:

Advisory roles for First Nations typically do not go far enough. (sub. 59, p. 1)

Traditional Owner involvement and decision-making should not be limited to current (insufficient) legal frameworks. Further rights and mechanisms for Traditional Owner involvement and decision-making are required on all aspects of water planning and management. (sub. 59, pp. 3)

In their submission the Australian Academy of Technological Sciences and Engineering talked about how a focus on partnerships in a renewed NWI might help realise greater water ambitions for First Nations peoples:

We encourage the NWI to strive for responsible and accountable partnerships that go beyond consultation and engagement, and narrow committee structures. Stronger ties will enhance public confidence and provide a basis for shared empathy to the various stressors and demands on water in national water reform and management. (sub. 68, p. 2)

Below are some examples of jurisdictions' progress, maintenance or backsliding under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

Murray–Darling Basin

Murray–Darling Basin state governments (New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory) are responsible for developing water resource plans (WRPs) that identify the objectives of First Nations peoples for managing water resources, and the outcomes that are desired by First Nations peoples. In doing so, ‘regard must be had to’:

- Indigenous values: the social, spiritual and cultural values of First Nations peoples that relate to the relevant water resources of the WRP area
- Indigenous uses: the social, spiritual and cultural uses of the relevant water resources of the WRP area by First Nations peoples
- the views of First Nations peoples with respect to cultural flows
- the views of relevant Indigenous organisations on a range of other matters, including native title rights and Indigenous Land Use Agreements (ILUAs) (PC 2023a, p. 156).

All Murray–Darling Basin governments (state governments and the Australian Government) have made some efforts over the past three years to improve engagement and collaboration with First Nations peoples to plan and manage water resources, including environmental watering activities, in the Murray–Darling Basin (PC 2023a, pp. 161–162).

Recent amendments to the *Water Act 2007* (Cth; Water Act) and Murray–Darling Basin Plan in 2023 expand:

- the objects of the Water Act (s. 3) to include ensuring ‘that the use and management of Basin water resources takes into account spiritual, cultural, environmental, social and economic matters relevant to Indigenous people, including in relation to their knowledge, values, uses, traditions and customs’.
- the purpose of the Basin Plan (as defined in s. 20 of the Water Act) to provide for ‘the use and management of Basin water resources that takes into account spiritual, cultural, environmental, social and economic matters relevant to Indigenous people’ (Parliament of the Commonwealth of Australia 2023).

Prior to the recent Murray–Darling Basin Plan amendments, there were no ‘formal’ requirements for Murray–Darling Basin state governments to meaningfully and consistently address First Nations objectives when developing WRPs. The Basin Plan requirement to ‘have regard to’ these matters can be (and has been, in some states) interpreted in a minimal way, and there is limited accountability (PC 2023a, p. 161).

Outside the Murray–Darling Basin

Beyond the Murray–Darling Basin, jurisdictions have slowly been increasing their efforts to enhance representation of First Nations peoples in water planning since 2021, with Victoria the most progressed in implementation.

New South Wales

The New South Wales Department of Climate Change, Energy, Environment and Water is currently implementing its *NSW Water Strategy: Towards 2050* which will identify ways of empowering First Nations peoples to contribute to water management and planning decisions. The department has established Regional Aboriginal Water Committees to inform implementation of the strategy (NSW Government 2024b).

Victoria



Building on their Aboriginal Water Program (2016–20), Victoria continues to implement *Water is Life: Traditional Owner Access to Water Roadmap*, which provides a framework to create and maintain a balance between Traditional Owner self-determination in water access and management, and the rights and entitlements of a range of stakeholders.

As of June 2022, the Victorian Government has appointed six First Nations Victorians to water corporations' boards (including in a Chairing role), and seven First Nations Victorians to catchment management authority boards. In addition, the Victorian Government has provided '\$18 million for Traditional Owner water projects (2020–2024) and funding for 17 Aboriginal Water Officers to support Aboriginal values and uses of water across Victoria' (Victorian DELWP 2022c, p. 9).

Queensland



Queensland has allocated \$4.5 million over 3 years for a *First Nations Water Strategy* to support more meaningful engagement and culturally inclusive water planning with First Nations communities. The Queensland Department of Regional Development, Manufacturing and Water intends to undertake on country engagement to develop the scope of the strategy. In mid-2024 a listening report will be published summarising the engagement discussions and strategy's scope and reporting mechanisms (Qld DRDMW 2023b).

Western Australia



The Western Australian Department of Water and Environmental Regulation (WA DWER) engages with the relevant First Nations communities during the development of water allocation plans or significant policies. WA DWER has an Aboriginal Water and Environmental Advisory Group to 'ensure that Aboriginal knowledge, values and needs are considered and appropriately addressed across the Department strategies, policies, programs and planning for the management and regulation of the State's environment and water resources' (WA Government 2024a).

South Australia



The SA Government has committed to strengthening partnerships with First Nations peoples through several initiatives, including the: *First Nations Voice Act 2023* (SA) and the signing of a 'Statement of Commitment' to collaborate with First Nations peoples to manage, protect and restore landscapes, by each of the 9 regional landscape boards (SA LSAB 2021).

The South Australian Aboriginal Partnerships Program also aims to increase the participation of First Nations peoples, groups and organisations in all levels of landscape management, including environmental watering and wetlands management (SA MRLB 2024). In addition, Aboriginal Waterways Assessments are undertaken along the Murray River to measure the cultural health of the River and its wetlands and inform water management activities (SA DEW 2021a).

Tasmania



Tasmania is seeking to increase understanding of Tasmanian First Nations peoples' interests and connections to freshwater systems to progress positive and meaningful improvements in outcomes for

Tasmanian First Nations peoples. Tasmania is planning to refine its water policies in relation to cultural and economic water allocations (NRE Tas 2022c).

Northern Territory



The *Territory Water Plan* includes priority actions aimed at improving First Nations water participation, such as – ‘enhancing Aboriginal participation in water decisions’ (NT OWS 2023c, p. 17). In the Plan, the NT Government commits to strengthening opportunities for First Nations peoples to participate in local water management and decision making, through water advisory committees and Aboriginal Reference Groups (NT OWS 2023c, p. 31).

Noting the NT Government’s ambition to improve First Nations peoples’ representation in water planning and decision-making, the Commission heard from a number of participants who considered that consultation and engagement with First Nations peoples in water planning during the last three years since 2021 has been limited (chapter 11).²

Concerns remain about the extent to which engagement with First Nations peoples has informed water planning and outcomes monitoring over the last three years, and the low level of ambition in water plans around improved understanding of First Nations peoples’ cultural values associated with the Northern Territory’s water resources. For example, the Northern Land Council commented that:

NT legislation does not specify a requirement that Aboriginal people must be part of Water Advisory Committees. Enshrining a requirement for Aboriginal people’s involvement in water advisory remains a crucial element of a refreshed water reform agenda. (sub. 38, p. 4)

The Arid Lands Environment Centre also highlighted frustration with the NT Government’s consultation processes and lack of inclusion of First Nations objectives:

There is no attempt for the objectives or its outcomes to do anything to conserve or protect ecological values. They are vague knowledge gathering exercises where the associated outcome is for there to be an ‘improved understanding’ and that ‘the condition of [groundwater dependent ecosystems] is known and monitored as far as practicable, and bizarrely around the perception of the public that ‘people are confident that key environmental values are ...’. None of these words have any meaning, the Northern Territory Government has not told us what an ‘improved understanding’ means. They are vague and they obfuscate any responsibility for environmental protection ... This analysis is mirrored for the cultural value objectives. (sub. 53, p. 20)

The Georgina Wiso Water Allocation Plan (WAP) is the only plan established or updated since 2021. The Commission notes the following contextual remarks by the NT Department of Environment, Parks and Water Security (NT DEPWS) in its submission to this inquiry:

... while all plans attract debate, the Georgina Wiso Water Allocation Plan 2023–2031 generated more interest than previous NT plans for two main reasons. Firstly, because development of the plan was not advised by a water advisory committee and secondly that the development of the plan was explicitly in response to a recommendation of the Scientific inquiry into Hydraulic Fracturing in the NT. (sub. 72, attachment A, p. 1)

² ALEC, sub. 53, p. 35; CLC, sub. 44, pp. 18–19; EDO, sub. 50, pp. 26–27; NLC, sub. 38, p. 4.

The Commission further notes that within the Georgina Wiso WAP plan area there is ‘currently no competition for the resource and limited interaction between the CLA [Cambrian Limestone Aquifer] and environmental values’ (NT DEPWS, sub. 72 attachment A, p. 7).

The Georgina Wiso WAP specifies environmental and cultural outcomes incompletely – this issue, and the inconsistency with the NWI is discussed further in chapters 4 and 7. The plan also specifies an Aboriginal water reserve (NT DEPWS 2023b). To support public consultation on the Georgina Wiso WAP 2023–2031, stakeholder meetings – as opposed to a use of a water advisory committee – were held to provide an overview of information and activities in the draft plan area, including with the Beetaloo Regional Reference Group and the Northern Land Council (NT DEPWS, sub. 72 attachment A, p. 2).

The Commission heard concerns about the adequacy of the consultation process for the Georgina Wiso WAP. For example, the Arid Lands Environment Centre stated that:

No Water Advisory Committee [WAC] was created and no consultation occurred: Schedule B(i) [of the NWI] makes clear that water plans are to be ‘developed in consultation with all relevant stakeholders.’ Schedule E also states that ‘water planning processes include consultation with stakeholders including those within or downstream of the plan area’. There was no WAC for this plan. No consultation occurred outside of an online ‘Have Your Say’ submission process ... ALEC understands that there was no attempt to consult indigenous stakeholders. (sub. 53, pp. 38–39)

In addition, the Northern Land Council outlined:

The lack of jurisdictional commitment of the [Northern Territory Government] in relation to Aboriginal access and inclusion is illustrated by the Georgina Wiso WAP, declared in November 2023, the largest water allocation plan in the NT. The WAP was developed in the absence of a stakeholder Water Advisory Committee, and without consultation with local Aboriginal people. As a result, there has been no opportunity for Aboriginal people to have meaningful involvement in decision making or to have their needs and rights represented, including consideration of cultural values ... (sub. 38, pp. 3–4)

The Commission notes that the Georgina Wiso WAP commits to multiple forms of engagement with First Nations peoples to support and monitor its implementation over the next eight years (NT DEPWS, sub. 72 attachment A, p. 1).

Australian Capital Territory

The Australian Capital Territory is entirely within the Murray–Darling Basin. The ACT *Water Strategy 2014–44 Striking the Balance Implementation Plan Two (2019–23)* outlines 18 actions and supporting milestones, including to: ensure First Nations representation on governance bodies; establish an Upper Murrumbidgee Aboriginal Nations Group; empower local communities to share their knowledge of land and water; and investigate arrangements for cultural flows (ACT Government 2019a, pp. 16–17). In addition, the ACT Government has developed an Aboriginal Water Assessment tool to enable Traditional Custodians to use a cultural lens to assess the health of Country and set priorities for water and natural resource management (ACT EPSDD 2023a).

2.3 Incorporating First Nations peoples' objectives and strategies for achieving them in water plans

Summary of actions under the NWI

Under the NWI, jurisdictions committed to incorporating in water plans, First Nations social, spiritual and customary objectives — and strategies for achieving them — wherever they can be developed (NWI paragraph 52 ii).

Previous findings (2021)

The Commission's 2021 inquiry found that whilst jurisdictions had amended water plans and planning processes to more explicitly identify and help achieve First Nations peoples' cultural objectives, there was still considerable scope for jurisdictions to better protect cultural sites and accommodate First Nations peoples' water interests by ensuring that:

- cultural objectives are explicitly identified and provided for in water plans
- progress in achieving cultural objectives is regularly monitored and reported publicly (PC 2021b, p. 43).

Assessment (2024)

The Commission's 2021 findings remain relevant. Jurisdictions are still planning, or are in the early stages of implementing, initiatives that better identify, and subsequently protect, cultural outcomes in water plans. Noticeable changes are yet to be realised.

Progress in achieving cultural objectives is not regularly monitored and reported publicly, and there is scope for governments to improve co-ordination and alignment with their other commitments under the NWI and the priority reforms under the National Agreement on Closing the Gap. Some jurisdictions, such as the Northern Territory, Western Australia and Tasmania made limited progress in planning or implementing initiatives that identify and help achieve First Nations peoples' cultural objectives between 2021 and 2024.

Greater potential exists to partner with local governments, natural resource management groups such as catchment management groups, Aboriginal Rangers programs and other stakeholders to plan and implement actions to achieve cultural and environmental outcomes, as the Murray–Darling Basin Authority articulated:

There is an opportunity for the NWI to consider how water management arrangements can work with other policies and programs (for example Ranger programs, community development and employment programs) to support First Nations communities to achieve their goals in a community-centred way. (sub. 36, p. 4)

The Arid Lands Environment Centre also supported catchment-based water management approaches:

The promotion of integrated environmental water, waterway and catchment management in NWR [National Water Reform] 2020 creates a strong case for strengthening provisions in the NWR 2024 (sub. 53, p. 17).

Investment by NWI Parties is also needed in order to:

- empower First Nations organisations to be partners in water planning decision making
- plan engagement activities with First Nations peoples
- develop water specific materials (online, print, webinars, in person) with First Nations peoples, to support meaningful engagement.

New South Wales



Since 2021, New South Wales has finalised several Water Sharing Plans which specify high-level cultural objectives. For example, clause 10(1) of *the Water Sharing Plan for the New South Wales Great Artesian Basin Groundwater Sources 2020* outlines ‘the broad Aboriginal cultural objective of this Plan is to maintain the spiritual, social, customary and economic values and uses of groundwater by Aboriginal people’ (NSW Government 2020, p. 11).

In the Commission’s 2023 *Murray–Darling Basin Plan Implementation Review*, a number of participants emphasised that the NSW Government failed to address key gaps in their WRP processes. These included limited or no consultation with all Nations identified in WRPs, a lack of clarity about the scope and purpose of the engagement, and insufficient time for participants to respond when substantial issues or concerns emerged (PC, 2023, p. 160).

The NSW Government notes that WRPs in the New South Wales Murray–Darling Basin are now informed by local consultation with First Nations peoples on a Nation-by-Nation basis, aimed at improving efficacy and honouring connection to Country (NSW DPIE 2023, p. 7).

In April 2024, the NSW Government withdrew three WRPs from the Murray–Darling Basin Plan WRP assessment process as the Aboriginal cultural objectives outlined in the plans no longer reflected community priorities and required further consultation. Plans are expected to be resubmitted by December 2024, pending engagement with Traditional Owners and the local First Nations community (chapter 4).

Priority 2 of the *NSW Water Strategy: Towards 2050* is ‘Recognise First Nations/Aboriginal people’s rights and values and increase access to and ownership of water for cultural and economic purposes’. Actions include ‘Strengthen the role of First Nations/Aboriginal People in water planning and management’ and ‘Work with First Nations/Aboriginal People to maintain and preserve water-related cultural sites and landscapes’ (NSW DPIE 2021a).

Queensland



In Queensland, from 2018 new or replacement water plans need to explicitly recognise the importance of water resources for First Nations peoples. Cultural outcomes are stated separately instead of being embedded in social, economic or environmental outcomes, and water plans need to include strategies for their achievement, monitoring and reporting (Business Queensland 2024).

All Queensland water plans since 2018 state First Nations cultural outcomes separately from other social environmental and economic outcomes. Finalised in 2023, the *Barron Water Plan* identifies several cultural outcomes, including to recognise and respect the cultural and spiritual connection to water of First Nations, through engagement in decision–making processes and integration of First Nations knowledges and sciences into water management (Queensland Government 2023). All water plan outcomes are monitored and assessed in accordance with the performance assessment requirements under the *Water Act 2000* and *Water Regulation 2016* (Queensland Government, pers. comm.).

Western Australia



No water allocation plans in Western Australia specifically address cultural water outcomes. The cultural water interests of First Nations peoples are considered in the development of water allocation plans and where possible, water can be reserved for the economic development of First Nations communities (WA Government 2023c).

One plan – the *Gnangara Groundwater Allocation Plan* – has been released since 2021. The Plan has limited information on First Nations or other public benefits and included limited consultation with First Nations peoples (WA DWER 2022b).

South Australia

A new *Far North Prescribed Wells Area Water Allocation Plan* was adopted in February 2021. The plan aims to: support Aboriginal peoples water interests through the provision of access to the water resource; and recognise and incorporate the traditional knowledge of Aboriginal peoples in managing the extraction and use of using water from the groundwater resource (SA ALLB 2024).

The revised *Adelaide Plains Allocation Water Plan (2022)* does not specifically identify water needs for First Nations peoples although the plan does outline a cultural water consumptive pool for native title holders to take and use water for personal, domestic, cultural, spiritual and non-commercial water needs (SA DEW 2022a).

The Commission understands that the SA Government has commenced conversations with First Nations peoples to gain a better understanding of cultural objectives for the Adelaide Plains prescribed water resource and, in reviewing the *Mount Lofty Ranges Water Allocation Plan* (SA HFLB 2024).

Tasmania

In Tasmania, non-statutory Water Management Statements document the current water management arrangements for a catchment. Specification of cultural and environmental outcomes in these statements appears limited (NRE Tas 2023g). Since 2020, engagement with First Nations peoples when reviewing water management plans in Tasmania has been undertaken, to explore cultural objectives and identify review priorities. For example, in reviewing the *Mersey Water Management Plan* the Tasmanian Government has engaged with First Nations peoples to explore cultural values and the significance of waterways and catchments to First Nations (Tasmanian Government, pers. comm.).

Only the *Great Forester River Catchment Water Management Plan* has been reviewed since 2020. The Plan sets out some environmental objectives and includes a preamble acknowledging and describing the cultural significance of the Great Forester River and catchment to Aboriginal peoples. There is no specification of First Nations peoples' objectives, ownership or cultural flows (Tasmanian DPIPWE 2021a).

In addition, the Department of Natural Resources and the Environment Tasmania commenced review of the Ansons, Boobyalla and Tomahawk River catchment Water Management Plans in 2023 and has sought to engage with First Nations peoples and organisations to understand First Nations perspectives and topics for the reviews (Tasmanian Government, pers. comm.).

Northern Territory

All water allocation plans in the Northern Territory identify cultural objectives and the NT Government is currently establishing an Aboriginal Water Advisory Council to help identify opportunities for First Nations peoples to participate in water management (NT OWS 2023c, p. 31).

In its submission, the Central Land Council outlined that the Northern Territory's Water Allocation Planning Framework 'makes no mention of and does not provide for Aboriginal water interests or cultural values' (sub. 44, p. 12).

In its submission, the NT DEPWS noted that ‘the NT Water Allocation Planning Framework prioritises allocations for environment and other public benefit. Per the definitions in Schedule B(ii) of the National Water Initiative, other public benefits include indigenous and cultural values’ (sub. 72, attachment A, p. 2).

2.4 First Nations peoples’ access to water, including through native title rights to water

Summary of actions under the NWI

Under the NWI, jurisdictions agreed that water access entitlements and planning frameworks would recognise the needs of First Nations peoples in relation to water access and management (paragraph 25.ix). Specifically, the NWI parties committed to:

- take account of the possible existence of native title rights to water in the catchment or aquifer area in water planning processes³
- account for water allocated to native title holders for traditional cultural purposes.⁴

Native title, on its own, does not provide access to water in the form of entitlements. Native title determinations typically allow for non-exclusive access to water on native title land for non-commercial use. Native title rights to access water for personal, domestic, social and cultural purposes are commonly recognised in native title determinations. The right to use water for commercial purposes has not, to date, been expressly recognised in native title legislation (PC 2021a, pp. 39–40).

Previous findings (2021)

In 2021, the Commission found that whilst most jurisdictions had policies to account for native title rights in water planning, some states have created alternative ways for Traditional Owners to access water based on native title rights. For example, native title determinations in water planning areas had in some instances led to Strategic Aboriginal Water Reserves (SAWRs) being created in the Northern Territory, Queensland and Western Australia. The Commission found that despite this, there are still few examples of the use of native title rights by Traditional Owners to access water, and jurisdictions should continue to adapt their policies to overcome the limitations of native title legislation in giving Aboriginal and Torres Strait Islander people access to water (PC 2021a, p. 44).

Assessment (2024)

The Commission’s 2024 assessment mirrors that of 2021. There is still generally limited use of native title rights to water. That said, some jurisdictions are achieving water access outcomes for First Nations peoples. For example, the *Yamatji Nation Indigenous land use agreement* has realised water and funding for Traditional Owners in Western Australia through a SAWR. Similarly, water for Traditional Owners and Aboriginal Corporations has been set aside in Victoria in the Mitchell River, Palewarra and Goulburn Murray catchments.

³ NWI paragraph 53.

⁴ NWI paragraph 54.

Strategic Aboriginal Water Reserves

A SAWR is a portion of water that is put aside for First Nations peoples' future use in water plan areas. It is enabled by state or territory water legislation. Water in the reserves is often allocated based on Indigenous land holdings. Only some forms of tenure are 'eligible' for an Aboriginal water reserve and the definition of 'eligible' land varies between jurisdictions. SAWRs are not a guarantee of secure water access entitlements or licences and legal protection for Indigenous water reserves varies between jurisdictions (Taylor et al. 2022, pp. 3–8).

It can be challenging for First Nations peoples to access water from SAWRs. Applying for a licence to take water can require providing a business development plan that specifies intended economic uses of the water, and scientific studies to assess the potential impacts of extraction and use. These activities require business and technical knowledge and can be costly and time consuming.

Meeting future aspirations of all water users is also characteristic of the challenge that jurisdictions face in their efforts to increase water ownership amongst First Nations peoples using SAWRs. For example, in some places where SAWRs are being instituted (Northern Territory and Queensland), First Nations peoples are unable to access these water reserves due to competition from existing commercial water users (Sue Jackson and Erin O'Donnell, sub. 57, p. 9).

The Kimberley Land Council, commenting on SAWRs in Western Australia, noted that:

Traditional Owners still have many questions about how Aboriginal water reserves might work and whether they will serve Traditional Owner interests. There remains a lack of information and understanding about the pros and cons of Aboriginal water reserves. (sub. 59, p. 4)

The Commission notes that governments have not provided publicly available frameworks, guidelines, process flowcharts or other information that would help First Nations peoples navigate the application process to apply for access to water from a SAWR. The Commission requested the Queensland and Western Australian water departments' assistance with illustrating and describing their respective SAWR application processes, however they did not provide materials detailing their processes because such guidelines and flowcharts have not been developed.

There remains a need for all governments with SAWR processes to design clear, transparent and sufficiently detailed materials about the existence of SAWRs (and other relevant policies) and describe how they can be accessed by First Nations peoples – ideally in collaboration and partnership with First Nations peoples and with a focus on human centred design.

Water entitlements through market purchases

In regions where water rights are fully allocated, jurisdictions can provide water entitlements to First Nations communities by purchasing entitlements on the market. The Australian Government's Murray–Darling Basin Aboriginal Water Entitlements Program (AWEP) is an example of an entitlement purchase initiative.

Several participants in this inquiry supported this approach, noting that additional water for First Nations peoples whether it 'be achieved through the market, through existing Indigenous reserves, or where available through unallocated water, it cannot come at the expense of reliability for existing entitlement holders' (Cotton Australia, sub. 91, p. 2). The NSW Irrigators' Council voiced similar sentiments, arguing that they 'do not support the prioritisation of one water user groups rights over others' (sub. 88, p. 14). Some participants outlined the need to ensure that provision of water for First Nations does not result in third party

impacts to existing entitlement holders (box 2.3) and a desire for transparency when assigning unallocated water to First Nations, particularly in Murray–Darling Basin catchments that are over-recovered.⁵

Accessing water for economic development and self-determination

First Nations peoples own and control less than 0.2% of water nationally (DCCEEW 2024b) and data holdings are of low quality (for example Sue Jackson and Erin O’Donnell, sub. 57, p. 7). As the NSW Aboriginal Land Council outlined in its submission to the Commission’s Murray–Darling Basin Plan Implementation review 2023, in NSW:

Our ownership of water is minuscule and has been going backwards. ... Aboriginal water holdings between 2009 and 2018 indicate a new wave of dispossession. Almost one-fifth of Aboriginal water holdings by volume were lost during this time. (NSWALC 2023)

A new target under the National Agreement on Closing the Gap is being designed to progress towards securing First Nations peoples’ interests in water bodies inland from the coastal zone under state and territory water rights regimes (NIAA 2023). There is a provisional target for Aboriginal and Torres Strait Islander ownership of national water entitlements in inland waters of 3% (NNTC 2024). The Joint Council on Closing the Gap indicated it expects to consider the inland waters target again in 2024 (2023, p. 2). The finalisation of the target provides further impetus for governments to consider how best to increase First Nations peoples’ ownership of water entitlements, and, as raised by one submission, address issues around how ‘to improve the evidence base, particularly to understand better the status of Indigenous [water] ownership and to track, as well as report, changes over time’ (Sue Jackson and Erin O’Donnell, sub. 57, p. 7).

However, as noted by the Commission in 2021, access to water is not the only barrier that First Nations peoples may face in taking advantage of economic development opportunities. Other factors, such as access to specialist skills and knowledge, experience with water related businesses, and the infrastructure and financial capital needed to make best use of water are just as important. Water access arrangements for First Nations peoples are likely to produce the greatest community value when they are part of a broader strategy for self-determined community development, which may include investment in education, training and business development (PC 2021c, p. 28). A co-ordinated approach by governments to provide suitable education and training for First Nations peoples and communities interested in water access and ownership is an important step.

Inquiry participants outlined broad support for increasing First Nations peoples’ access to, and ownership of water (box 2.3).

Box 2.3 – Support for increasing First Nations water access and capacity building

National Farmers Federation (NFF)

- The NFF supports the provision of water for indigenous use only where this does not result in third party impacts to existing entitlement holders, including the environment...
- The NFF supports the use of existing market mechanisms to acquire indigenous water entitlements from willing sellers for contemporary economic use.

⁵ AMEC, sub. 92, p. 7; Cotton Australia, sub. 91, p. 2; Murray Irrigation Ltd, sub. 90, pp. 7–8; NFF, sub. 70, p. 10; NSWIC, sub. 88, p. 14.

Box 2.3 – Support for increasing First Nations water access and capacity building

- The NFF acknowledges that the ownership framework for indigenous water entitlements for contemporary economic use is a matter for governments and indigenous peoples. (sub. 70, attachment 1, pp. 1–2)

Lifeblood Alliance

First Nations access to water resources must be advanced through measures that support acquisition of water rights (entitlements, licences and other water ‘products’) in fully allocated systems, as well as provision for reservation or transfer of identified volumes in systems with unallocated water resources. (sub. 67, attachment, p. 26)

Professor Sue Jackson and Dr Erin O’Donnell

[I]t is imperative that governments closely work with Indigenous representatives to identify the means of addressing the substantive issues pertaining to Indigenous water rights. Resources should be made available to assist Indigenous organisations and communities to prepare policy positions, options for law reform, and contribute fully developed ideas to the process of NWI review. (sub. 57, p. 2)

NSW Irrigators’ Council

NSWIC supports that “access [to First Nations] is provided by sourcing water within existing water entitlement frameworks, such as by purchasing water on the market”. When considering First Nations water interests under the objectives of the NWI, current planning and entitlement frameworks must be upheld in the allocation of water. (sub. 88, p. 14)

Interim First Nations Working Group

[T]o participate in all levels of water governance (including to hold and manage water access entitlements for community benefit) a national water reform initiative must invest in building the capacity of First Nations communities to reasonably participate. Limited inclusion of First Nations in freshwater use planning and decision-making has been a major factor in the limited recognition so far achieved. This is an opportunity to strengthen First Nations freshwater rights, particularly with respect to rights to licensed allocations for economic purposes. (sub. 78, pp. 2–3)

NSW Aboriginal Land Council (NSWALC)

NSWALC supports the development of shared water-related definitions across jurisdictions and the Commonwealth. Reaching a shared understanding of water security and water related terms support a whole of government approach to water management, climate change and meeting the Closing the Gap inland water targets. (sub. 60, p. 3)

Box 2.3 – Support for increasing First Nations water access and capacity building

Committee on Aboriginal Water Interests (CAWI)

The Committee encourages jurisdictions to explore the many different potential water ownership and access models and arrangements for Aboriginal and Torres Strait Islander Peoples, including native title, trusts, entitlements, temporary licences and strategic water reserves. The Committee strongly recommends that jurisdictions include Aboriginal and Torres Strait Islander rights and interests in decision-making around water access entitlements and planning frameworks when considering the trade-offs between economic, social and environmental considerations. (sub. 95, p. 15)

Australian Government



The AWEP aims to support Murray–Darling Basin First Nations communities’ investment in cultural and economic water entitlements and associated water planning activities.

The AWEP commenced in 2018 with \$40 million to support Murray–Darling Basin First Nations peoples to purchase cultural and economic water entitlements. Funding for the AWEP was increased to \$100 million in 2023 (Plibersek and Hanson-Young 2023a). To date, no AWEP money has been spent on water purchases. Some of the reported program implementation challenges include administrative changes and diverse perspectives on how the funding should be allocated to ensure enduring shared benefits for First Nations from the AWEP (DCCEEW 2024b, p. 5).

The Australian Government Department of Climate Change, Energy, the Environment and Water is implementing interim governance arrangements for the AWEP so that water entitlements can be purchased now. This will help ensure the \$100 million investment’s buying power is not reduced over time. Murray–Darling Basin First Nations peoples have informed the design of the interim arrangements, based on the principles of cultural recognition and safety (DCCEEW 2024g).

New South Wales



The NSW Government has committed to increasing First Nations peoples’ ownership of and access to water for cultural and economic purposes. The *NSW Water Strategy: Towards 2050* identifies First Nations peoples’ access and ownership of water for cultural and economic purposes as a priority. Associated actions include developing an Aboriginal water strategy, provision of water ownership and preservation of water related cultural sites (NSW DPIE 2022b).

The NSW Government is working with six First Nations stakeholder groups to develop a Cultural Watering Plans pilot program, building on the *National Cultural Flows Research Project*. These plans are intended to improve understanding of how First Nations peoples want to use their cultural water and what barriers there are to accessing water (NSW Government 2024a).

In New South Wales, Aboriginal peoples can access water for cultural purposes through an Aboriginal Cultural Specific Purpose Access Licence. However, at the end of 2022, uptake of this licence was very low, with only seven licences ever issued, and two currently in place (NSW Government 2024a). The Aboriginal Water Program is looking to understand the barriers and challenges experienced by people looking to access water for cultural purposes.

Queensland

The Queensland *Water Act 2000* does not prescribe the requirements for allocation of water to Native Title holders, however water plans may prescribe eligibility requirements, including recognition of First Nations peoples who hold Native Title within a water plan area.

First Nations peoples have a right to access water for cultural purposes and traditional activities under section 95 of the Queensland Water Act regardless of native title. The Water Act recognises that all First Nations peoples have rights and interests in water regardless of whether they hold Native Title over land within a water plan area (Queensland Government, pers. comm.).

In late 2023, the Queensland Government established two new Aboriginal water reserves on North Stradbroke Island (Minjerribah). 'One reserve, totalling up to 30,595 megalitres was established for the social and economic benefit of the Quandamooka people. This includes ongoing land rehabilitation and commercial activities. The second reserve also up to 30,595 megalitres would be to preserve the unique water-related environmental and cultural values of the island' (Qld DRDMW 2023k).

Implementation of these reserves will include finalising water assessments and a fit-for-purpose groundwater model that will help inform future decision-making about the allocation and management of water. The Queensland Department of Regional Development, Manufacturing and Water and the Quandamooka Yoolooburabee Aboriginal Corporation have commenced working collaboratively to deliver these initiatives (Qld DRDMW 2023d, p. 5).

Victoria

The Victorian Government has, since 2021:

- returned 2 gigalitres per year (GL/yr) of unallocated water from the Mitchell River in Gippsland to the Gunaikurnai Land and Waters Aboriginal Corporation in early 2021 for cultural and economic development purposes
- returned 2.5 GL/yr of unallocated water in the Palawarra (Fitzroy River) system in southwest Victoria to the Gunditj Mirring Traditional Owner Aboriginal Corporation
- set aside 1.36 GL/yr of additional water savings from the Goulburn Murray Connections project for Traditional Owners in northern Victoria (Victorian DELWP 2022c, pp. 8–9).

However, in their submission to this inquiry, Sue Jackson and Erin O'Donnell noted that although Victoria has issued four section 51 water licences to Traditional Owner organisations since 2021, these collectively do not bring the total volume above 0.2% of water rights in Victoria (sub. 57, p. 6).

The *Water is Life, Traditional Owner Access to Water Roadmap* includes 12 targeted outcomes and associated actions, including that:

- water is returned to Traditional Owner groups across Victoria through the issue of water entitlements for their self-determined use
- access to land will not be a barrier to Traditional Owners applying for or holding water entitlements
- Traditional Owners will be funded to pay any fees and charges associated with their water entitlements unless use is purely commercial
- where Traditional Owners become purely commercial users of water, they will become responsible for an increasing portion of fees and charges over time to full cost recovery
- Traditional Owners can hold and manage water in culturally appropriate ways and have oversight of the implementation of Water is Life (Victorian DELWP 2022c, pp. 10–11).

These initiatives represent progress in providing water access and ownership to First Nations peoples. But there is limited information regarding the impact that the return of water to the Gunaikurnai Land and Waters Aboriginal Corporation and the Gundiṯj Mirring Traditional Owner Aboriginal Corporation is having on their communities.

Western Australia

Aboriginal water reserves are being implemented on a local scale through water allocation plans or state-led negotiated settlement outcomes as part of ILUAs. Western Australia is applying Aboriginal water reserves in local areas to ensure that they are designed to achieve outcomes for economic development by Traditional Owners. Some examples follow:

- The *Derby groundwater allocation plan: draft for public comment 2020* is the first plan in Western Australia that has proposed an Aboriginal water reserve (WA DWER 2020, pp. 24–25).
- The recently released *Water allocation planning in the Fitzroy – Policy position paper* suggested an Aboriginal water reserve will be set aside as part of a suite of policies designed to recognise and involve Aboriginal peoples in water regulation and management (WA DWER 2023d, p. 6).

As raised previously, Traditional Owners have many questions about how Aboriginal water reserves will work:

It is unclear whether making water available for Traditional Owners will increase their opportunity to gain economic advantage from the granting of licences, with the cost of licences just one factor to consider. Further, if Aboriginal water reserves place a limitation on water being used only for economic development and not other purposes – such as cultural, social and ecological purposes – this may not align with Traditional Owner aspirations and priorities.

Other questions relating to Aboriginal water reserves – particularly in the context of the Martuwarra Fitzroy River – relate to how water would be allocated between Traditional Owner groups, how customary law would be reflected, and what percentage of the total groundwater allocation the Aboriginal water reserve would comprise. (KLC, sub. 59, p. 4)

Western Australia has developed and established the first Aboriginal water reserve in the state through the *Yamatji Nation Indigenous Land Use Agreement (2020)* under the *Native Title Act 1993* (Cth).

- The reserve provides up to 25 GL of accessible groundwater per year for the exclusive use, or trade, for economic benefit by the people of the Yamatji Nation.
- \$20 million will be provided over ten years to carry out groundwater investigations to develop and manage sustainable access to the Yamatji Nation Aboriginal water reserve.
- Negotiated ILUAs between the state government and Native Title holders provide funding to support the protection and restoration of Aboriginal cultural water sites through actions such as fencing, rehabilitation or the capturing and telling of cultural water stories through publications or interpretive signage.
- Yamatji Rangers will undertake activities associated with the management of the Yamatji Conservation Estate and rehabilitation of abandoned mine sites within the agreement area under the management plan.
- The reserve enables the Yamatji Nation to trade water entitlements to third parties without needing to be a water licence holder.
- The Yamatji Nation secured a water trade agreement in the first year of implementing the ILUA (WA DPC 2020c, 2020a).

The Yamatji agreement includes a diverse range of benefits. However, the provision of 25 GL/yr of water for ‘use or trade’ appears to be tied to economic and business development outcomes with resource intensive governance arrangements through the Yamatji Southern Regional Corporation (WA DPC 2020b). The

Martuwarra Fitzroy River Council had a negative view of ILUAs, stating they 'are not a substitute for, or adjunct to, formal recognition of the existence of inherent Indigenous water rights' (sub. 75, p. 10).

Northern Territory

There are six current water allocation plans that cover 14 percent of the Northern Territory's land area (NT DEPWS, sub. 72, attachment 2, p. 3). The *Water Act 1992* (NT) outlines that a water allocation plan is to include an Aboriginal water reserve if any of the land in the water control district to which the water plan relates is eligible land (NT Government 1992, p. 27). The reserve is held for the benefit of eligible Aboriginal peoples until they are ready to use it, or they can choose not to use it, if leaving the water unused delivers spiritual, cultural, environmental and economic benefit by remaining untouched (NT DEPWS, sub. 72, attachment B, p. 1).

The Georgina Wiso WAP, finalised in 2023, establishes an Aboriginal Water Reserve (NT DEPWS 2023b).

The Ooloo Dolostone Aquifer WAP 2019–2029 includes a 'Strategic Aboriginal Water Reserve calculation within each groundwater management zone' and Schedule B of the plan outlines 'notional allocations to Strategic Aboriginal Water Reserve rights holders' (NT DENR 2019b, pp. 73 & 115). According to the NT DEPWS, the reserve volume available rose from 9,825ML in 2019 to 15,627ML in 2023 (sub. 72, attachment 2, p. 3).

In its submission, the Environment Centre NT noted that:

... the Ooloo WAP states: 'The Northern [groundwater management zone] is overallocated. As a consequence the Strategic Aboriginal Water Reserve is notional and cannot be provisioned.'
(sub. 54, p. 7)

Across the Northern Territory's water plan areas, the total volume of Aboriginal water reserves is more than 81 GL/yr, of which 66 GL/yr is available for use. Aboriginal water reserves are 20 percent of the consumptive pool allocated in water allocation plans, excluding allocations to public water supply and rural stock and domestic purposes (NT DEPWS, sub. 72, attachment B, p. 1–2).

The Aboriginal Water Reserve Policy Framework was introduced by the NT Government in 2017 as a mechanism for Aboriginal economic empowerment, however supporting legislation to enable access to water in reserves has not been finalised (Taylor et al. 2022, p. 10). The NT DEPWS notes that they are in the final stages of working with Aboriginal stakeholders on how Aboriginal water reserves will be managed, by establishing regulations that prescribe the group of Aboriginal peoples that will provide consent to access the reserve and the method for how consent will be determined (sub. 72, attachment B, pp. 1–2).

Some participants in this inquiry expressed concerns about the challenge of accessing water through Aboriginal water reserves in the Territory (CLC, sub. 44, pp. 21–22; ECNT, sub. 54, p. 7; Sue Jackson and Erin O'Donnell, sub. 57, p. 9).

Aboriginal water reserves in the Northern Territory are only available:

- in areas where the minister has declared a water allocation plan
- where systems are not overallocated
- to Aboriginal peoples with rights to land under the Aboriginal Land Rights (Northern Territory) Act 1976 (Cth) and Exclusive Possession Native Title and only allow for licenses for the purpose of extraction for economic use. Leaving water in the ground for environmental and cultural uses is not supported (CLC, sub. 44, pp. 21–22).

In addition, to come into being, the SAWR requires the existence of at least 1 hectare of 'eligible land' within a WAP area. The eligibility criteria affects both land to which the SAWR applies ... as well as the Indigenous organisations that are eligible to access the SAWR ... Land under a non-exclusive possession native title determination is not considered to be eligible land. The definition means that a large area of the Northern Territory will be ineligible for access to a Reserve, because the majority of its native title determinations are non-exclusive determinations over pastoral leases. (Jackson and O'Donnell, sub. 57, p. 9)

The Department of Environment, Parks and Water Security in the Northern Territory is working with Land Councils to adopt a specific and solely Aboriginal decision-making framework for designating Aboriginal land eligible for the Aboriginal water reserve and consenting to applications for water extraction licence applications from the reserve (sub. 72, p. 2).

2.5 Renewal advice

Incorporate First Nations objectives into the objectives of a renewed NWI

The Commission advised in 2021 that a renewed NWI should include both an objective and a new element dedicated to First Nations peoples' access to water and the involvement and participation of First Nations peoples in water management.

This inquiry supports and extends that advice below, which received broad support in submissions to the interim report (ATSE, sub. 68, p. 2; IFNWWG, sub. 78, p. 2; Lifeblood Alliance, sub. 67, p. 1; NSWALC, sub. 60, p. 1). For example, the Water Services Association of Australia outlined:

We support the Commission's ... recommendation to elevate and create a dedicated objective on First Nations values and involvement in water management ... and the ongoing role of the Committee on Aboriginal and Torres Strait Islander Water Interests, while noting the importance of other First Nations voices as well. (sub. 81, p. 4)

The NSW Irrigators' Council (NSWIC) stated:

NSWIC supports the inclusion of a new objective and element for First Nations access to water and involvement and participation in water management. (sub. 88, p. 13)

The Commission emphasises that its renewal advice 3.1 commits the parties to a renewed NWI to recognise First Nations peoples' desire to participate in *all significant processes and decisions* informed by it. This is a general idea that should permeate the agreement – a point made by CAWI in its submission to this inquiry:

Each aspect of the NWA [National Water Agreement] needs to be considered through a Aboriginal and Torres Strait Islander lens and not just be limited to a specific Aboriginal and Torres Strait Islander goal and objective. (CAWI, sub. 95, p. 10)

NWI renewal advice 3.1: A modernised goal

UPDATED IN 2024

The overarching goal of the National Water Initiative remains sound but should be modernised through reference to mitigation of and adaptation to climate change and recognition of the importance of water in the lives of First Nations peoples. Suggested wording follows:

The Parties commit to this renewed National Water Initiative in recognition of the continuing national imperative to increase the productivity and efficiency of Australia's water use, to service the changing needs of rural, urban and First Nations communities and to ensure the health of river and groundwater systems and their surrounding landscapes whilst adapting to a changing climate.

In committing to this agreement, the parties recognise First Nations peoples' reverence and ongoing cultural responsibility for rivers and groundwater systems and their desire to participate in all significant processes and decisions informed by this Initiative.

NWI renewal advice 3.2: Modernised overarching objectives

UPDATED IN 2024

The National Water Initiative has a strong focus on water resource management. A renewed agreement should give greater emphasis to water service provision, and this should be reflected in the overarching objective. The objective should also include reference to cultural outcomes to recognise the aspirations of First Nations peoples, where cultural outcomes may be inclusive of economic development outcomes. Suggested wording follows.

The overarching objectives of the Parties in implementing this agreement are to:

- optimise economic, environmental, social and First Nations peoples' cultural outcomes through best practice management of Australia's water resources. In the process, this will provide certainty for investment, water users, the environment and First Nations peoples
- enable entitlement holders, communities and the environment to contend with climate variability and adapt to a changing climate
- ensure effective, efficient and equitable provision of water services that meet the needs of customers and communities in a changing climate.

Committee on Aboriginal and Torres Strait Islander Water Interests

Establishment of the committee

In 2021, the Commission supported the establishment of CAWI to develop the new NWI element and outlined that in developing the new element, the committee should:

- ensure alignment between commitments under the National Agreement on Closing the Gap and new NWI content
- have a terms of reference that allows for an advisory role to the Coalition of Peaks
- report directly to water ministers.

CAWI's current terms of reference outline that the role of the Committee will be to 'identify, inform and advise the National Water Reform Committee, the Australian Government, and the Water and Murray–Darling Basin Ministers Council' on:

- national Aboriginal and Torres Strait Islander water policy principles that will support the national Aboriginal and Torres Strait Islander water policy framework
- priority national water reform directions (DCCEEW 2020, p. 1).

CAWI's activity since 2021

CAWI continues to build its visibility as an influential First Nations voice on water issues. CAWI meets regularly and provides publicly available communiques after each meeting outlining key meeting outcomes, providing a level of transparency regarding their activities. The Australian Government has committed \$700,000 to support CAWI to December 2026 (DCCEEW 2024a).

CAWI is closely involved in negotiations to renew the NWI, including drafting of a renewed objective, and has regular discussions with the Australian and jurisdictional water ministers and the National Water Reform Committee (DCCEEW 2024a). The National Farmers' Federation supported CAWI maintaining 'its advisory responsibilities to water ministers, the National Water Reform Committee and Ministerial Council regarding: national First Nations' water policy principles, to support a First Nations water policy framework; and priority national water reform directions' (sub. 70, p. 6). In addition, the NSW Irrigators Council outlined:

We acknowledge the role of the Committee on Aboriginal and Torres Strait Islander Water Interests (CAWI) and the importance of its input into this new element of a National Water Agreement in line with commitments under the National Agreement on Closing the Gap, engagement with First Nations groups, and with direct reporting to water ministers.
(sub. 88, pp. 13–14)

In 2023, CAWI produced an Insights Paper to support conversations and a shared understanding about First Nations peoples' water interests and values. The Insights Paper outlines First Nations peoples' water values, principles, and actions that the CAWI encourages governments to consider when planning for, engaging in, and developing national water reform initiatives (CAWI 2023b). Actions outlined in the Insights Paper were supported by some inquiry participants:

The Working Group considers that the recently published Insights Paper by the Committee on Aboriginal and Torres Strait Islander Water Interests should be the starting point for the design of a nationally consistent set of principles for First Nations participation in water policy.
(IFNWWG sub. 48, p. 7)

The ILSC strongly supports the work of CAWI as it deeply aligns with the ILSC's own mandate and strategic agenda. The ILSC and [CAWI] are platforms for gathering and amplifying the aspirations of First Nations peoples regarding water reforms. (ILSC sub. 52, p. 4)

... the refresh of the NWI is an opportunity to position water policy and management in a broader context of outcomes for the community and for Country, consistent with the holistic and connected view of First Nations people.

It is critical that this work be led by First Nations people and the MDBA [Murray–Darling Basin Authority] supports the important role of the Committee on Aboriginal and Torres Strait Islander Water Interests (CAWI) in leading the conversation on reform ... (MDBA sub. 36, p. 4)

CAWI's role in creating objectives and governance for a renewed NWI

This inquiry has supported the Commission's 2021 advice regarding CAWI's role in a new NWI development and governance architecture. The Commission reiterates and extends that advice below, noting that CAWI should have an additional role in leading the development of monitoring, evaluation and reporting for the First Nations outcomes from a new agreement.

Monitoring and evaluation of outcomes

Performance monitoring and public reporting arrangements to support transparency and accountability for progress against outcomes are part of the National Agreement on Closing the Gap. The Commission currently conducts this three-yearly progress assessment, but there is no comprehensive, ongoing, national monitoring or reporting on whether and how governments engage with First Nations peoples on NWI planning and implementation, or how insights shared by First Nations peoples are specifically considered in water planning and management decisions.

This limits any assessment of the scope, effectiveness and outcome of governments' efforts on engagement with First Nations peoples on NWI implementation. Without public reporting, government accountability for engagement in water planning is weak.

Better monitoring and reporting can:

- assist in holding governments to account regarding engaging and sharing decision-making with Aboriginal and Torres Strait Islander peoples in water planning and management, access and ownership
- highlight gaps in engagement processes and opportunities for collaboration and streamlining
- allow for learnings to be shared and processes to be refined and improved (PC 2023a, p. 169).

Inquiry participants also support improved monitoring of governments' First Nations engagement. For example, the NSW Aboriginal Land Council stated:

calls on improved accountability and transparency through the development of monitoring and reporting frameworks around government engagement with First Nations people. Consultation must not be paternalistic and must be underpinned by Aboriginal self-determination and be community led ... Consultation and engagement with Aboriginal peoples must provide adequate notice, incorporate the principles of 'free, prior and informed consent' (FPIC), and actively seek Aboriginal people's views. (sub. 60, p. 2)

The Inspector-General of Water Compliance also noted that:

... commitments to achieve Aboriginal objectives and outcomes need to be clear, measurable and relevant to the outcomes that are intended to be delivered, so these [are] able to be monitored, reported and used to evaluating the effectiveness of governments' efforts. (sub. 80. p. 8)

Evaluation of the effectiveness, appropriateness and outcomes of engagement with First Nations peoples on water plans and achievement of First Nations peoples' desired outcomes is limited.

The Commission's 2020 *Indigenous evaluation strategy* provides a framework for government agencies to utilise in evaluating Indigenous specific and mainstream policies and programs affecting First Nations people. The Strategy's supporting *Guide to evaluation under the Indigenous evaluation strategy* puts First Nations peoples at its centre and provides advice on how to conduct evaluations of policies and programs affecting First Nations peoples including:

- building evaluation into policy and program design
- evaluation planning, design and conduct

- reporting and using evaluation findings
- building capability and an evaluation culture (PC 2020a, p. 4).

Any reporting and evaluation framework for First Nations engagement in water planning processes should be developed with First Nations peoples to ensure that the framework is fit for purpose, outlines what is going to be monitored and how, and has clearly defined mechanisms and timeframes.

NWI renewal advice 9.1: A new element designed in partnership with First Nations peoples

UPDATED IN 2024

The renewed National Water Initiative (NWI) should include both an objective and a new element dedicated to First Nations peoples' access to water and the involvement and participation of First Nations peoples in water management. The Commission advises that the Committee on Aboriginal and Torres Strait Islander Water Interests should continue to lead the development of the new NWI element.

In developing the new element, the Committee should:

- ensure alignment between commitments under the National Agreement on Closing the Gap and new NWI content
- continue to engage with First Nations groups
- report directly to water ministers.

The National Water Reform Committee should also support the Committee on Aboriginal and Torres Strait Islander Water Interests to lead the development of a monitoring, evaluation and reporting framework for this new element.

Renewal advice for First Nations outcomes in a new NWI

The Commission also continues to support the development of the new NWI content by CAWI.

In 2021, the Commission also advised that in relation to paragraph 52 i) of the NWI, CAWI should consider content that ensures that: cultural objectives are explicitly identified and provided for in water plans and progress is regularly monitored and publicly reported; and environmental water holders seek to deliver cultural outcomes when consistent with their ecological obligations, and work with natural resource managers and Traditional Owners in on-ground management programs to achieve cultural objectives. The Commission reiterates that advice.

In relation to improving access for economic development, this inquiry has again reaffirmed the Commission's renewal advice. The Commission extends that advice below:

NWI renewal advice 9.3: Improving access for economic development

UPDATED IN 2024

In developing a new National Water Initiative element, the Committee on Aboriginal and Torres Strait Islander Water Interests could consider content that ensures that, where agreement is reached between state and territory governments and Traditional Owners that consumptive access to water is an effective way to support the economic development of First Nations communities, access is provided by:

- sourcing water within existing water entitlement frameworks, such as by purchasing water on the market or as part of transparent processes for assigning unallocated water
- ensuring adequate supporting arrangements (such as training and business development) and information provision (e.g. about the costs of accessing, holding and trading water) are in place to enable First Nations communities to access water, and maximise the value of the resource for their needs and uses
- actively involving First Nations communities in program design.

The provision of water by governments to First Nations communities would be supported by:

- governance arrangements for such water developed in partnership with First Nations groups
- regularly monitoring and publicly reporting on the inland waters target under the National Agreement on Closing the Gap.

Where governments invest in new water infrastructure, particularly in undeveloped areas, governments should consider whether reserving a share of any new water rights for Traditional Owners would be consistent with plans for future community development and assist in meeting targets set under the National Agreement on Closing the Gap.

3. Water security in a changing climate

Key points

- ✳ **Climate change poses a major threat to the access, use and management of water across Australia.**
 - Large areas of Australia are projected to become hotter, drier, and to experience more variable and uncertain climate conditions. The prevalence of extreme weather events – flooding, bushfires, drought and heat events – is also likely to increase.
 - Drying and changing climates are weakening the reliability of rainfall-dependent water sources, such as dams and groundwater, which supply the majority of Australia’s water.
 - Climate change intersects with a range of water management challenges, such as planning for the role of water in developing liveable cities and towns and ensuring the long-term sustainability of water resources and environments to support community, economic and environmental objectives.
- ✳ **All jurisdictions develop planning documents that aim to address water security. However, there is no common definition of water security.**
 - Jurisdictions should develop a shared understanding of water security that includes setting out what outcomes are to be achieved and reflect this in an updated National Water Initiative (NWI).
- ✳ **Adhering to the principles underpinning the NWI is fundamental to addressing the pressures and uncertainty associated with climate change.**
 - For example, statutory, perpetual tradable water entitlements and water plans can help ensure water is allocated to its highest value use, while risk assignment frameworks ensure clarity and responsibility for changes in water availability.
- ✳ **The NWI can be further enhanced to better support water security planning in the face of a changing climate. All forms of extreme weather events including storms, flooding and bushfires, in addition to drought, should be considered in water planning.**
- ✳ **The transition to net zero carbon emissions could directly impact Australia’s water demands, but little attention is being paid to this element of climate change mitigation. Planning and modelling are urgently needed to understand the potential impact on water demand and water systems.**
- ✳ **Australian governments need to consider a diversified portfolio of water security options to ensure a least-cost response in the face of uncertainty due to climate change. Options are not limited to building infrastructure to augment supply, but also include demand management, conservation and water trade.**

This chapter discusses aspects of the impact of climate change on Australia's water security, and how it can be addressed by governments through the renewal of the National Water Initiative (NWI).

- Section 3.1 considers definitional issues associated with water security.
- Section 3.2 discusses the key water security risks in Australia, focusing on climate change.
- Section 3.3 discusses modelling climate change and incorporating projections into water plans.
- Section 3.4 considers the role of a renewed NWI in addressing water security risks.
- Section 3.5 reviews how addressing climate change through a transition to net zero is likely to impact water demand.
- Section 3.6 discusses planning for cost effective water security, focusing on the need for all policy options to be on the table.
- Section 3.7 outlines how the Productivity Commission's NWI renewal advice can assist jurisdictions in navigating these challenges.

3.1 What is water security?

There is clear evidence that Australia's perennial water security challenges, such as the extremes of drought and flood, are likely to become both more intense, and more frequent under climate change (Steffen et al. 2018). Governments, utilities and other organisations conduct water security planning in response to these challenges, in various locations of Australia. However, there is no common definition or framework of water security in place across Australia (Taylor 2019) nor clear national policy direction as to what are the priority outcomes from water security.

Definitions of water security are multifaceted, typically describing the availability, accessibility, and quality of water resources (and their regulatory frameworks and policies) – the condition of which underpins or affects broad societal outcomes such as human well-being, economic development, and ecosystem sustainability.

Definitions are also often aspirational, describing a state in which water needs and demands are satisfied to meet those outcomes. United Nations (UN) Water defines water security as:

... the capacity of a population to safeguard sustainable access to adequate quantities of acceptable quality water for sustaining livelihoods, human well-being, and socio-economic development, for ensuring protection against water-borne pollution and water-related disasters, and for preserving ecosystems in a climate of peace and political stability. (2013, p. 1)

Further, the water service and safe access to drinking water objectives of water security are often defined in – and managed under – separate frameworks than those relating to water resource management or water-related ecosystems. The UN Sustainable Development Goal 6 – 'ensure availability and sustainable management of water and sanitation for all' – aims to address some of these linkages to these other aspects of water security in some of its targets and indicators (UN 2015, p. 20).

Illustrating the multifaceted nature of challenges and desired outcomes, participants in this inquiry raised a range of different priorities and issues when discussing water security. For example:

- the Australian Academy of Technological Sciences and Engineering (ATSE) highlighted water scarcity, flooding hazards, pollution of waterways, and cybersecurity threats as elements relevant to water security in Australia (sub. 5, p. 3)
- the Local Government Association of Queensland (LGAQ) raised equity concerns, advising that water 'should be shared equitably through institutional arrangements that facilitate efficient service delivery and resource use' (sub. 12, p. 2)

- Engineers Australia recommended a national policy for water security that meets the needs for potable, agricultural, industrial, mining, fisheries, environmental, recreational, tourism and cultural uses (sub. 34, p. 4).

On water security for First Nations communities, the Central Land Council said:

Inadequate consideration of remote drinking water security in the context of NWI implementation has arguably allowed the continuation of a racialised governance regime in the NT governing urban/regional water ... to the detriment of Indigenous people and communities. Drinking water security has been subordinated to other water concerns ... [D]rinking water security, and hence the very viability of remote Indigenous communities, is under threat in the NT from government neglect, renewed calls for water-intensive development in northern Australia, and climate change. (sub. 44, attachment A, pp. 3, 11)

The Water Services Association of Australia (WSAA) recommended the inclusion of water security actions within a renewed NWI, and that governments:

[d]evelop a national water security framework that incorporates:

- A consistent framework and metrics to measure water security in Australia
- A guiding principle that all options must be on the table for water security
- Guidelines on a national approach to engaging with local communities, using facts and evidence, for sustainable and supported local solutions
- A requirement to consistently and transparently publish information and data on all options as part of community engagement. (sub. 15, p. 9)

Developing a shared understanding of water security

A shared understanding of water security in Australia, which recognises the risks to water security, and the costs and trade-offs involved in achieving often competing priority outcomes would assist parties in developing and implementing a renewed NWI (recommendation 3.1). Participants also recognised the benefits a shared understanding of water security would bring (Lifeblood Alliance, sub. 67, pp. 2–3; NSWALC, sub. 60, p. 3; WSAA, sub. 81, p. 6). For example, the New South Wales Aboriginal Land Council said:

Reaching a shared understanding of water security and water related terms support a whole of government approach to water management, climate change and meeting the [Closing the Gap] inland water targets. (sub. 60, p. 3)

Aspirational definitions assist in developing a shared understanding of common goals and priorities, but they do not necessarily help planners and decision-makers to practically identify and manage risks or consider societal preferences (OECD 2013, p. 12). That is, aspirational definitions do not always assist in managing scarce resources to optimise outcomes: how costs and trade-offs are to be managed so that available water supply is matched with demand.

In the interim report for this inquiry, the Commission sought information from participants on what nationally agreed priority outcomes for water security should form part of a renewed NWI, and how those outcomes should be treated when considering trade-offs between competing priorities and the management of risk (information request 3.1).

Some participants identified priority outcomes for human needs and the environment. The Inland Rivers Network said, 'The hierarchy of water entitlement during water scarcity must be based on the type of water use. Critical human needs and the environment must have highest priority.' (sub. 64, p. 3). Similarly, the Lifeblood Alliance advised:

An agreed hierarchy of water security should be included in the NWI with critical human needs and the environment granted highest security. Current arrangements are based on the nature of entitlements (high security, low security etc) not the purpose of the entitlement. . . Critical human needs require an agreed definition on a per capita basis for personal use (eg 100l/person/day) and provision for essential services (hospitals, schools etc). (sub. 67, pp. 2–3)

While prioritising human water needs, participants also recognised the linkages between water security and food security, through water for livestock and crops (MFC, sub. 75, p. 16; NFF, sub. 70, p. 7, NSWIC, sub. 88, pp. 6–7).

Advice from participants also highlighted how priority outcomes could be matched with resilient water sources, to promote water security. For example, WSAA (sub. 81, p. 8) advised that rainfall independent sources of water (in particular desalinated water and purified recycled water) be considered for water security. WSAA called for the Australian Government to support identifying these options in a renewed NWI, Likewise, the Lifeblood Alliance noted that human needs should be underpinned by climate independent sources of water (sub. 67, pp. 2–3).



Recommendation 3.1

Incorporate a shared understanding of water security priorities in the renewed NWI

Parties should develop a shared understanding or common definition of water security that includes setting out what outcomes are to be achieved, recognising the risks to water security will differ between jurisdictions and within jurisdictions – which will be a matter for each party to transparently assess and communicate.

3.2 Climate change poses a major risk to Australia's water security

There are multiple stressors on Australia's water systems, particularly climate change, population growth and changing demand (boxes 3.1 and 3.2). These pressures intersect, such as in the role of water to ensure liveable, resilient cities in the face of climate change.

A hotter, drier and more uncertain climate

A changing and uncertain climate threatens Australia's long-term water security. There has been a decline in the long-term rainfall trend in most of southern Australia since 1970 (Overview figure 1), which is particularly evident in the south-west of Australia (BOM 2024d). There have also been declines in rainfall in the cooler months, which is when peak streamflow occurs in most catchments in these regions. Overall declines in rainfall has resulted in more than 60% of hydrologic stations around Australia showing a declining trend in streamflow (BOM 2024d).

The prevalence of extreme weather events – short, and intense, but variable rainfall events, bushfires, drought and heat events – has also increased. In 2021 the Commission's review referred to the then recent experience of bushfires and drought; since then, different parts of Australia have experienced further record-breaking extreme events (box 3.1).

Box 3.1 – Recent extreme weather events

Storm and high rainfall

A series of storms across south-eastern Queensland and eastern New South Wales in February 2022 resulted in these regions receiving rainfall more than five times the February average with, for example, flood levels in Lismore peaking two metres higher than previous records (Gillett et al. 2023, p. 17). The wetter conditions provided a reset for many of the Murray–Darling Basin’s water-dependent ecosystems. However, high flows in some areas also negatively impacted communities and the environment, including because of water quality issues. These events were the costliest in Australia’s history, totalling an estimated \$3.35 billion in insured losses across Queensland and New South Wales, damaging infrastructure, disrupting food and fuel supplies, and transport systems (Gillett et al. 2023, p. 17). In late 2022, thunderstorms impacted parts of South Australia and Northern Territory resulting in damaging wind gusts over 100km/h over a small region, known as a ‘microburst’ event (Gillett et al. 2023, p. 29).

Heat

Western Australia experienced a series of heatwaves with the equal hottest day in Australia of 50.7°C recorded in Onslow on 13 January 2022 and Perth recording a record six days in a row above 40°C in January 2022 (Gillett et al. 2023, p. 16).

The trends driven by climate change are forecast to accelerate further as the climate continues to warm (BOM 2024d). Climate projections suggest that Australia will experience continued increases in temperature and more heat extremes (CSIRO 2024a). Hotter and drier conditions are also likely to increase the risk of bushfires, placing further pressure on our drinking water supplies.

Climate uncertainty is driving increasing concern about the security of climate-dependent water sources, like dams and groundwater, which account for 82% of Australia’s water usage in major urban regions in 2022-23 (BOM 2024b, p. 16). There has been a marked slowdown in large dam construction since the 1990s, due to a lack of suitable, cost-effective sites (Doolan 2016; Sheldon and Hamilton nd) and in recognition of the lack of reliable inflows and suitable landscapes (Garnaut et al. 2021). Drying conditions, lack of reliable inflows and high rates of evaporative losses, will see water security provided by existing dams in some areas fall under climate change. Drying conditions similarly affect the long-term reliability of groundwater, whose use tends to be countercyclical to rainfall and hence subject to higher rates of extraction during dry periods (Walker et al. 2021, p. 5). For example:

- across southern Australia, recharge-precipitation elasticities are in the range of 1.5 to 4, whereby a 10% decrease in rainfall results in a 15% to 40% decrease in aquifer recharge (Walker et al. 2021, p. 27)
- in Perth, where 45% of water supply was sourced from groundwater in 2019-20 (BOM 2021, p. 50) the Water Corporation (2009) is forecasting supply from surface water sources to decline by 72% and groundwater sources to decline by 79% by 2060 compared to 2008.

The uncertain climate outlook highlights the need for a diversification of our water sources. As noted by WSAA:

We need to provide water supplies in an increasingly uncertain climatic outlook. Our dams are a vital source of water now and for the future. However, there is a need to diversify our sources of water to incorporate non-rainfall dependent sources of supply including further desalination, recycling for industry and purified recycled water for drinking (sub. 15, p. 2).

Box 3.2 – Growing and changing demand for water

Australia’s population is growing, concentrating in capital cities and some regional towns

In the year ending June 2023, Australia’s population increased by 624,100 people, or 2.4% (ABS 2023a). Australia’s population is becoming increasingly concentrated in capital cities (67% in 2022 compared to 40% in 1911) (ABS 2023b; CfP 2023). Projections from the Centre for Population (2023) show that Australia’s population is expected to reach 29.8 million by 2030-31 with the population of the combined capital cities expected to increase by 23% to 21.4 million in 2033-34, driven mainly by net overseas migration.

This will put pressure on Australia’s urban water supplies. For example, Greater Sydney’s drinking water system can provide a long-term supply of 515 to 540 GL/year. Projections suggest that under a ‘middle-range’ population growth scenario, supply will need to increase by an additional 250 GL/year – or around 50% – by 2060 (NSW DPE 2022d, p. 58). Demand for bulk water in south-east Queensland is projected to increase from 350 GL/y to 500 GL/y between 2022 and 2050 (Seqwater 2023b, p. 17).

Population growth is also occurring in some regional areas creating pressure on traditional water supply and town water infrastructure. As noted by the Central NSW Joint Organisation:

As more and more people move to regional areas and new industries are established, we will need secure water supplies to ensure economic and social growth. While some inroads have been made in the NSW context there continues to be a lack of focus on urban water security in most strategies. The challenge remains to ensure the true social and economic value of town water is recognised. Until this and the primacy of options for water for critical human need are addressed the NWI will struggle to meet its objectives of optimising social and economic water outcomes for communities (sub. 30, pp. 6–7).

And so is demand for urban amenity, including in response to climate change

Urban expansion increases focus on liveable cities and urban amenity, including due to the heat impacts of climate change. Urban green spaces, which contribute to community health and wellbeing by ‘reducing temperatures, providing recreational opportunities, enhancing neighbourhood liveability and adding aesthetic appeal to cities’ can support liveability in cities and towns (Huerta 2023). For example in its 30 Year Plan for Greater Adelaide (2017, p. 150), the SA Government has committed to increasing urban tree canopy by 20% in metropolitan Adelaide by 2045. A shift towards more urban greening will increase the demand for water. Preliminary estimates suggests that achieving a 20% increase in urban tree canopy in Adelaide could potentially require an additional 10% to 30% of Adelaide’s current water demand (SA DEW 2021b, p. 6).

Climate change will affect some more than others

The effects of climate change will not be evenly spread across all regions, households and businesses. Some industries and regions will suffer more severe climate change impacts than others (PC 2012, p. 68). Climate risks disproportionately affect the poorest people, who are more exposed and more vulnerable to their impacts (Guivarch et al. 2021).

While all parts of Australia are expected to experience long-term changes in climate, the impacts of extreme rainfall events, bushfires and heatwaves are not projected to be uniformly geographically distributed (Overview figure 1, BOM 2022). In 2022 the Climate Council developed a risk map indicating the increasing risk of property damage and destruction as a result of extreme weather events arising from climate change (Climate Council 2022). It found that areas at highest risk are those exposed to riverine flooding (80% of the contribution to increased risk), and then bushfires and surface water flooding ('flash flooding'). These hazards disproportionately occur in rural areas, with south-east Queensland and northern Victoria particularly at risk (Climate Council 2022). However, even small increases in risk in densely populated urban centres have the potential to affect millions of people.

The health impacts of climate change are also unlikely to be evenly distributed. Heatwaves are responsible for more deaths in Australia than any other type of natural disaster (Climate Council 2014, p. 21), and as a result of climate change are becoming longer in duration, hotter and more frequent (BOM 2024d).

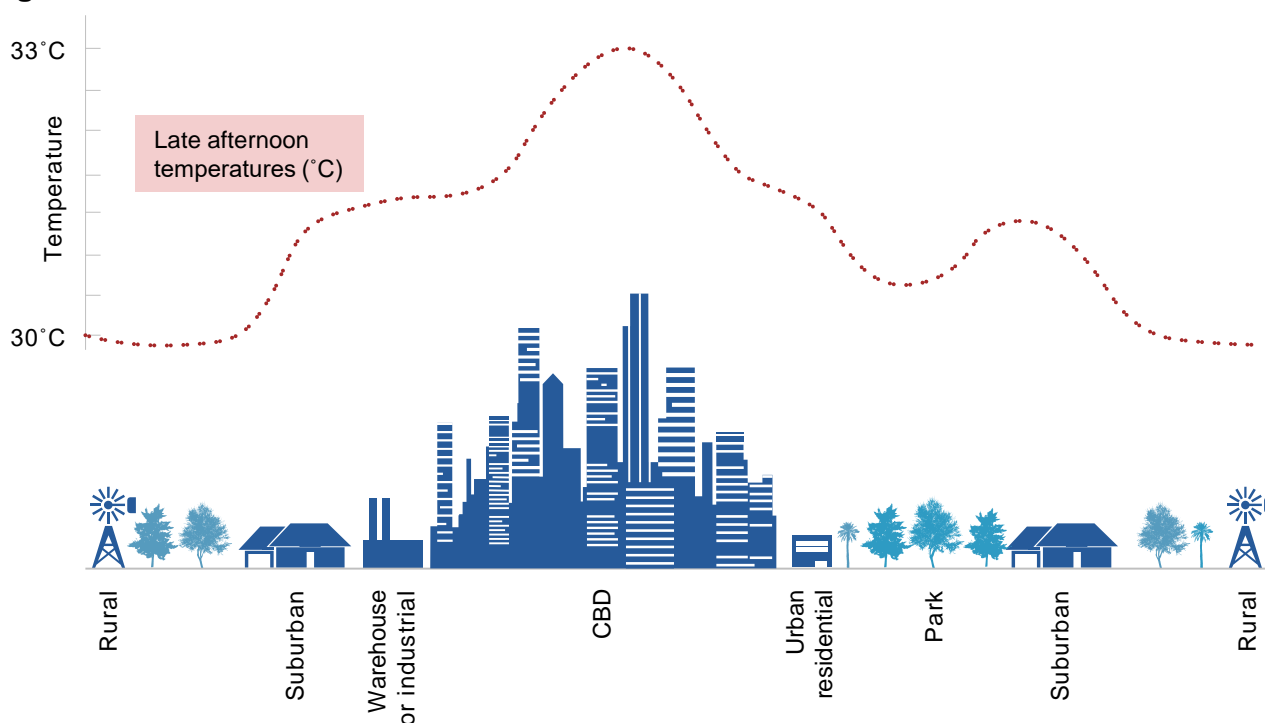
The impacts of extreme heat are likely to be most significant in cities due to the urban 'heat island' effect – the effect that dense urban environments can be 1-3 °C hotter than surrounding areas (figure 3.1) due to a decreased amount of vegetation, increased amounts of dark surfaces and the heat produced from vehicles and generators (Stone et al. 2010). Furthermore, urban heat islands disproportionately affect urban areas that are socio-economically disadvantaged (Latham 2023, p. 5; VCOSS 2021, p. 14) as such areas are likely to integrate fewer urban blue and green spaces that have a cooling effect. As such, those most vulnerable to the effects of extreme heat are also more likely to live where the risks are highest (Latham 2023, pp. 6–7).

The economic impacts of climate change are also likely to be unevenly distributed, with some parts of the economy more directly exposed than others. For example, climate change will affect the yields and quality of agricultural outputs – climate change is expected to cause significant economic harm to areas in Australia's agricultural areas such as the Murray–Darling Basin and southwest Western Australia – fishery stocks, the productivity of forestry plantations and the viability of alpine and nature-based tourism (Climate Council 2019, p. 15; PC 2012, pp. 48–49).

Irrigated agriculture is particularly exposed to changes in water availability: while it accounts for less than 1% of agricultural land by area, it produces over 25% of total agricultural value (ABS 2019) and accounts for over 60% of consumptive water use in Australia (ABS 2023d).

The food sector is also vulnerable to the more chronic effects of ongoing climate change, like rising temperatures, changing rainfall patterns, and the persistent damage caused by repeated extreme events. (Climate Council 2019, p. 15)

Several submissions noted the potential impact on agriculture of climate change, its impacts on water security, and the flow-on impacts to Australia's food security (Murray Irrigation, sub. 90, pp. 6–7; NFF, sub. 70, p. 7; NSWIC, sub. 88, pp. 6–7). The National Farmers' Federation (sub. 70, p. 7) also highlighted the climate-adaptation work already underway within the sector through 'improved understanding, investment, and adoption of improved water management infrastructure and on-farm efficiency measures across several decades'.

Figure 3.1 – The urban heat island effect

Source: Hughes and McMichael (2011).

Due to the uneven distribution of climate change impacts, there is a need to consider more than just average water volumes and quality in water security planning. Several participants in this inquiry highlighted the need for water planning and pricing to balance sustainability and water security along with equity and affordability concerns.¹

The NWI should require the undertaking of a more thorough examination of the escalating costs associated with delivering water services within a progressively intricate environment, encompassing factors such as climate variability, regulatory frameworks, and evolving community expectations. It is imperative to carefully deliberate upon how these heightened costs impact affordability and to determine the appropriate allocation of these costs among stakeholders and customers. (Water NSW, sub. 55, p. 4)

As the Commission found in 2021, trade-offs in water planning, pricing, allocation and investment should be the subject of clear and transparent conversations within jurisdictions and communities, with an assessment made of the relative values the community places on various outcomes. Decisions should be taken to maximise the overall benefit to the community in line with those values (OECD 2020, p. 16; PC 2021b, pp. 80–81). Governments also have a role to protect the vulnerable and address equity concerns (PC 2012, pp. 68–69).

¹ AWA, sub. 43, p. 10; LCAQ, sub. 66, p. 13; SACOSS, sub. 23, p. 4-5; Dr Paul Wyrwoll, sub. 27, p. 3; Water NSW, sub. 55, p. 4-5 and sub. 85, p. 5; WSAA, sub. 15, p. 12.

3.3 Climate projections to inform water planning

Jurisdictions are focusing on climate modelling ...

Climate change brings greater uncertainty, and this requires jurisdictions to undertake rigorous modelling and planning. CSIRO (sub. 42, p. 2) highlights that devising adaptation strategies to mitigate the impacts of climate change requires access to reliable sources of information. ATSE (sub. 5, p. 4) agrees that without adequate modelling of Australia's water resources and their interconnections, adaptive management is not possible.

There are a range of climate projections available, but they differ in their geographical scope, spatial resolution, choice of emissions futures, and underlying modelling approaches, resulting in inconsistent climate information across jurisdictions (DCCEEW 2023b, p. 7).

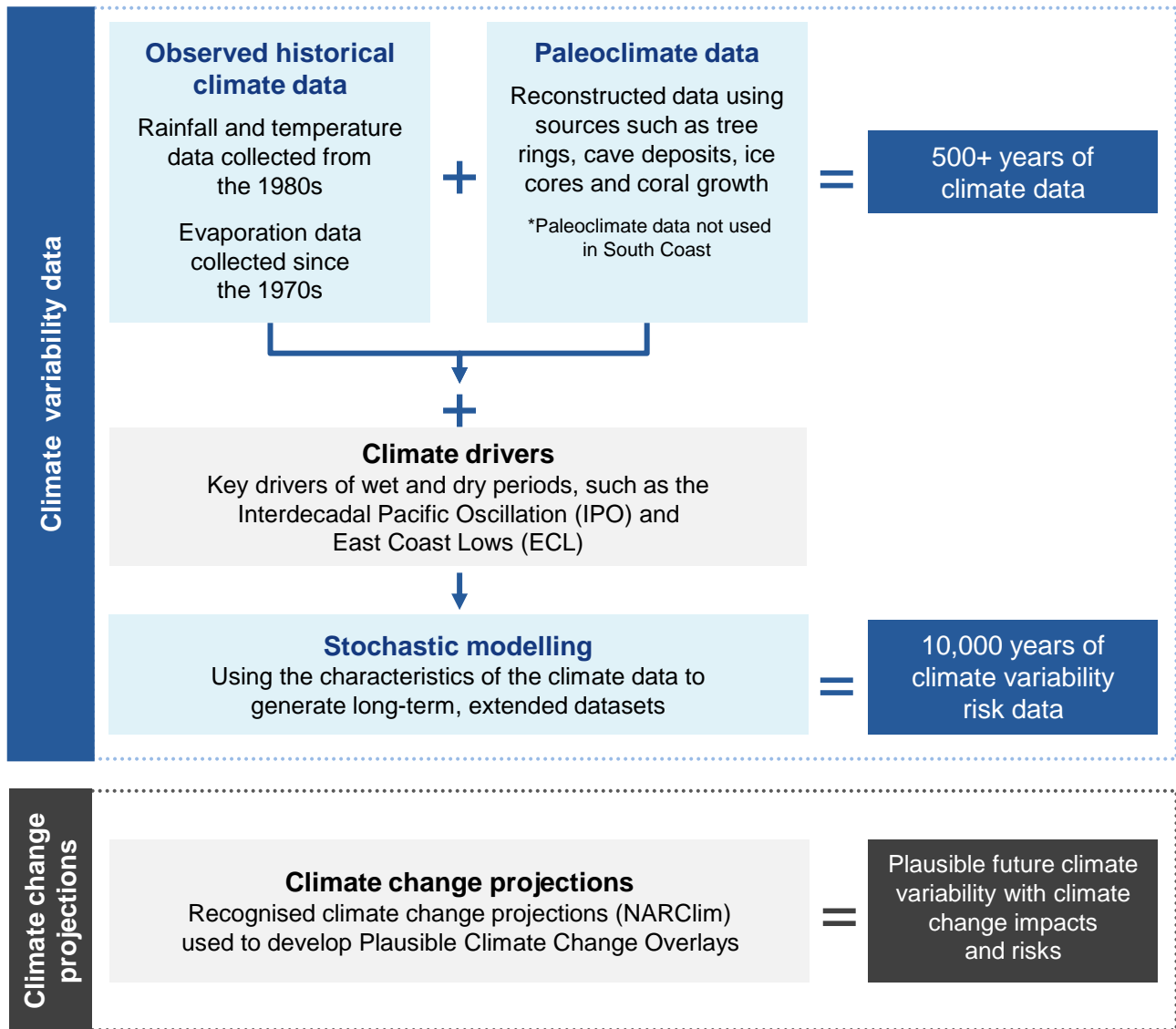
Consistent with the Commission's renewal advice 6.2 in 2021, some jurisdictions are adopting more advanced climate projection techniques in their water strategies. Recently, the New South Wales Government developed eight new regional water strategies using a four-step stochastic modelling approach (figure 3.2) based on hundreds of years of climate data to inform a set of plausible climate futures.

The Queensland Government released *Queensland's water plans in a variable and changing climate* in December 2023, outlining the use of down-scaled global climate models to produce regional climate models (Qld DRDMW 2023g). The regional models are then used as inputs for the hydrological models that inform individual water plans.

The use of downscaled, or high spatial resolution, climate models has increased, partly in response to the Royal Commission into National Natural Disaster Arrangements (2020, pp. 125–126), which recommended that Australian, state and territory governments produce downscaled climate projections. This led to the creation of the National Partnership for Climate Projections, to deliver coherent and improved climate projection information to a wide range of users. Jurisdictions are now working towards finer spatial resolution (ranging from 1 km to 5 km) projections through a range of projects (box 3.3).

Some less densely populated regions are not covered by finer resolution (1-5km) downscaled modelling – Western Australia's downscaled modelling with NARCLIM 2.0 will only cover the State's south-west and no finer resolution downscaled modelling is currently being produced for the Northern Territory (WA DWER 2023b, p. 10). The Climate Change in Australia project did produce Australia-wide climate projections, however these projections were released in 2015, and only used downscaled modelling to 'complement [non-downscaled] general circulation model results, where it [was] likely to show 'added value' in the climate change signal of rainfall and temperature' (CSIRO and BOM 2024b, 2024a).

Figure 3.2 – New climate data and modelling approach used in New South Wales regional water strategies



Source: NSW DCCEEW (2024k).

Box 3.3 – Finer Spatial Resolution Projections

The following finer spatial resolution projections have been or are being produced:

- the NSW Government, in partnership with the ACT and SA governments, is delivering downscaled regional climate projections (4km) for south-east Australia through the New South Wales and Australian Regional Climate Modelling Project (NARClIm2.0).
- the WA Government, in partnership with NARClIm2.0 and the Murdoch University, is delivering downscaled climate projections (4km) for the south-west of Western Australia through the Climate Science Initiative.

Box 3.3 – Finer Spatial Resolution Projections

- the Victorian Government, in partnership with CSIRO’s Climate Science Centre, delivered downscaled projections (5km) for Victoria, which were released in 2019, and are considering options to update its projections.
- the Queensland Government has produced downscaled projections (10km) over Queensland and are planning to produce convection-permitting projections with a resolution between 2.5km to 4km.
- the Tasmanian Government produced downscaled projections in 2010 (~10km) and is considering updating its projections as part of its next climate change action plan.
- the Australian Government, through the Australian Climate Service, will produce a national set of downscaled climate projections for the period 1979 to 2100 over the next 2–3 years, primarily focused on climate hazards including tropical cyclones, heatwaves, fire weather, and heavy rainfall that leads to flooding.

Source: DCCEEW (2023b, p. 11); ACE CRC (2010, p. 6).

... but water planning has yet to catch up

Despite significant progress in downscaled climate modelling, jurisdictions are in the early stages of incorporating the impacts of these models into water planning instruments. With the impacts of climate change on water availability increasing, the creation of robust and transparent frameworks for managing them will reduce the uncertainty faced by entitlement holders about future reliability and avoid unmitigated degradation of environmental systems.

Several submissions called attention to the importance of this work.² The Murray–Darling Basin Authority (MDBA) stated that:

Updated [climate] science is needed to support decision making and understand the consequences for the sustainability of our rivers and communities. (sub. 36, p. 3)

The Business Council for Sustainable Development Australia (BCSD) agreed, including a recommendation to:

Integrate climate change adaptation into water resource management. This includes considering future climate scenarios in water planning and risk management, as highlighted in the United Nations World Water Development Report. (sub. 7, p. 8)

Similarly, David Shearman stated that:

Australia must change its national management system for water to a science and technology based system with the power to deliver decisions that will keep the rivers and other surface and ground water systems as healthy as possible in the face in rising temperature, increased evaporation and decreasing rainwater and the increased needs of all ecosystems and life forms. (sub. 10, p. 5)

Governments have begun this work, through incorporating climate science in high level documents such as water strategies. Some have started to incorporate climate projections into their water allocation and sharing plans. The following are examples:

² BCSD, sub. 7, p. 8; David Shearman, sub. 10, p. 5; LBA, sub. 67, p. 3; MDBA, sub. 36, p. 3.

- The NSW Government has used its new climate datasets, described above, to inform various water strategies, but is yet to develop techniques for applying the datasets to water sharing plans (NSW Government, personal communication).
- The Victorian Government has been incorporating assessments of climate change impact on water availability into Long Term Water Resource Assessments (LTWRAs), Urban Water Strategies, and Sustainable Water Strategies (Victorian Government, pers. comm.). LTWRAs allow the water minister to rebalance water between the environment and consumption in response to climate change if water availability has declined (Victorian DEECA 2023b).
- The Queensland Government has used its downscaled climate projections as inputs for the hydrological models that inform its water plans and since 2021, the *Water Act 2000* (Qld) has required Queensland's water minister to consider climate change when making a water plan (Qld DRDMW 2023g, pp. 8, 13). A number of Queensland's water allocation plans are due to expire in the coming years, providing an opportunity for the new climate modelling to be incorporated.
- The WA Government recently revised the Cockburn, Waangaamaan-Serpentine and Murray Groundwater Allocation Plans' allocation limits downwards to account for projected falls in rainfall recharge due to climate change (WA DWER 2024d, p. 18; WA Government 2023a, 2024c). Approaches to rebalancing water allocations are discussed below.
- Tasmanian allocation limits are currently determined using the Tasmanian Sustainable Yields future dry scenario climate data, which was released in 2010 (NRE Tas 2022b, p. 3, 2023d, p. 47). The Tasmanian Government, through its *Catchment Yield Science Update Project*, has determined a preferred pathway for using more modern downscaled climate projections to update those hydrological models that underpin the state's water allocations (NRE Tas 2023d, p. 16). Funding is currently being sought to implement this preferred pathway (Tasmanian Government, pers. comm.).

Governments have yet to incorporate climate planning into most water allocation plans or similar catchment-level instruments. The Commission asked governments about the challenges of incorporating climate science into water plans. Several pointed to significant resourcing and capacity demands for an already complex activity, noting that incorporating climate change science into water planning is 'resource-intensive, requiring significant investment in research, modelling and infrastructure' (ACT Government, pers. comm.). Greater collaboration and coordination – for example, through partnerships such as NARCLIM – may help to reduce the costs of these activities, as will broader capacity building activities.

Jurisdictions also highlighted that a risk-based approach is needed, given the intrinsic uncertainty around the specific levels of future global emissions and the physical effects of these emissions on climate drivers and water availability:

... possessing the technical tools is only one part of a broader need and further discussion is required to understand which future scenarios warrant planning, develop methods to address different decision-making timeframes and consider strategies to handle uncertainties associated with the range of available models. (NSW DCCEEW, sub. 77 attachment, p. 3)

Scenario planning – with stakeholder engagement throughout the process - can help water planners manage this uncertainty through consideration of multiple plausible futures, informed by climate projections (Dunn and Rubenstein 2020, pp. 14–20, LBA sub. 67 p. 4). The *Climate Change Adaptation Planning in Victoria's Water Sector* report, funded by the Victorian Government, lays out principles for the use of scenarios in adaptive water planning (Dunn et al. 2020).

3.4 Using the renewed NWI to manage the risks to water security from a changing climate

The current NWI does not explicitly raise water security as an outcome of national water policy, nor does it specify what actions the parties to the agreement should take to promote water security. But implicitly, the fundamental principles, outcomes and actions of the NWI encourage decision making that leads to best practice management of water resources in the face of increasing scarcity and competing demands.

The renewal of the NWI presents an opportunity to build on these principles to address emerging water security risks. With respect to climate change in particular, that means dealing with more extreme events, and general climate uncertainty.

A renewed NWI that builds on the fundamentals is important to support water security

In 2021 the Commission emphasised that climate change heightened the need for governments to embed and adopt planning reforms for adaptive management approaches in water resource systems. In 2024 the Commission is reiterating this advice.

A changing climate has the potential to impact all uses and values of water in a system – consumptive, environmental, cultural and social. This is the case in fully allocated systems, but climate change is also accelerating pressure in less developed systems. As climate change exacerbates these pressures – and trade-offs – effective water planning processes, as per the current NWI, remain fundamental. They ensure that water management is productive, efficient, reflects community-wide perspectives on priorities and cumulative impacts of risks, and sustains the underlying environmental system for current as well as future generations.

In 2021 the Commission’s renewal advice (6.2) made clear that there needed to be a broad range of processes to better account for climate change and extreme events in water planning (PC 2021b, p. 87). The advice included that:

- water plans include priorities, actions and rules that cover drought conditions, as well as mechanisms for dealing with more extreme scenarios, including clear triggers, roles and responsibilities for actions and a hierarchy of uses
- a process for rebalancing between environmental and consumptive uses as a result of climate change is developed
- water quality issues are better incorporated into water planning, particularly in drought scenarios
- water planning processes in relatively undeveloped and developing water systems take climate change into account in ways that manage the risk of less water
- there are clear provisions for allocating risk, with water access entitlement holders continuing to bear the risks to the consumptive pool arising from climate change and periodic natural events (as reflected in paragraph 48 of the NWI)
- climate modelling is undertaken at the system scale, based on the best available data and subject to on-going reviews and refinements.

Reductions in water availability and reliability will continue to place pressure on environmental objectives and on the character of waterways and wetlands. In 2024, the Commission has also reiterated and strengthened advice about specifying and monitoring environmental outcomes from environmental water. An ongoing commitment to adaptive management through effective monitoring, evaluation and reporting of outcomes is also key (renewal advice 8.12, overview. Further information is in PC 2021, pp. 119–120).

First Nations people have deep knowledge about managing and caring for rivers, waterways, ecosystems, country, communities and economies in an integrated, sustainable way. In 2024 participants in this inquiry, and the Commission, have again emphasised the importance of recognising First Nations knowledge and integrating it into water management planning and implementation, and ensuring adequate protection for Indigenous Cultural and Intellectual Property.³ Chapter 10 also discusses the incorporation of First Nations knowledges into water management.

Clear triggers and criteria are needed for addressing changes in water availability

As noted above, incorporating climate change impacts into water planning frameworks is an unresolved challenge for Australian jurisdictions. The renewal of the NWI is an opportunity to develop a consistent, best-practice approach to incorporating climate change into water planning.

NWI-compliant water entitlements allow water managers to flexibly manage fluctuations in water resource availability over the short term through changes in annual allocations. However, longer term changes in water availability, as a result of a changing climate, may require permanent changes or ‘rebalancing’ of the allocation of water resources between different uses.

The Commission’s 2021 report advised jurisdictions to develop triggers (such as hydrological or ecological thresholds) and mechanisms for rebalancing environmental and consumptive uses. However, no jurisdictions have articulated a trigger as described by the MDBA (2021, p. 2): ‘scientifically robust, evidence based, transparent and provide certainty for communities and water users’. Nor have jurisdictions articulated a rebalancing process as identified in the Commission’s 2021 report:

- Review of the plan objectives and outcomes
- Identification of options to meet the new objectives and outcomes, and selection of the options that achieve this most cost-effectively
- Agreement on a mechanism to transition to the new balance. (PC 2021b, p. 85)

For interconnected water resources, such as the Murray–Darling Basin, triggers and rebalancing processes need to be integrated across jurisdictions. As noted by the MDBA (sub. 36, p. 6), the Basin Plan review in 2026 will be an opportunity to consider the appropriateness of sustainable diversion limits in the Murray–Darling Basin under future climate change.

In the interim report for this inquiry, the Commission sought views on how a renewed NWI can assist jurisdictions in establishing a consistent approach to developing climate change triggers and rebalancing processes (information request 4.1). In response, some inquiry participants highlighted the importance of robust evidence, such as climate modelling, to inform triggers and rebalancing processes (ATSE, sub. 68, p. 5, IRN, sub. 64, p. 4; LBA, sub. 67, p. 3; LGAQ, sub. 66, p. 12). However, the processes should draw on a wider evidence base than climate modelling to better understand the impacts and potential adaptive responses to climate change. As noted by LGAQ:

Continued research and investment in securing urban water supplies (including alternative water sources) and water modelling that includes all sources of water in rebalancing processes, brings

³ ATSE, sub. 68, p. 2; BCSD, sub. 7, p. 9; EA, sub. 34, p. 4; ECNT, sub. 54, p. 3; MDBA, sub. 36, p. 4; ACT OCSE, sub. 3, p. 3; NLC, sub. 38, p. 26; NSWALC, sub. 60, p. 6; Sydney Water, sub. 41, p. 23; Terri Janke and company, sub. 18, pp. 4-5; WaterNSW, sub. 55, p. 7.

in climate change scenarios and First Nations experiences around water management, is critical to our future water security. (sub. 66, p. 12)

Relevant evidence should be drawn from physical and social sciences, as well as local Indigenous Knowledges. The processes should also provide for appropriate stakeholder engagement throughout, in both developing triggers and rebalancing mechanisms, and in the rebalancing of consumptive and environmental pools. In doing so, it can be ensured that the processes ‘consider cultural, social, environmental and economic values’ (WJH, sub. 40, p. 5).

Other participants emphasised the importance of a risk-based approach, recognising that while the NWI should aspire to providing consistent language, definitions and guidelines for triggers, the needs of individual systems will depend on their level of development and local characteristics, and that triggers therefore need to be set on an individual plan level (Darryl Day, sub. 76, p. 2; IRN, sub. 64, p. 4).

A renewed NWI provides an opportunity to establish a standardised approach to developing triggers and rebalancing processes. The need for a common approach is especially important for the shared management of cross-jurisdictional water resources. Appropriate measures will provide greater certainty to water entitlement holders and improved environmental outcomes over the long term.

Attention is needed on a broader range of climate change impacts and extreme events

The principles contained in the NWI, and the Commission’s renewal advice, are sufficiently broad to encapsulate a wide range of risks to water security, including from drought, flooding and extreme events. This enables the NWI principles to form the basis of water planning and other water management processes to deal with risks to water security.

However, beyond the principles, the NWI has traditionally helped governments focus more on managing the risks associated with drought, than other extreme climate events. The NWI module *Considering Climate Change and Extreme Events in Water Planning and Management* (2017) brought a stronger focus on drought, and noted that flooding was dealt with by emergency management agencies, and not by water policy departments.

A focus on drought in the NWI, and in a renewed NWI, is well founded (the NWI was signed in 2004 at the height of the Millenium Drought) and should remain. However, under climate change, a wider range of extreme weather events, including flooding, are likely to become more frequent and more damaging (section 3.2).

Specific attention is warranted in a renewed NWI to highlight and address risks to water security from a broader range of direct and indirect climate change impacts, as supported by participants in this inquiry. CSIRO suggests that:

Incorporating climate change impacts into water resource planning is essential to build resilience and adaptability in the face of evolving environmental conditions. Improving understanding of the impacts of climate change on water availability, quality, and distribution could help decision-makers to develop sustainable and adaptive strategies to ensure a reliable and equitable supply of water for current and future generations. Failure to account for these changes may lead to increased water scarcity, compromised ecosystems, and heightened social and economic vulnerabilities. (sub. 42, p. 2)

ATSE provided similar comments:

The NWI must specifically account for a changing climate which remains the single most significant threat to Australian productivity and quality of life. Delivering climate-resilient infrastructure is a necessary part of the solution as the impacts of climate change often negatively impact water supply and quality. Impacts on communities can be direct – such as water security issues of drought, floods and environmental degradation and loss of natural capital. Or they can be indirect – in terms of food security, public health and in responses to heat waves and wildfires. (sub. 5, p. 3)

Engineers Australia recommends the development of state-wide resilience planning that caters for:

national crisis and disaster scenario planning through climate change risk analysis, including natural climate variations. (sub. 34, p. 4)



Recommendation 3.2

Consider all extreme climate events in water planning

Over the past decade, climate change has been associated with an increase in extreme weather events, which disrupt and damage water supply and infrastructure. Where the NWI Climate Change and Extreme Events Module focused on the risks from drought, greater focus should also be given to other events, such as flooding, storm, and bushfires.

In implementing the Commission's renewal advice 6.2 regarding water planning for climate change (including that historical climate outcomes may not be indicative of future outcomes), governments should adopt the principles set out in the National Water Reform report 2021, focusing on this broader range of events.

3.5 The water demands of transition to net zero

Climate change will present a water management challenge on more than just the supply side. Water will also play a central role in supporting the transition to net zero emissions by 2050. This transition, agreed under the Paris Agreement, is essential to limit global temperature increase to no more than 1.5 °C.

The Australian Government has committed in legislation that Australia will reach net zero emissions by 2050 (*Climate Change (Net Zero Future) Act 2023* (Cth)). All state and territory governments have committed to at least this objective as well, with several having more ambitious targets.⁴ Meeting these commitments will require changes across the economy: in our electricity and energy generation, transportation, agriculture, resources and land use.

The transition is already underway, and governments are rolling out interim plans for 2025–2035 milestones (ACT Government 2019b; NSW DPIE 2020b; Qld DEC 2024; Tasmanian DSG 2023; Victorian DEECA 2023c). The transition will impact water use across Australia, changing planning assumptions through redirected and increased demand. But notably absent from these plans to date is recognition of the demands and impacts on Australia's water management – water is a footnote, if mentioned at all.

⁴ Victoria and the ACT have committed to net zero by 2045, and Tasmania by 2030 (ACT Government 2019b; Tasmanian DSG 2023; Victorian DEECA 2023c).

The UN Expert Group on Water and Climate-Change presented preliminary figures to COP28 in November 2023, indicating that by 2030 clean energy mitigation measures alone are estimated to require 900 teralitres of fresh water globally (UN Water Expert Group on Water and Climate Change 2023). For comparison, global freshwater consumptive demand by agriculture, industry and domestic use in 2014 was 4,000 teralitres (IGBP 2015). This highlights the need to incorporate water planning holistically into climate change mitigation now.

Water for low-emission energy generation

A range of zero-emission technologies for energy generation exist, with more becoming viable as technology improves. All solutions require water to varying degrees and with different quality considerations (and relatively more or less compared to existing energy generation technologies – figure 3.3). Examples include:

- hydrogen, which requires water as feedstock for generation and for cooling (Arup 2022). One kg of green hydrogen (that is, hydrogen produced using renewable sources) is estimated to require 9-11 litres of water as feedstock, and 3-60 litres for cooling (Arup 2022, pp. 40–43). This equates to a typical water consumption of 363 to 3,090 L of water per MWh of energy produced (figure 3.3).⁵ A further consideration for feedstock water is quality: hydrogen production requires high purity water (Arup 2022, p. 124).
- biofuels (fuel derived from biomass), which require water as a feedstock for generation. For example, most bioethanol is produced from corn or sugarcane which requires water to grow and for the industrial fermentation processes. One litre of bioethanol is estimated to require anywhere from 2-160 litres of water, depending on the input biomass (Wu and Xu 2018). Biomass has a typical water consumption of 484 to 591 kL of water per MWh of energy produced⁶ (figure 3.3 top line, Jin et al. 2019, p. 2).

Solar and wind technologies do not have significant water demand in operation (as opposed to manufacturing and establishment, which may need water that also needs to be planned for), but due to their intermittent nature, increasing their use means the energy grid needs adjustment to include more storage and dispatchable energy (AEMO 2024). Many of these technologies also demand water. Examples include:

- pumped hydro – pumping water uphill to reservoirs while excess (relatively cheap) electricity is available and releasing water downhill to generate hydroelectric power when demand requires. While this process does not consume water per se, it sequesters large volumes of water that become unavailable for other uses, and losses may occur through evaporation. Hydroelectricity typically consumes 57 to 83 kL of water per MWh of energy produced, primarily as a result of evaporation from storage (figure 3.3 second line, Jin et al. 2019, p. 2). While hydroelectricity does not have significant water quality demands by itself, in some cases reservoirs may serve a dual purpose of providing drinking water supply and enabling pumped hydroelectricity storage (AWA 2019), meaning water quality for subsequent use must be maintained.
- batteries require minerals whose production processes use water at the mining and ore extraction stages. In particular, lithium is in demand due to its high energy density and light weight. Australia is currently the world's largest lithium producer (USGS 2024). Lithium mining is water intensive – extracting one kilogram of lithium consumes between 150-400 litres of water (Chordia et al. 2022, p. 7). When fabricated into a lithium-ion battery, this equates to around 750 to 5,300 kL of water per MWh of energy storage capacity.⁷ Furthermore

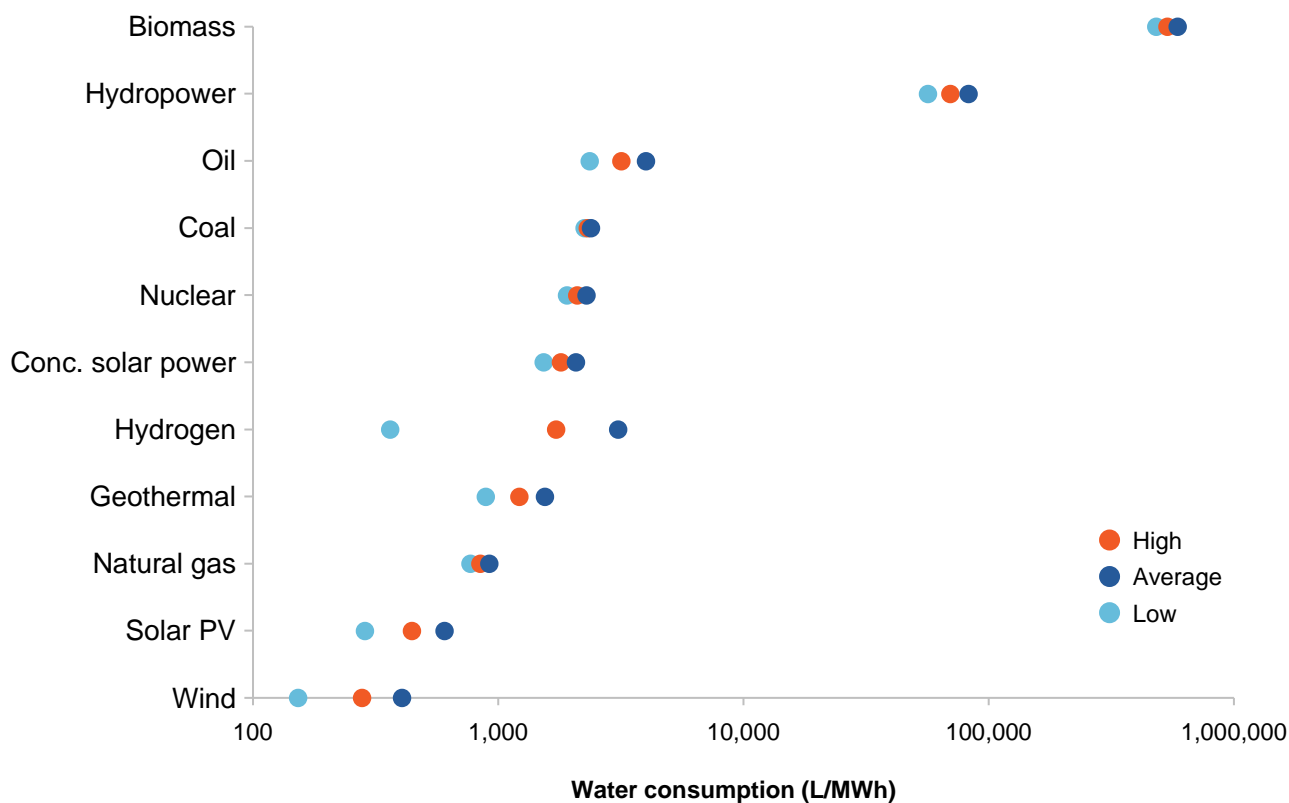
⁵ Calculation based on the specific energy of hydrogen as 33.33 kWh per kilo and a typical fuel cell efficiency of 50-80% (Yue et al. 2021, pp. 6–7).

⁶ Biomass can vary beyond this range – the input water is highly variable depending on the type of biomass and the climatic and soil conditions it is grown in. Figure 3.3 shows an average range from 23 studies, but the extremes of the range in those studies are between 7 kL per MWh at the low end to 28,000 kL per MWh at the high end (Jin et al. 2019, p. 3).

⁷ Calculation based on a typical battery storage capacity of 75-200 Wh per kg lithium (Kebede et al. 2022, p. 7).

lithium deposits in Australia are mostly located in remote areas of Western Australia (Geoscience Australia 2018, p. 3) in which water is scarce due to the arid climate (S&P Global Market Intelligence 2022).

Figure 3.3 – Water consumption by electricity generation technology^a



a. Consumption is volume of withdrawn water from surface and groundwater sources not returned to the source due to evaporation, transpiration or incorporation into products.

Source: Adapted from Jin et al. (2019, p. 2), additional data for hydrogen from Arup (2022, pp. 40–43) and Yue et al. (2021, pp. 6–7).

Water saving and emissions reduction

Not all measures that reduce emissions from the energy sector will cost water. Some will reduce both water demand and emissions, given alternative options for the energy system.

One example is reducing the use of coal for domestic power generation. The Australian Government has committed to deliver 82% of the electricity in the National Electricity Market from renewables by 2030 (DCCEE 2022b) and has endorsed (Bowen 2023) the joint statement by the 28th United Nations Climate Change Conference that calls for:

(a) Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;

(b) Accelerating efforts towards the phase-down of unabated coal power;

...

(d) Transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050 in keeping with the science (UNFCCC 2023).

These commitments are likely to result in a reduction in coal mining and use for domestic power generation in Australia, and with those a reduction in water demand from those activities. Coal has a water consumption of 2,255 to 2,395 L per MWh of energy produced (figure 3.3, Jin et al. 2019, p. 2). Domestic coal use (both mining and electricity generation from coal fired power plants) is estimated to use 214 GL of water annually, around 2.4% of the total consumptive pool in New South Wales and Queensland (Overton 2020).

Water for enabling natural ecosystems to mitigate climate change

Another option for climate change mitigation is carbon capture and sequestration: removing carbon dioxide from the atmosphere and ensuring it is not re-released. Many strategies to capture carbon also demand water. For example:

- reforestation, to capture carbon in trees via photosynthesis, requires 80-130 litres of water for every 1 kg of carbon dioxide absorbed (Zhang et al. 2023)
- bioenergy with carbon capture and storage – a process that involves extracting energy from biomass and capturing the carbon emitted. While this has the potential for significant emission reductions, it is water intensive due to the need to grow and process biomass, needing around 575 litres of water per 1 kg of carbon dioxide captured (Rosa et al. 2021).

Adaptation measures, such as greater planting and watering of urban green spaces to manage urban heat island effects (above) will increase urban water use. As watering is most likely to be required during prolonged hot dry spells and when water restrictions are in place, the design of these restrictions (within water plans and strategies) should consider the potential benefits of green spaces to manage temperature (NSW DCCEEW sub. 77 attachment B, pp. 3–4).



Recommendation 3.3 Water for net zero

All Australian governments should collectively model and plan for changed water demand as a result of necessary climate change mitigation measures. All solutions will have water demands, in terms of both quality and quantity, that need to be estimated and planned for.

Findings should be integrated into both net zero strategies and sustainable water strategies to ensure sufficient water is available to enable Australia's transition to net zero emissions.

3.6 Planning to provide cost effective urban water services in a changing climate

Rigorous, transparent planning will be the cornerstone for achieving cost effective urban water security in a changing climate. The BCSD (sub. 7, p. 7), as well as the Commission's 2017 and 2020 National Water Reform Inquiries (PC 2017, p. 187, 2021b, p. 168), called for the National Urban Water Planning Principles to be updated and embedded in a renewed NWI (box 3.4).

Box 3.4 – National Urban Water Planning Principles

1. Deliver urban water supplies in accordance with agreed levels of service
2. Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base
3. Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply/demand balance
4. Manage water in the urban context on a whole-of-water-cycle basis
5. Consider the full portfolio of water supply and demand options
6. Develop and manage urban water supplies within sustainable limits
7. Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply/demand balance
8. Periodically review urban water plans

Source: DCCEEW (2019).

The development of water strategies based on the urban planning principles are important risk management tools that provide an opportunity to identify cost effective options for meeting water security objectives. All potential supply and demand options must be considered.

State and territory governments have developed water strategies to articulate the anticipated challenges to water management over the coming years, including ensuring urban water security (NSW DPIE 2021a; Victorian DELWP 2016; Qld DRDMW 2023f; SA Government 2010; Tasmanian DPIPWE 2021b; NT OWS 2023c; ACT Government 2019a). Some jurisdictions have also developed region-level water strategies and/or strategies for major metropolitan areas (examples include NSW DPE 2022b; SA DPTI 2017; Victorian DELWP 2022; box 3.5). The level of detail varies from plan to plan, with some only identifying high-level principles and others identifying more detailed programs of work.

Box 3.5 – Case Study: The Lower Hunter Water Security Plan

The NSW Government released the Lower Hunter Water Security Plan in April 2022, with the stated aim of ensuring water security for the Lower Hunter for the next 40 years. The plan was developed in parallel with the New South Wales Water Strategy and draws on New South Wales's new modelling methods to better understand future climate conditions.

Process for developing the plan

Over five years, Hunter Water engaged local communities to understand their values and preferences, to define goals and objectives, investigate and shortlist options (including sensitivity testing and scenario analysis), evaluate programs of actions and finalise the Plan. Hunter Water also engaged First Nations peoples to understand and incorporate their water values and knowledge into the Plan's priorities. Hunter Water examined the feasibility of all options for reducing water demand and increasing supply, which were assessed against environmental, social, technical and financial criteria. From this, a shortlist of options was derived, grouped into programs of actions, which were subsequently assessed on their performance under various climate conditions.

Box 3.5 – Case Study: The Lower Hunter Water Security Plan

Options on the table

The portfolio of potential options included:

- a water conservation and leakage reduction program
- recycled water and stormwater harvesting programs for non-drinking purposes
- a new Hunter Water connection to the proposed Lostock Dam – Glennies Creek Dam pipeline scheme (a new water sharing arrangement with the Upper Hunter)
- increasing existing water sharing with the Central Coast including upgrading the existing interconnecting pipeline and increasing the capacity of Mangrove Creek Dam by raising the dam wall
- desalination as either a permanent or drought response source of water, located at either Belmont or Walsh Point, on Kooragang Island
- a new purified recycled water for drinking scheme involving sending highly treated recycled water to Grahamstown Dam for storage and further treatment at the existing Grahamstown Water Treatment Plant
- a new 230 billion litre on-river dam at Upper Chichester, immediately upstream of the existing Chichester Dam
- a new 160 billion litre off-river dam at Limeburners Creek, east of Clarence Town.

The analysis undertaken by Hunter Water found that a diverse portfolio of the Belmont desalination plant, Upper Hunter transfers and purified recycled water offered the largest estimated net present value of \$112 million. The selected portfolio was also found to be resilient to a range of assessed climate change scenarios and future uncertainty, and represented the least-cost portfolio of options to achieve that resilience^a.

a. 'Least-cost' is still expensive, reflecting the investment challenges to achieving water security. The estimated capital cost of the Belmont desalination plan has increased from \$90 million in 2019 (GHD 2019, p. 41) to more than \$530 million in 2024 (Jacobs 2024, p. 139). On 24 January 2024, Hunter Water announced that the cost would be passed on to consumers in the form of an approximately \$90 increase to the average annual household bill (Hunter Water 2024).

Source: NSW DPE (2022e).

All options need to be on the table

Australia has a significant water investment challenge ahead of it.

The first is to achieve water security in the face of a changing climate. This requires a diversity of solutions, including supply and demand measures and infrastructure and non-infrastructure alternatives (NFF, sub. 70, p. 7; Sydney Water, sub. 41, p. 7; WSAA, sub. 15, p. 9).

The second is to maintain and upgrade ageing, conventional water storage and wastewater infrastructure (such as dams and sewers). As this infrastructure reaches the end of its design life, maintenance costs tend to increase and operational efficiency declines (UNESCO 2020, p. 48). According to WSAA (sub. 15, p. 3), capital expenditure is expected to double to over \$10 billion annually by 2027.

To deal with these challenges efficiently and at least cost, all options need to be available and evaluated on their merits, even those that are politically difficult.

The Commission supports the opinion previously expressed by the National Water Commission, that:

options should be selected through a robust, open-minded and transparent comparison of all options, examining the social, environmental and economic costs and benefits and taking into account the specific water system characteristics, in consultation with the community. (NWC 2009, p. 236)

What options are technically feasible?

Regardless of the definition of water security (section 3.1), governments should take a broad approach to meeting its requirement. Urban water planning has traditionally focussed on infrastructure and supply-side approaches to deliver water. Best-practice water planning requires going beyond those options, to also consider combinations, sequencing and adaptive staging that includes demand side options and trade.

In its report *All options on the table: urban water supply options for Australia*, WSAA (2020, p. 11) lays out a comprehensive set of potential options. Some of these options, and participants' views on them, are described in box 3.6.

Box 3.6 – Potential solutions for water security in a changing climate

Recycled water

In its submission to this inquiry, Sydney Water recommended the NWI (more on this in the section below):

Provide further support to improve the adoption of purified recycled water [PRW] as a viable, safe option for supply augmentation.

- Develop national objectives for water supply security for urban areas, including measures of rainfall independent water supply.
- Improve information sharing and analysis, including authoritative and government-endorsed guidance on costs and benefits of PRW and treatment effectiveness.
- Provide foundational planning advice that builds on the learnings of PRW implementation by major utilities.
- Provide clear national guidance to improve consistency of approach by state health regulators and drive a review of national recycled water guidelines. (sub. 41, p. 3)

Desalination

There are approximately 270 desalination plants in Australia providing 880 GL/y of desalination capacity (BOM 2021b, p. 38). Most are small scale, but with six large desalination plants in major urban centres providing 534 GL/y between them, which is 60% of total capacity (Victorian DEECA 2023a). There are also a number of major projects under consideration, including in New South Wales, Queensland, South Australia and Western Australia (Cook et al. 2023; Hunter Water 2024; Infrastructure SA 2024; Palaszczuk and Butcher 2023).

Many inquiry participants acknowledged that desalination is an important option in the diversification of urban water supplies.⁸ While desalination is rainfall independent, its high cost both in capital and operation, combined with high power demands and pollution potential, means that it is not always the lowest cost or most ecologically sustainable water supply option (WSAA 2020, p. 37).

⁸ BCSD, sub. 7, p. 10; NPA, sub. 33, p. 2; Sydney Water, sub.41, p. 8; WSAA, sub. 15, p. 2.

Box 3.6 – Potential solutions for water security in a changing climate

Managed aquifer recharge

Some inquiry participants (Alex Gardner, sub. 46, p. 4; CSIRO, sub. 42, p. 4) indicated the need for more investment in processes to top up groundwater reserves in wet years as a form of water banking. As CSIRO states:

Managed Aquifer Recharge (MAR) is an internationally proven, low-cost solution that could improve drought resilience across regional Australia. Despite 25 years of experience using MAR for alternative urban water sources, the full potential of MAR is yet to be realised at a national scale. (sub. 42, p. 4)

Managed aquifer recharge (for example, via percolation or direct injection of treated wastewater, stormwater, surface water during high flow events or desalinated water) has the benefit of replenishing depleted aquifers, reducing evaporative losses compared to dam storage and improving water quality, while potentially providing a relatively cheap source of water for consumption (CSIRO 2024c).

Water efficiency/conservation

Improving conservation efforts may prove effective in reducing demand. As Sydney Water outlined:

there is a need to provide leadership and ongoing support to maintain and grow water conservation activities delivered by government, utilities and the market. A baseline level of activity and investment is required to ensure that continual improvements in efficiency levels and minimum standards, and to build and maintain the capacity and capability of professionals in relevant industries, such as plumbing, to embed water conservation. Doing so, will build greater community resilience to drought, reducing social and economic impacts of drought. (sub. 41, p. 9)

Water conservation and savings measures for domestic users could come through behavioural change led by information and education and through adoption of newer water efficient appliances and devices with support through certification standards.

Scarcity pricing

Retail pricing practices vary between jurisdictions but usually consist of a two-part tariff: a fixed charge and a volumetric charge. The volumetric charge should be set at the long-run marginal cost of supply augmentation, but this means the price does not usually reflect the scarcity value of water in the short term. Adopting flexible volumetric pricing that incorporates a scarcity factor would encourage consumers to tailor their consumption accordingly (e.g., reduce consumption during periods of relative scarcity because the price would be relatively high). Moreover, it provides clearer, and more appropriate, signals to suppliers about when, and how much, to invest in new supply options (dynamic efficiency), delivering water security at least cost (PC 2011, pp. 157–195).

Governments need to resist policy ‘bans’

Governments often rule out options for water security for political reasons, without due consideration of the actual costs and benefits – so called ‘policy bans’. Options such as purified recycled water (PRW) for drinking and other potable uses, stormwater harvesting and rural-urban water trade are all contemporary examples of viable supply augmentation options that have been subject to policy bans in Australian jurisdictions (WSAA 2020, p. 6). The WSCA’s submission notes:

Jurisdictions generally use a narrow definition of water and focus implementation on raw water sources (surface, ground and desalination in some jurisdictions), potable water and wastewater/recycled water. This approach misses other sources such as stormwater and results in lost opportunities to optimise overall water management and realise better outcomes. Policy bans on the use of some water sources have compounded this issue. (sub. 45, p. 1)

Policy bans potentially result in outcomes that are not lowest cost or efficient. They are almost never justified on economic grounds.

Purified recycled water

While PRW for drinking is used in various places around the world (including in London, Los Angeles, and Singapore; Cook et al. 2022), it has seen limited adoption in Australia. This appears in part to reflect a reluctance in the community – a perceived ‘yuk’ factor – which has led policy makers to shy away from even raising PRW as an option (Healy et al. 2020). For example, there appears to be an implicit ‘policy ban’ on PRW in place in Victoria, with plans such as the *Central and Gippsland Regional Water Strategy* not considering it as an option as it is ‘not a permitted source of drinking water’ ((Victorian DELWP 2022a, p. 39); chapters 4 and 7). The Australian Water Association (sub. 43; p. 10) identifies a lack of political will and insufficient effort to improve the community’s water literacy about how safe PRW actually is.

Community attitudes to PRW do appear to be changing. For example, in a 2023 poll conducted in Queensland, 64% of respondents stated that they were happy to drink recycled water outside of a drought (Lynch 2024). Sydney Water opened a Purified Recycled Water Demonstration Plant at Quakers Hill in 2023 to ‘help build acceptance for PRW as a supply source and improve water literacy’ (Sydney Water, sub. 41, p. 8). WSAA (sub. 15, p. 6) found from surveys that communities are increasingly open to exploring PRW for drinking. And many participants in this inquiry supported recycled water as an option that should be considered to address Australia’s urban water security.⁹

The Commission reiterates its advice from 2021 that policy bans on using PRW are not justified. PRW should be evaluated alongside other options on its merits in terms of cost effectiveness and reliability to supply safe drinking water.

Participants also suggested that updates to the *Australian Drinking Water Guidelines* to explicitly encompass PRW are important to support its implementation as a water source option (WRA, sub. 49, p. 2; WSAA, sub. 15, p. 9).

Rural-urban water trade

Where physically feasible, allowing trade between rural and urban users can represent a least cost option for enhancing urban water security. Much like trade within the rural sector has provided community benefits from allowing water to move from lower to higher value uses, allowing rural to urban water trade can also benefit the community. Trade benefits willing sellers, such as irrigators, while urban users benefit from lower cost

⁹ ATSE, sub. 5, p.3; EA, sub. 34, p. 4; Qldwater, sub. 29, p. 4; Sydney Water, sub. 41, p. 3 and sub. 71, p. 1; WIM, sub. 4, p. 1; WSAA, sub. 81, p. 3.

water supply options (PC 2011, p. 90). Given that agriculture accounts for 67% of water use in Australia, there appears to be significant scope for rural-urban water trade (BOM 2021b, p. 5). However, jurisdictions continue to rule out rural-urban water trades (NSW DCCEE 2024b, p. 4; Victorian DELWP 2022a, p. 39).

Transparent and rigorous assessment of options is required for least cost water security

The rationale for government subsidies for water infrastructure projects are frequently inconsistent with the cost recovery objectives in the NWI and tend to result in inefficient (and possibly even ineffective) investment (box 3.7). Subsidies can distort the type, timing and scale of water supply augmentation, and encourage (inefficiently) high levels of consumption by water users.

Moreover, subsidised investments are often not subject to regulatory oversight and create future liabilities for asset replacement and ongoing maintenance (NWC 2011b, p. 24).

Value for money for water users comes from water utilities efficiently investing in and using their infrastructure. Efficient use is a necessary condition for ensuring that water security can be delivered at least cost to water users. Governments can facilitate this by ensuring that investments – and any subsidies – are compliant with the NWI pricing principles (section 6.1, renewal advice 14.2).

Box 3.7 – Case study – the stage 2 Haughton Pipeline project

Stage 2 of the Haughton Pipeline project commenced construction in 2023 with \$195 million in funding from the Queensland Government, despite a net present value of negative \$220 million and a benefit-cost ratio of 0.3. Infrastructure Australia found the proponent's business case would provide no additional water security to Townsville and that an alternative option – identified in the business case – of moving Townsville to a two-part water pricing tariff (with a fixed and variable component):

is likely to have economic, social and environmental merit ... would be consistent with the National Water Initiative ... would provide a water pricing structure for Townsville that is similar to other comparable Australian jurisdictions and would provide a net benefit of \$1.5 million. (IA 2020, p. 5)

In response to the pipeline investment, the WIM Alliance observed that:

[average consumptive use in Townsville] is 400-500 L/EP/day. Comparatively water use per equivalent person (EP) per day in Mackay is 200-230 L/EP/day and elsewhere along the eastern seaboard between 140-250 L/EP/day. No state or federal funding should be allocated for water security or resilience where utilities, communities and residents are inefficiently using a water resource. (sub. 4, p. 10)

Under a two-part tariff, even with projected population growth, reducing Townsville's per capita domestic water to nearer the national average would be expected to meet demand for the next 50 years.

Source: IA (2020).

Climate change and crisis decision-making

When extreme weather situations occur which have not been adequately planned for, governments face ‘crisis situation’ pressures from communities and businesses to respond urgently. Decisions made in these situations are not always subject to established institutional processes for considering effectiveness, the short or long-term costs and who bears them.

For example, the Millennium Drought (1996–2010), which saw major urban water supply dams drop to their lowest levels in decades (Steffen et al. 2018, p. 52), prompted state governments to invest heavily in building large-scale infrastructure, committing upfront to expensive projects that were not the most cost-effective option at the time of investment (e.g., see Grafton and Ward 2011 for an analysis of the costs and benefits of constructing Sydney’s desalination plant). The nature of pressures on and responses by governments in crisis situations reinforces the need for their commitment to robust options assessment and decision-making.

3.7 Renewal advice

The Commission reiterates its renewal advice from 2021 for how a renewed NWI should provide guidance for best practice urban water system planning and infrastructure investment to enhance water security and deliver on community expectations.

In renewing the NWI, Australian governments should build on the principles in the original NWI of full cost recovery, as well as economic viability and ecological sustainability of project investments and ensure that infrastructure development processes are also culturally responsive to the interests of First Nations peoples.

NWI renewal advice 3.6: An updated statement of interactions

UPDATED IN 2024

The current paragraph of the National Water Initiative covering interactions with other key initiatives needs to be brought up to date. Suggested wording follows:

Other initiatives with a significant water focus, subject to separate agreements by the Parties, include the *Water Act 2007* (Cth), the 2012 Murray–Darling Basin Plan, the Murray–Darling Basin Agreement and the 2020 National Agreement on Closing the Gap. Also relevant are the Australian Government’s commitments under the Paris Agreement, national and jurisdictional frameworks for emissions reduction, climate change mitigation and adaptation; and environmental planning laws. These play an important and complementary role in improving the management of water in Australia. Continued linkages to the National Water Quality Management Strategy will also complement achievement of the objectives of this agreement. And the agreement should be the major policy vehicle for pursuing the water-related goals endorsed as part of the United Nations 2030 Agenda for Sustainable Development.

NWI renewal advice 12.1: Best-practice urban water system planning

UNCHANGED FROM 2021

Updating the *National Urban Water Planning Principles* and formally embedding them within the National Water Initiative would establish a standard for best-practice urban water system planning. A renewed National Water Initiative should include the following principles:

- Integrated management of water supply, wastewater and stormwater is embedded in urban water planning and management systems.
- Planning decisions align with system objectives for levels of water security, service quality, the environment and urban amenity.
- System objectives are discovered through a transparent and consultative approach and approved by governments in line with customer and community preferences.
- Urban water planning connects water planning across different scales and with land-use planning.
- All supply options are considered and their relative merits subject to a rigorous, consistent and transparent assessment of costs and benefits.
- Roles and responsibilities in the planning and management process are clearly assigned between relevant governments, utilities and other planning entities.
- Governments enable effective coordination between utilities, regulators, developers and land-use planners.

To support efficient service delivery by smaller providers, jurisdictions should consider developing national guidelines for both long-term system planning and contingency planning for regional and remote water systems.

NWI renewal advice 14.1: A new water infrastructure element

UNCHANGED FROM 2021

In renegotiating the National Water Initiative, jurisdictions should develop an element to guide investment in water infrastructure.

The new element should restate the high-level requirements for all infrastructure to be assessed as economically viable and ecologically sustainable prior to the commitment of funding, with cost recovery from users as the norm, and add a further requirement that infrastructure development processes are culturally responsive to the interests of Traditional Owners.

The new element should also include:

- an agreed framework to guide government investment in major water infrastructure, incorporating project selection and assessment processes and clear roles and responsibilities for governments and service providers
- principles for cost sharing (including government subsidies) and allocating water from new developments.

NWI renewal advice 14.2: Assessment criteria for water infrastructure

UPDATED IN 2024

As part of the new infrastructure element, jurisdictions should agree to criteria on how major projects can demonstrate adherence to the NWI requirements for infrastructure.

Economic viability should be demonstrated by a benefit–cost ratio (at least) greater than one, determined through a transparent and rigorous cost–benefit assessment, with:

- an assessment of a range of options, including non-infrastructure options where these can meet the investment objective, and selection based on the highest expected net benefit
- transparency supported by publication of business cases as a matter of course (except where commercially sensitive data limits publication, in which case the business case should be reviewed by a qualified independent body)
- use of entitlement pre-sale to limit optimism bias
- robust estimates of social and distributional impacts.

Ecological sustainability should be demonstrated through environmental and social impact approvals, and compliance with a high-quality and NWI-consistent water plan that:

- establishes the environmental water provisions necessary to meet agreed environmental outcomes under a changing climate
- sets out the social, economic and cultural outcomes sought from the water plan
- clearly defines the expected reliability of water rights, taking into account the likely impacts of climate change
- is developed with robust community engagement to reflect community values.

Criteria for culturally responsive infrastructure development should be determined through the process led by the Committee on Aboriginal and Torres Strait Islander Water Interests. At a minimum, culturally responsive infrastructure processes would:

- incorporate deep engagement with the Traditional Owners of affected areas (both at the infrastructure site and downstream) as part of business case development
- comprehensively identify and manage impacts on cultural heritage in affected areas.

Costs should be recovered from users as the norm, with any government funding provided through a transparent subsidy. This should be limited to situations where:

- substantial public benefits associated with water infrastructure impose additional costs that are best borne by governments
- an equity argument exists (for example, to support access to an essential service in high-cost regional town water systems where the cost of supplying a basic level of services is considered unaffordable).

Governments should not subsidise major water infrastructure for strategic objectives, such as regional development, without first demonstrating that the project is the most effective means of addressing that objective. This requires alignment with broader high-quality and long-term strategic regional planning processes.

- Jurisdictions should maintain the principle supporting use of market mechanisms for allocating water, although they should consider allocating a share of new entitlements in undeveloped systems to Traditional Owners.

4. Water access entitlements and planning frameworks



This chapter considers progress in achieving element one of the National Water Initiative (NWI) – water access entitlements and planning frameworks. Paragraph 25 of the NWI identifies 11 outcomes relating to water access entitlements and planning (section 4.9), including increased entitlement security, legal protection of environmental water, transparent planning processes, adaptive water management, sustainable levels of extraction, assignment of risks for changes in the consumptive pool, improved compatibility across jurisdictions, recognition of Indigenous water needs, identification of high value environmental water assets and regulation of interceptions.

The NWI outlined eight action areas against these outcomes:¹















1. Water access entitlements (NWI paragraphs 28–34)
2. Water planning (NWI paragraphs 36–40)
3. Water for environmental and other public benefit outcomes (NWI paragraph 35)
4. Addressing overallocated and overused systems (NWI paragraphs 41–45)
5. Assigning risks for changes in allocation (NWI paragraphs 46–51)
6. Indigenous access (NWI paragraphs 52–54)
7. Interception (NWI paragraphs 55–57)
8. Integrating surface water and groundwater management (NWI paragraph 23 x)).









A summary of the Productivity Commission's assessment framework (appendix B) – which does not map perfectly against the action items – and progress against it is in table 4.1. The notes to the table indicate which assessment items relate to which NWI actions and outcomes. Action item six is assessed in chapter 2.

Table 4.1 – Assessment summary: water access entitlements and planning frameworks

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Water access entitlements (section 4.1)			
Legally defined (statutory) long-term share of the consumptive pool	Largely achieved 	Largely achieved 	Apart from Western Australia and the Northern Territory, all jurisdictions have enacted legislation required to create secure, NWI-consistent water access entitlements.

¹ NWI paragraphs 28–57.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Unbundled (into access, use, and delivery) where cost effective	Largely achieved 	Largely achieved 	Unbundling and partial unbundling of water licences has continued in South Australia since 2021. Water licences remain bundled in Western Australia and the Northern Territory.
Apply to all major consumptive water uses (to the extent practicable)	Largely achieved 	Largely achieved 	The incorporation of mining and petroleum industries into the Northern Territory's licensing framework is a significant improvement. The only remaining jurisdiction providing an exemption for mining industries is Queensland for associated water take.
Water plans (section 4.2)			
Statutory	Largely achieved 	Largely achieved 	Western Australian water allocation plans remain non-statutory. A recent judicial decision in the Northern Territory found water plans are non-binding in nature on decision makers, undermining their effectiveness in providing secure water access.
Articulate trade-off decisions between economic, social and environmental considerations	Partially achieved 	Partially achieved 	Jurisdictions have made progress to enhance their understanding of climate change impacts. However, no jurisdiction has developed clear triggers for rebalancing environmental and consumptive uses.
Provide for adaptive management of surface water and groundwater systems	Partially achieved 	Partially achieved 	Improvements in monitoring, evaluation and reporting of water plans have occurred in some jurisdictions.
Water for environment and other public benefit outcomes (section 4.3)			
Statutory recognition and afforded the same level of security as consumptive uses	Largely achieved 	Largely achieved 	The non-binding nature of water allocation plans in the Northern Territory mean water for the environment and other public benefit outcomes do not have the same level of security as consumptive uses.
Addressing overallocation and overuse (section 4.4)			
All overallocated and overused systems returned to sustainable levels of extraction	Partially achieved 	Partially achieved 	Some systems previously identified as overallocated have been returned to within sustainable levels of extraction, primarily in the Murray–Darling Basin. However, overallocation of some systems continues to be a problem in Western Australia.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Assigning risks for changes in allocation (section 4.5)			
Clearly established (through statutory instruments)	Partially achieved 	Partially achieved 	No changes to risk assignment policies have occurred since 2021.
Implementable and effective in providing certainty to entitlement holders	Partially achieved 	Partially achieved 	No changes to risk assignment policies have occurred since 2021.
Interception (section 4.6)			
Significance of water intercepting activities assessed and effectively managed	Largely achieved 	Largely achieved 	The implementation of floodplain harvesting licensing across northern New South Wales improves the ability to manage this interception activity.
Integrating surface water and groundwater management (section 4.7)			
Physical connectivity between groundwater and surface water assessed and managed	Largely achieved 	Largely achieved 	Multiple jurisdictions have undertaken activities to improve their understanding of groundwater systems and the connectivity with surface water systems.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding.

4.1 Water access entitlements

Summary of actions under the NWI

Jurisdictions are required under the NWI to implement statutory-based water access entitlements for consumptive use to provide commercial certainty and security. Entitlements must be separate from land, exclusive, mortgageable, tradeable and provide a perpetual right to a share of a system's consumptive pool.

Previous findings (2021)

By 2017, the Commission found that most states and territories had introduced NWI-consistent water access entitlements, but some outstanding issues remained (PC 2017, pp. 67–76). While water rights to regulated surface water were largely separated from land, water rights remained tied to land in many regulated groundwater systems and some unregulated surface water systems. In some instances, water rights had been separated from land, but the components of the water rights (i.e., to access, use and delivery of the water) remained effectively bundled (box 4.1).

Box 4.1 – Water rights explainer

Water rights can be thought of as comprising four components:

- water access entitlement: a long-term share of a consumptive pool as defined in a water plan
- allocation: usually a volume of water distributed periodically against an entitlement
- delivery: the right to have an allocation of water delivered to a certain take-off location or to obtain water from a particular location
- use: permission to use an allocation, with prescribed conditions for use.

Source: PC (2017)

In 2021, the Commission noted that Western Australia and the Northern Territory had yet to introduce legislative changes to separate water rights from land, or provide perpetual entitlements – which are instead issued for 10 years at a time (PC 2021a, pp. 14–17). Moreover, mineral and petroleum industries in Queensland remained exempt from the entitlement framework for ‘associated water’ (underground water taken or interfered with during operation).

In its renewal advice for the NWI, the Commission recommended removing special provisions for mineral and petroleum industries in water access and planning arrangements, as well as establishing a process to determine if alternative water sources (stormwater, recycled water, etc.) can be incorporated into entitlement frameworks (PC 2021a, pp. 75–77).

Below are some examples of jurisdictions’ progress, maintenance or backsliding under this area. Where a jurisdiction is not shown, it is because there has been no significant change since 2021.

Assessment (2024)

Victoria

In November 2023, the Victorian Government introduced the Place of Take Approvals Framework to replace water delivery entitlements across declared water systems in Victoria. The new framework will reduce delivery risks and improve transparency and allocation efficiency of extraction licences. The new framework better reflects system constraints, provides extraction shares in perpetuity, improves the security of entitlement holders and allows for the trade of rights.

In *Groundwater 2030*, the Victorian Government identified several priorities to improve groundwater management, including opportunities to improve the state’s licensing framework to improve outcomes for water users and the environment.

Queensland

Exemptions remain for resources projects (such as mining and gas extraction) from the need to hold water entitlements for some types of ‘associated water’ use in Queensland in some circumstances. Following the incorporation of mining into the water licensing framework in the Northern Territory, Queensland will remain the only jurisdiction providing exemptions.

Western Australia

In December 2023, the WA Government announced that it would no longer proceed with legislative reform of Western Australia's water resource management system. The legislative reforms were expected to include unbundled, perpetual water access entitlements, which would have brought WA's water access entitlement settings in line with the NWI. Alex Gardner (sub. 46, pp. 3-4) noted that the proposed legislative reforms would have supported the sustainable extraction of water, in the face of growing scarcity caused by climate change, through a variable annual allocation. Furthermore, the reforms would provide greater legal certainty for investment in water infrastructure.

South Australia

The Landscape South Australia (Transitional Provisions) Regulations 2019 (SA) allow for partial unbundling of water entitlements or for entitlements to remain bundled. Following the review of a water plan, the relevant landscape board can decide whether to partially unbundle entitlements or let entitlements remain bundled.

Unbundling of water rights into four components (box 4.1) has been implemented in its Murray–Darling system and in groundwater systems that are responsive to rainfall (Southern Basin and Musgrave Prescribed Wells Area). For other groundwater systems, partial unbundling links a water user's allocation and delivery rights to help manage the localised impacts of draw down. In all cases, land and water remain unbundled.

In 2022, entitlements were partially unbundled in the *Adelaide Plains water allocation plan*. Water allocation plans being developed for the Barossa, Padthaway and Baroota areas are also expected to allow for partially unbundled entitlements. In 2021, entitlements were fully unbundled in the Far North Prescribed Wells area.

The Landscape South Australia (Water Register) Regulations 2020 (SA) came into effect in July 2022. These regulations will provide greater confidence in water trade and improve entitlement holders' access to finance. The regulations allow for security interests and caveats to be registered against licences, as well as providing for joint ownership and the ability to subdivide, consolidate or devolve water licences.

Tasmania

In December 2022, the Tasmanian Government introduced an additional requirement for applications for summer water allocations. The applicant must provide the following:

- A detailed study of the impacts of climate change focused on the 30 years around the 2050 dry climate on water availability both at a seasonal and daily access level.
- An environmental flow study following the Tasmanian Environmental Flows Framework.
- An impact assessment of the environment and existing downstream users to be undertaken within the zone of impact (NRE Tas 2022b, p. 7).

The requirements are an interim measure until a review of the water allocation policy is completed, including the updating of hydrological models (water planning section).

Northern Territory

Before amendments to the *Water Act 1992* (NT) in 2018, mining and petroleum activities had been exempted from requiring a water licence. The amendments required all new projects from 2019 to obtain a

water licence. In 2023, the NT Government passed legislation requiring all mining and petroleum activities – new and existing – to obtain a water licence within two years.

The 2023 amendment requires all mining and petroleum activities that were in operation under an approved environmental management plan prior to 2019 to apply for a licence. The amendment ensures that all water use relating to mining and petroleum activities are brought into the water licensing framework, consistent with the NWI. However, concerns relating to the effectiveness of these legislative changes, as well as around the transparency and accountability, have been raised (EDO 2023; Fitzgerald 2023):

- Applications for water licences by mining and petroleum activities will not be advertised for public comment. This is different from other applications and is justified for existing mining and petroleum activities on the grounds they have previously been assessed under the *Mineral Titles Act 2010* (NT) and the *Mining Management Act 2001* (NT). However, the Commission understands that applications will be subject to freedom of information requests.
- Mining and petroleum operations will estimate their own water use requirements through the application process. However, applicants must provide prescribed types of evidence of take under the legislation, and self-assessment is similarly used for other applications in the Northern Territory.

Nevertheless, the Commission acknowledges that the incorporation of mining and petroleum activities into the Northern Territory's water licensing framework is a significant step towards NWI-consistent practices.

The 2023 amendment also introduced a 2-year transition period for commercial groundwater users in the Darwin rural water control district to obtain a water license. It requires commercial applicants to demonstrate they were using water prior to, and continued to use water after, the revocation of the exemption in the Darwin rural water control district. The amendment also provides the minister with the right to declare restricted water extraction areas where water resources are at risk.

In April 2023, the Northern Territory Minister for Environment, Climate Change and Water Security appointed a new Controller of Water Resources that is not also employed by the Department of Environment, Parks and Water Security, providing greater independence to the role. The decision has been positively received by inquiry participants despite some reservations (CLC, sub. 44, p. 9; ECNT, sub. 54, p. 11; NLC, sub. 38, p. 2). Under the *Water Act 1992* (NT) the Controller's powers include granting licences and permits, approving actions and enforcing compliance.

Under the *Statute Law Amendment (Territory Economic Reconstruction) Act 2021* (NT), the water minister may declare criteria under which longer-term water licences may be granted up to a maximum of 30 years. The current maximum licence period is 10 years. The amendment also allows for developers to apply for water licences over areas for later development.

In 2021, the NT Government released its *Staged water extraction licence guidelines*. The guidelines outline the water controller's prerogative to place conditions on licences for large volumes of water in systems where knowledge is limited, water requirements vary over the life of the project or supporting information will take more than five years to deliver. The conditions would release incrementally larger volumes of water for extraction, if project milestones and environmental thresholds are met.

If a water allocation plan is absent for a region, the Northern Territory relies on its contingent allocation framework when issuing licences. The contingent allocation framework, introduced in July 2000, stipulates generic extraction limits based on resource type (river or aquifer) and location (Top End or arid zone). Inquiry participants have criticised the framework because its scientific basis is not clear (ALEC, sub. 53, p. 42; EDO, sub. 50, p. 14). The *Scientific inquiry into hydraulic fracturing of onshore unconventional reservoirs in the Northern Territory* noted that if the arid zone rule were applied to the Beetaloo Sub-basin, it would "essentially permit 'mining' of the groundwater resource, and would be ecologically unsustainable" (Pepper

et al. 2018, p. 137). Others have criticised the arid zone rule's use of aquifer storage volumes, rather than recharge rates, as out of step with other jurisdictions and sustainable practices (Currell et al. 2024, pp. 11–12; Jackson et al. 2022).

The NT Government also implemented its *Surface water take – wet season flows policy* in February 2024. The policy likewise provides a contingent allocation rule: 5% of the 25th percentile of total flows for the three highest flow months of the year (generally January, February and March) is available for consumptive use. The rule replaces the contingent allocation framework during the wet season which allows for the extraction of 20% of water flows.

The NT Government states that this policy represents a conservative approach to surface water take:

The 5% setting is based on using 50 years of records to identify historic poorer wet seasons (the 25th percentile) to ensure the estimated water availability is even more conservative, sustains flows in drier years to account for climate variability. In reality, this limits surface water extraction to about 3% of annual wet season flows, possibly as little as 1% in wetter years.

This is a precautionary approach and will protect biodiversity and river systems across the NT as it has been established before large scale development is introduced into the NT. (NT Government 2024a)

Whilst prima facie this policy is conservative, the scientific basis for the wet season flows policy uses limited direct evidence of impact of water take on water systems in the Northern Territory. This is because very little evidence exists on the impacts of water abstraction in the Northern Territory given the low level of water resource development (O'Mara et al. 2023, p. 58). Instead, the policy appears to be based on general studies and observations that water take of 10% of flow or lower is unlikely to significantly affect the flow of tropical rivers (Grill et al. 2019).

Given that water resources across northern Australia vary widely, so do the opportunities and risks of water resource development (CSIRO 2023a, p. 27). This is particularly relevant given the additive impact of water extractions on water availability and ecosystems under drying climate scenarios (CSIRO 2023a, p. 23). Impact assessments, and subsequent modelling specific to Northern Territory river systems would be required to assess the appropriateness of this policy – and collecting data to inform this work could occur parallel to the issuance of licenses and as development occurs. In the meantime, the NT Government should make use of response triggers in applying license conditions (or resource condition limits; Cook et al. 2022, p. 10; Currell et al. 2024, p. 12). Response triggers should reflect the unique risks of extraction from the water source, including to other users, environmental assets, cultural sites and local communities.

4.2 Water planning

Summary of actions under the NWI

Under the NWI, jurisdictions are required to prepare statutory water plans² for surface water and groundwater management systems in which entitlements are issued. However, the NWI allows jurisdictions to determine the need for water plans for specific areas based on an assessment of the level of development

² Statutory water plans are “developed in consultation with all relevant stakeholders on the basis of best scientific and socio-economic assessment, to provide secure ecological outcomes and resource security for users” (NWI p.30).

of water systems, projected future consumptive demand and the risks of not having a detailed plan. Parties to the NWI also agreed on characteristics and components to guide the preparation of water plans.

In implementing water plans, parties will monitor the performance of water plan objectives, outcomes and water management arrangements; factor in knowledge improvements as provided for in the plans; and provide regular public reports to help water users and governments to manage risks and provide early indications of possible changes to the consumptive pool.

Previous findings (2021)

In 2021 (PC 2021a, pp. 17–29), the Commission noted that jurisdictions had largely achieved water planning outcomes, and that coverage of NWI-consistent water plans was continuing to increase. Jurisdictions had also undertaken scheduled reviews of water plans and many were taking various actions to strengthen planning processes.

As required under the *Water Act 2007* (Cth), jurisdictions in the Murray–Darling Basin had developed water plans (known as water resource plans – WRPs). In 2021, water resource plans for Victoria, Queensland, South Australia and the Australian Capital Territory (ACT) were accredited and operational, but New South Wales water resource plans were found to be inconsistent with the Murray-Darling Basin Plan (Basin Plan) requirements, and the NSW Government was in the process of withdrawing and resubmitting some, if not all, existing plans (PC 2021a, p. 20).

The Commission noted that there are opportunities to better achieve the intent of the NWI, for example by completing unfinished business, such as the introduction of statutory water plans in Western Australia – which have now been put on hold indefinitely. The Commission considered that the requirement to articulate trade-off decisions between economic, social and environmental considerations, including balancing environmental and consumptive use in a changing climate had only been partially achieved.

Assessment (2024)

Water planning instruments have generally improved as the science and knowledge around water management has advanced. However, there are shortfalls in some jurisdictions, and backsliding in the Northern Territory. For most jurisdictions, the coverage of water plans³ has remained largely unchanged, except for increased coverage in Western Australia and the Northern Territory, and decreased coverage in Tasmania⁴ (table 4.2). All jurisdictions except for the ACT have reviewed water plans since 2021 (table 4.3).

Table 4.2 – Coverage of water plans in Australia, as at May 2024^a

Jurisdiction	Coverage in 2024	Coverage in 2021	Comments
NSW	>99%	>99%	Percentage of water entitlement volumes covered by water sharing plans ^b
Vic	100%	100%	Water management is conducted through the entitlements system, which covers all water sharing in the state ^c

³ 'Coverage' generally means that proportion of licensed water take that occurs within the allocations specified in a water plan, compared to the total licensed consumptive pool within the jurisdiction.

⁴ A decrease in coverage in Tasmania is due to an increase in licenses issued outside areas covered by water plans.

Jurisdiction	Coverage in 2024	Coverage in 2021	Comments
Qld	>98%	98%	Data not comparable to 2021. Percentage of area in Queensland covered by water plans ^d
SA	96%	100%	Data not comparable to 2021. Percentage of water extractions entitlement volumes covered by water sharing plans ^e
WA	67%	35%	Percentage of water entitlement volumes covered by non-statutory plan areas ^f
Tas	27%	34%	Percentage of water entitlement volumes covered by statutory plan areas ^g
NT	31%	28%	Percentage of water entitlement volumes covered by statutory plan areas ^h
ACT	100%	100%	Percentage of water volumes identified in legislation.

a. Estimates of water plan coverage are indicative only. Estimates are not directly comparable across all jurisdictions due to different approaches to calculating coverage. Estimates were provided by jurisdictions. **b.** The small proportion of water licences not managed under a water sharing plan include some unique licences still managed under the *Water Act 1912* and proposed floodplain harvesting licences which are yet to be incorporated into the Namoi water sharing plan. **c.** In 2021-22, Victoria allocated 6,661 gigalitres (GL) of entitlements to consumptive use of an estimated 34,669 GL of available surface water, groundwater and recycled water. **d.** In 2021, the percentage represented water entitlement volumes covered by statutory plans. **e.** Of the 2,992 GL of water licensed for extraction in 2023, 2,860 GL are managed by a water allocation plan. For the 4% of licences outside a plan area, 2 GL occur in the Baroota Prescribed Water Resource Area and 130 GL are extracted for salt production in tidal watercourses where a plan is not required. The Commission's 2021 reported estimate of 100% was incorrect, as some of these licences existed at the time. **f.** In Western Australia, 2,898 GL of licensed water is covered by water allocation plans out of 4,308 GL of total licensed water. The Commission has not been able to identify a reason for the large increase in coverage. **g.** 500 GL (including 6 GL of groundwater) is allocated in statutory plan areas out of a total 1,879 GL of allocated water state-wide. **h.** There are 196 GL of water entitlements within planning areas of 631 GL of entitlements in the whole of the territory.

Table 4.3 – Water plan reviews since 2021

Plans reviewed

NSW	The Natural Resource Commission has reviewed the following plans since 2021: Murray Unregulated and Alluvial, Bega and Brogo Rivers Area Regulated, Unregulated and Alluvial, Murrumbidgee Area Unregulated and Alluvial, Towamba River Unregulated and Alluvial, Richmond River Area Unregulated, Regulated and Alluvial, Tweed River Area Unregulated and Alluvial, Greater Metropolitan Region Unregulated River, Greater Metropolitan Region Ground, North Western Unregulated and Fractured Rock, Castlereagh Unregulated and Alluvial, NSW Border Rivers Unregulated and Alluvial, Intersecting Streams Unregulated and Alluvial, Lower Murray-Darling Unregulated and Alluvial, Gwydir Unregulated River, Namoi and Peel Unregulated Rivers, Macquarie Bogan Unregulated Rivers, Lachlan Unregulated River, Belubula Regulated River Water Source
Vic	In 2022, the Victorian Government released its Central and Gippsland region sustainable water strategy. The government also published an annual progress report to 30 June 2023. A review of the Northern region sustainable water strategy is contingent on the Long-term Water Resource Assessment (January 2025) and the Basin Plan review (2026). A stocktake of actions in the Western region sustainable water strategy was completed in 2022 but has yet to be published.
Qld	Since 2021, 5-yearly ministerial performance reports have been prepared for the following plans: Gold Coast, Logan Basin, Moreton, Warrego, Paroo, Bulloo and Nebine, Great Artesian Basin and other

Plans reviewed

Regional Aquifers, Calliope, Gulf, Mitchell and Baffle. The Barron water plan was replaced in June 2023 following its performance report, and a replacement of the Mary Basin water plan was finalised in May 2024. The drafting of replacement water plans has commenced for Pioneer Valley, Gold Coast, Burdekin Basin, Gulf, Moreton, Logan Basin and Fitzroy Basin.

SA The Far North Wells water allocation plan was replaced in 2021, and an expanded water allocation plan for the Adelaide Plains was adopted in February 2022. Multiple amendments have been made to the River Murray Prescribed Watercourse and Tatiara Prescribed Wells Area plans. Plans that have been formally reviewed since 2021 include, Southern Basins and Musgrave Prescribed Wells Area, McLaren Vale Prescribed Wells Area, Western Mount Lofty Ranges Prescribed Water Resources Area, Eastern Mount Lofty Ranges Prescribed Water Resources Area, Mallee Prescribed Wells Area and the Lower Limestone Coast Prescribed Wells Area.

WA The WA Government released the Gngangara groundwater allocation plan in June 2022 and a Murray groundwater area allocation statement in December 2022, which set new allocation limits. The government also published a policy position paper on water allocation planning in the Fitzroy River. Since 2021, reviews of the Esperance groundwater allocation plan and the Warren-Donnelly surface water allocation plan have been released. Furthermore, the government released of the Wellington Reservoir allocation statement 2023, Wellington Reservoir modelling – re-evaluation yield and salinity levels 2023 and Water source options in the Collie-Wellington Basin 2023.

Tas The draft amended Mersey River catchment water management plan is expected to be adopted in 2024 and the Lakes Sorell and Crescent Water management plan is currently under review. Secretary reviews of the Tomahawk River, Boobyalla River and Ansons Water management plans are also underway.

NT Since 2021, the NT Government has introduced the Georgino Wiso water allocation plan and have reviewed plans for Alice Springs and Berry Springs. The Western Davenport water allocation plan expired in December 2022; a draft replacement plan was released for consultation in 2023. A draft Mataranka water allocation plan is currently out for public consultation.

ACT No changes since 2021.

New South Wales



The NSW Government has developed a new and enhanced climate modelling approach to support strategic water planning. The new technique has been used to inform the development of the *NSW water strategy*, two metropolitan strategies (Greater Sydney and Lower Hunter), as well as nine regional water strategies, with a further three in development. However, New South Wales is still yet to develop techniques for applying the climate modelling work to shorter-term planning, such as water sharing plans.

Under the Basin Plan, New South Wales is required to have 20 WRPs accredited by the Murray-Darling Basin Authority (MDBA). As of May 2024, 12 WRPs have been accredited since 2021. Four WRPs have been resubmitted for assessment after initial withdrawal, and four WRPs (Namoi surface water, Namoi alluvium, Gwydir alluvium and Gwydir surface water) have been withdrawn. In May 2023, the NSW Government withdrew the Namoi surface water plan and is now awaiting the licensing of floodplain harvesting in the catchment. In April 2024, the NSW Government withdrew a further three of the WRPs from the assessment process: Namoi alluvium, Gwydir alluvium and Gwydir surface water. The Aboriginal cultural objectives outlined in the plans no longer reflected community priorities and required further consultation, prompting the government to withdraw the plans. Plans are expected to be resubmitted by December 2024,

pending engagement with Traditional Owners and the local Aboriginal community (NSW Government, personal communication).

In 2021, the Nature Conservation Council (NCC) challenged the *Border Rivers water sharing plan* in the New South Wales Land and Environment Court. The NCC sought to ensure that future climate change projections would be considered when decisions about water sharing plans are being made. A key focus of the case was the provision of minimum flow requirements within the plan. Current plans include minimum inflow assumptions which do not consider climate change risks. In March 2024, the NCC and NSW Government reached an out of court settlement.

The NSW Government notes the case has expedited its work program on developing methodologies for applying climate modelling techniques to review minimum inflow assumptions in regulated water sharing plans across the state. There is a commitment to undertake this review by 2026. The settlement also commits New South Wales to undertaking further work to review long term average annual extraction limits to ensure they are set at a sustainable level under a changing climate. This work has commenced for coastal water sharing plans. However, no changes to long-term average annual extraction limits (LTAAELs) will be made in inland catchments until after the review of the Murray-Darling Basin Plan in 2026 (NSW Government, pers. comm.).

The Connectivity Expert Panel released its interim report in April 2024. The panel was convened by the Minister for Water to provide advice on the adequacy and potential improvements to rules in the New South Wales northern basin water sharing plans that impact connectivity. The panel made numerous findings and recommendations, including that flows during non-dry times were not adequate to maintain river and ecosystem health, and the current use of the Menindee Lakes' water level as a trigger for extraction restrictions upstream was inappropriate (Dula et al. 2024). The NSW Government is expected to await the release of the final report before responding (NSW Government, pers. comm.).

Victoria

The Victorian Government's *Water cycle adaptation action plan 2022-2026* (WCAAP) is intended to set an overarching direction for climate adaptation in Victoria's water sector and aligns with Victoria's *Climate change strategy*. The WCAAP identifies several outcome areas and 21 associated actions for the sector: diverse water supplies, resilient infrastructure and natural assets, operational resilience and efficiency, engaged community and orderly transition. The plan demonstrates the Victorian Government's consideration of the risks to water resources posed by climate change and responding with actions to meet productive, environmental and social objectives.

The *Central and Gippsland sustainable water strategy* (CGSWS), released in 2022, outlines the Victorian Government's plan to address water challenges facing the region over the next 50 years. The strategy identifies manufactured water as a primary source of water supply for the region, making up as much as 80% of Greater Melbourne's water supply by 2070. However, the strategy explicitly rules out alternatives, such as greater use of the north-south pipeline, potable use of recycled water and rural-urban water trade, without assessing their cost effectiveness (chapters 3 and 7). This also contradicts the Victorian Government's WCAAP, which specifies, "updates to relevant water supply planning and use guidelines will consider all water supply options". The strategy also emphasises that the risks to climate change will not be borne by entitlement holders, which is inconsistent with the NWI risk assignment framework. Nevertheless, the WCAAP and the CGSWS demonstrate progress in responding to the potential impacts of climate change and articulating the trade-offs between economic, social and environmental outcomes.

Melbourne's water corporations also released their *Greater Melbourne urban water & system strategy: water for life* in 2023 which integrates and updates the 2017 urban water strategies developed by each corporation and aligns with the CGSWS. The strategy outlines the water security challenges faced by the city and actions being undertaken in response by Melbourne's water corporations.

Long-term water resource assessments (LTWRAs) are required every 15 years under the *Water Act 1989* (Vic) and retrospectively examine if water availability has declined and waterway health has deteriorated. The LTWRAs provides the water minister the opportunity to rebalance water between the environment and consumption or actions to restore waterway health. LTWRAs remain the main mechanism through which water plans are rebalanced in response to climate change.

Queensland

Since 2021, the *Water Act 2000* (Qld) has been amended to require the minister to consider climate change and state cultural outcomes when making a water plan.

In October 2023, the Queensland Government released the *Queensland water strategy*, which was initiated through a review of the *Queensland bulk water opportunities statement*. The strategy identifies high-level priorities and delivery focus areas, including healthy waterways, rivers, aquifers and sustainable water management; First Nations partnerships, access and ownership; water for regional economic prosperity; and safe and secure water supply.

The Queensland Government also published its *Queensland water plans in a variable and changing climate report* in December 2023. The report outlines the impact climate change is projected to have on water plan regions across the state, as well as how the risks of climate change are managed within Queensland's water planning framework. As previously mentioned, the water minister is required to consider climate change when making a water plan. The effectiveness of water plans is also assessed in 5-yearly intervals, including the consideration of climate impacts. A plan review, amendment or replacement can be triggered at any time in response to certain conditions.

As water plans are reviewed or replaced, monitoring, evaluation and reporting strategies (MERS) are being developed based on the government's Monitoring, Evaluation and Reporting Framework. Since 2021, MERS have been included in water plans for the Barron area and the Mary Basin.

Western Australia

Western Australia and the Northern Territory are the only jurisdictions without binding statutory water allocation plans. In their absence, Western Australia uses non-statutory water allocation plans prepared by the Western Australian Department of Water and Environmental Regulation, which are guidelines only and are non-binding and unenforceable (EDO, sub. 50, p. 19).

In 2022, the WA Government released the *Kep Katitjin-Gabi Kaadadjan – waterwise Perth action plan 2*, a collaboration between the WA Government and the Noongar Traditional Owners of the Boorloo (Perth) and Bindjareb (Peel) region. The action plan identifies 14 targets for 2030 and 41 waterwise actions to ensure sustainable water management for the region. Targets include increasing wastewater recycling to 30% and reducing groundwater use by 10% by 2030.

The WA Government published its *Climate adaptation strategy* in July 2023. Actions identified in the strategy include improving understanding of climate impacts of water resources, developing a research program to address climate change challenges in the water sector, deliver new water sources for Perth and regional towns, and deliver more climate-resilient water to remote Aboriginal communities.

South Australia



The SA Government released its *Water security statement* in February 2022, which provides the first assessment of water security in the state since the adoption of the Water for good strategy in 2009. The statement also identifies ten strategic priorities for enabling water security in the near-term and highlights the government's intention to develop water security strategies for "key water resources, communities or industries", such as the Barossa Valley. The next water security statement is expected to be published in 2024.

The Barossa water security strategy was co-developed by community members and stakeholder organisations to provide a framework for policy initiatives and infrastructure to ensure water security for the region to 2050. The strategy identifies 27 actions under six strategic pillars: integrated supply and demand management for water security, regenerative land management for water security, healthy waterways and water-dependent ecosystems, business innovation and diversification, education and knowledge management for adaptive management and collaborative adaptive governance.

In 2022, the SA Government also published the *Guide to climate projections for risk assessment and planning in South Australia 2022* and the *Climate change science and knowledge plan for South Australia 2022*. Both documents provide cross-sectoral information with the guide providing projected changes to key climate variables across regions in South Australia, while the plan provides a roadmap for improving the evidence base to support South Australia's response to climate change. The SA Government is currently developing adaptation pathways for varying allocations in response to plausible climate futures.

Recent updates to water allocation plans have incorporated resource condition limits and triggers to respond to drought, such as the Adelaide Plains water allocation plan 2022. The provisions allow water allocations to be reduced due to reduced water availability or quality.

Tasmania



In 2021, the Tasmanian Government released its *Rural water use strategy* which intended to deliver "sustainable outcomes for rural water users, rural communities and the environment". The strategy outlines 29 actions under four overarching goals: sustainable management of Tasmania's water resources; strategic development to maximise opportunities from water resources; effective regulation, strong entitlements and planning; and optimising services.

The Catchment yield science update project is one of the key projects being pursued under the *Rural water use strategy* and is designed to update Tasmania's surface water yield estimates to inform water management in a changing climate. Phase one of the project has been completed, which was to provide the Tasmanian Government with a process for accessing and using the latest climate projection datasets to update hydrological models that underpin the state's allocation framework.

Northern Territory



The NT Government, in developing its *Territory water plan* (published June 2023), has committed to improving its water planning framework to better align with the objectives of the NWI. In addition, the NT Government has committed to 'develop and replace the *Water Act 1992 (NT)* to deliver a regulatory regime that sustainably manages water resources' (NT OWS 2023c, p. 34). The *Territory water plan* represents a commitment to improving water planning in the Northern Territory. However, inquiry participants identified significant shortcomings of the Northern Territory's *Water Act 1992* and Northern Territory's water planning framework since 2021.

Since 2021, the NT Government declared a water allocation plan (WAP) for Georgina Wiso. Community concerns have been raised about the approach taken by the NT Government in developing this WAP, including that it was developed in the absence of a stakeholder water advisory committee, and without adequate consultation with local Aboriginal people (chapter 2 and 11; Heather Ferguson & Carl Stephens, sub. 19, p. 1; NLC, sub. 38, p. 3). The issues raised by participants reflect the community concerns raised during the NT Government's consultation process (NT DEPWS 2023a). The Northern Land Council (sub. 38, p. 3) and the Environmental Defender's Office (sub. 50, p. 12) also highlighted concerns around the separation of the WAP into three documents, only one of which is statutory, with technical information, risk assessments, implementation and monitoring removed to non-statutory documents. In addition, the WAP includes environmental and cultural objectives at a lower level of specificity than previous WAPs, in terms of understanding characteristics' and 'condition is monitored as far as practicable' rather than what outcomes the WAP is aiming to achieve.

The NT Government also released a draft WAP for Western Davenport in 2023 for public comment. Concerns have been raised around the government's engagement with the water advisory committee and the protections provided for cultural values and environmental sites (CLC, sub. 44, p. 23). Chapter 11 also discusses concerns with community consultation for water planning in the Northern Territory.

On 15 November 2021, the NT Government issued a water license under the Western Davenport WAP to Fortune Agribusiness Singleton station that was not consistent with the WAP. A Northern Territory Supreme Court ruling in January 2024 found the minister must consider, but is not obliged to comply with, the relevant water allocation plan when issuing licences (box 4.2). The plaintiffs have filed an appeal to the decision to the Court of Appeal of the Northern Territory (CLC 2024).

The NWI requires allocation of water to be consistent with a statutory water plan (NWI paragraph 29) and that water plans 'give statutory recognition to environmental and other public benefit outcomes ... and give them the same degree of security as consumptive use' (NWI paragraph 35). The issuing of a licence that was not consistent with the Western Davenport statutory water plan, did not meet NWI requirements. Further, while the Northern Territory's WAPs are 'statutory' in as much as they are established under the *Water Act 1992* (NT), if WAPs impose no binding obligations on water allocations or decision makers, this would indicate that the Act does not support consistency with the intent and objectives of the NWI as outlined in paragraphs 29 and 35.⁵ This demonstrates backsliding compared to the assumed binding nature of statutory water plans in the Commission's 2021 assessment (PC 2021a, p. 8).

⁵ The Commission notes that there have been other reviews, including one commissioned by the NT Government, that have come to different conclusions about the NT's compliance with the NWI. For example, Badu Advisory – a private consulting company – was engaged in 2023 by the NT Government to undertake a review of the Northern Territory's implementation of the NWI in relation to water planning (NT DEPWS 2023h). Badu found the Northern Territory's planning processes to be consistent with the NWI. A subsequent assessment of the Badu review commissioned by the Environmental Defenders Office and undertaken by Alex Gardner – a legal consultant and academic – found water planning provisions in the Northern Territory to be inconsistent with the NWI (Gardner 2024). Issues highlighted by Gardner include environmental water allocations not having the same legal security as access entitlements under water allocation plans; a lack of legal guidance on planning processes in the *Water Act 1992* (NT); and water allocation plans not being legally binding on the Controller when making licensing decisions (as per Singleton station case).

Box 4.2 – Case study: Singleton station and water allocations in the Northern Territory

On 31 January 2024, a single judge of the Supreme Court of the Northern Territory found valid a decision of the Northern Territory Minister for the Environment (the Minister) to grant to Fortune Agribusiness (Fortune) a groundwater allocation licence of 40 GL/y from the area around Singleton Station. This is despite the allocation being inconsistent with the Western Davenport Water Allocation Plan (WDWAP) established under the Northern Territory *Water Act 1992* (the Water Act). As at the time of writing, Arid Lands Environment Centre Inc (ALEC) have filed for appeal, however the facts of the case provide important context regarding how the NT Government considered the extent to which a water plan should be treated as binding.

Background

In 2020 Fortune applied to the Northern Territory Controller of Water Resources for a groundwater licence for various horticultural projects at Singleton Station. This licence was granted by the Controller on 8 April 2021. The Mpwerempwer Aboriginal Corporation (MAC), as representatives of the native title holders of the Singleton pastoral lease, sought review of this decision by the Minister, as permitted under the Water Act. MAC was joined in this action by ALEC, an environmental organisation whose objective is to “to protect the environment and ensure healthy futures for lands and people”.

On 15 November 2021, the Minister for Territory Families and Urban Housing, acting under the delegated authority of the Minister for the Environment, upheld the grant of the licence. ALEC and MAC sought judicial review of the decision by the Supreme Court.

The decision

MAC and ALEC alleged that the Minister’s decision was invalid as it was not consistent with the WDWAP. The permitted take in the licence exceeded the limits set in the WDWAP for extraction to ensure the health of the region’s groundwater-dependent ecosystem. The NT Government argued that decisions under the Water Act were not required to be consistent with the WDWAP.

In finding in favour of the Minister, Justice Barr stated:

... although the Minister had a statutory obligation under s 90(1)(ab) of the Act to take into account the WDWAP, the Minister did not have a statutory obligation to “comply with” the WDWAP in the sense asserted by ALEC. More specifically... the Minister did not have a statutory obligation to apply and make a licence decision in strict accordance with Part 8.2.1 of the WDWAP. (decision at [59])

Participants’ views on the decision

Participants in this inquiry who commented on the decision were critical (CLC, sub. 44 p. 10-11; ECNT, sub. 54 p. 6; EDO, sub. 50, p. 12-13; Heather Ferguson and Carl Stephens, sub. 19, p. 1; NLC, sub. 38, p. 3; Sue Jackson and Erin O’Donnell, sub. 57, p. 12). Participants considered that the absence of a binding requirement to comply with water allocation plans puts environmental and First Nations’ cultural outcomes at risk in the Northern Territory:

The [Singleton Station decision] demonstrates how water management regulation is not worth the paper it is written on. There are very real risks of water overallocation, mining of aquifers and contamination of aquifers and rivers that sustain life in our desert areas and across the Top End. (Heather Ferguson and Carl Stephens, sub. 19, p. 1).

Box 4.2 – Case study: Singleton station and water allocations in the Northern Territory

Water allocation plans are the only process for identifying and providing for water requirements to sustain environmental and cultural assets in the NT... The weakness of water plans, where they exist in the NT, and the use of the WAPF across the rest of the Territory means these key functions as per the NWI are not being carried out sufficiently (nor are they required to be) before extraction can occur. This puts environmental outcomes and cultural values at significant risk. (CLC, sub. 44, p. 13)

The NT is clearly not meeting its requirements under the NWI in circumstances where its water plans, already comparatively weak, have been found not to impose binding rules on the granting of water extraction licences... the decision in the Singleton Station Case undermines the effectiveness of WAPs in regulating water extraction. (EDO, sub. 50, p. 13)

Source: *Mpwerempwer Aboriginal Corporation RNTBC v Minister for Territory Families & Urban Housing as Delegate of the Minister for Environment & Anor and Arid Lands Environment Centre Inc v Minister for Environment & Anor [2024] NTSC 4.*

Australian Capital Territory



The *ACT water strategy – 2023 report card* indicates the ACT is on track to achieve the three outcomes identified in the *ACT water strategy 2014-2044: striking the balance*: healthy catchments and waterbodies, a sustainable water supply used efficiently and a community that values and enjoys clean, healthy catchments and waterways. Since 2021, the ACT Government established the Office of Water to lead water policy and planning functions and implement governance reforms, including:

- a long-term integrated water management plan
- a 10-year review of the *ACT water strategy*
- the Ngunnawal Ngadjung Water Initiative
- a water information hub
- a water resource vulnerability assessment.

4.3 Water for environmental and other public benefit outcomes

Summary of actions under the NWI

The NWI outcomes are i) to provide water for environmental and other public benefit outcomes with statutory recognition, the same level of security as consumptive uses, and ii) be tradeable on the temporary market (if held as an entitlement). This chapter considers developments in the implementation of the first point. The tradability of water entitlements for the environment is addressed in chapter 7.

This section focusses on adequate frameworks for recognising and protecting environmental and other public benefits in the water allocations, primarily through statutory water plans. Discussion of specification and evaluation of environmental outcomes is in chapter 7. Discussion of accounting for environmental water is in chapter 8.

Previous findings (2021)

In 2021, the Commission found that jurisdictions had largely achieved their NWI commitments to provide water for the environment and other public benefit outcomes, with continuing adjustments to water plans based on new information (PC 2021a, pp. 29–31). For fully- or over-allocated systems, environmental water entitlements (held water) were used to supplement planned environmental water.⁶ Due to the lack of statutory recognition of water plans in Western Australia, environmental water lacked statutory protection. Likewise in New South Wales, the failure to implement water resource plans consistent with the Basin Plan placed the security of environmental water at risk in some systems.

Assessment (2024)

There has been little change to environmental water entitlements since 2021.

Queensland

The Queensland Government has changed its approach to specifying environmental objectives in water plans. Previously, environmental objectives were based on flow percentiles which do not necessarily translate to desired ecological outcomes. Water plans will now use an ecohydrological approach to determine the necessary flow regimes required to maintain ecological assets, as highlighted in the Queensland Government's *2020-2030 water planning science plan*. The new approach has been used in the Barron water plan (finalised in June 2023) and the Mary Basin water plan (finalised in May 2024).

Northern Territory

The recent judicial decision relating to Singleton station (section 4.2) has confirmed that water allocation plans in the Northern Territory do not impose a binding requirement on decision makers. By giving decision makers discretion to allow other factors to override water allocation plans and the environmental, cultural and other public benefit outcomes specified therein, the *Water Act 1992* (NT) does not give NWI-consistent recognition and security to those outcomes. Therefore, water for environment and other public benefit outcomes in the Northern Territory are not afforded the same level of security as consumptive uses.

4.4 Addressing overallocated and overused systems

Summary of actions under the NWI

Under the NWI, jurisdictions agreed to provide a better balance in water resource use in systems that had been overallocated or deemed to be stressed. Parties further agreed – for any other systems found to be overallocated or overused through the water planning process – to determine the precise pathway by which any of those systems would be adjusted to address the overallocation or overuse and meet the environmental and other public benefit outcomes.

⁶ Held water refers to water entitlement owned by environmental water holders. Planned water refers to water committed for environmental purposes through water plans (chapter 7).

Previous findings (2021)

In 2021, the Commission found progress towards addressing overallocation and overuse (box 4.3) to be only partially achieved (PC 2021a, pp. 31–34). Numerous systems across multiple jurisdictions remained overallocated or overused by 2021. The impact of climate change will mean that rebalancing of water between consumptive uses and the environment remains a high priority. Rainfall reductions associated with climate change have already resulted in several systems in Western Australia being deemed overallocated since 2017. The Commission’s renewal advice 6.2 provided suggestions for addressing overallocated and overused systems.

Box 4.3 – What do overuse and overallocation mean?

The National Water Initiative defines overallocation as situations where, with full development of water access entitlements in a particular system, the total volume of water able to be extracted by entitlement holders at a given time exceeds the environmentally sustainable level of extraction for that system. It defines overuse as situations where the total volume of water actually extracted for consumptive use in a particular system at a given time exceeds the environmentally sustainable level of extraction for that system. Overuse may arise in systems that are overallocated, or it may arise in systems where the planned allocation is exceeded due to inadequate monitoring and accounting.

Source: NWI Schedule B(i).

Assessment (2024)

New South Wales

The NSW Government assesses all catchments for compliance against their LTAAEL specified in water sharing plans, as required under the *Water Management Act 2000* (NSW). It also assesses catchments within the Murray–Darling Basin for compliance with Sustainable Diversion Limits (SDLs) under the Basin Plan.

The NSW Natural Resource Commission (NRC) has raised concerns about the lack of numerical LTAAELs in unregulated water sharing plans, as well as the lack of assessment on extraction levels from these systems (NSW NRC 2023). Unregulated water sharing plans were established with descriptive LTAAELs due to limited data at the time. As a consequence, there is no concrete value against which to assess compliance. Given the lack of compliance assessments, the NSW Government continues issuing 100% allocations, which are unlikely to be sustainable in many instances. The Commission supports the recommendations put forward by the NRC to establish accurate numeric LTAAELs across all water sharing plans, undertake compliance assessments with the best information available and make precautionarily conservative allocations until assessments have been undertaken (NSW NRC 2023).

The 2022 LTAAEL compliance assessment found the Upper Namoi and Lower Namoi Regulated River and the Greater Metropolitan Region Unregulated River were non-compliant (NSW DPE 2023e, 2023d). The imminent introduction of floodplain harvesting licensing in the Upper Namoi and Lower Namoi Regulated River and a reduction in supplementary licences are expected to return total extractions to within the LTAAEL. Within the Greater Metropolitan Region Unregulated River, the Southern Sydney extraction management unit exceeded the LTAAEL. The New South Wales water minister is required to undertake a review, which is currently being planned.

Under the Basin Plan, the Barwon Darling exceeded the SDL in the three consecutive years to 2021-22, and the Gwydir exceeded the SDL in 2021-22. The exceedance is understood to be the result of estimates based on outdated metering, with the issue addressed with the MDBA. SDL exceedance in the Gwydir is due to growth in floodplain harvesting, with a licensing regime recently introduced to return extractions to within the SDL.

Queensland

In the Condamine–Balonne catchment, surface water and groundwater allocations exceed the Basin Plan SDL. The overallocation is expected to be recovered under the Australian Government’s Bridging the Gap Program (Plibersek 2023a). Following an initial tender process in 2023, 8.5 GL of surface water and 3.2 GL of groundwater are yet to be recovered (DCCEEW 2024i).

South Australia

Two of the 11 consumptive pools within the Adelaide Plains are over allocated but not overused. Water use is assessed in the region each year, and a process is in place to reduce allocation in periods when extractions exceed the sustainable limit.

Western Australia

As of January 2024, 15.8% of resources with an allocation limit were considered overallocated. Approximately a third of the overallocated systems exceed the allocation limit by less than 10%. However, 9% of overallocated resources exceed the allocation limit by more than 90%. The vast majority of overallocated systems exist in the southwest of Western Australia. Water plans for overallocated systems include actions, such as increased compliance checks and recouping unused entitlements, to reduce extractions to within sustainable levels (WA Government, personal communication).

Northern Territory

The Darwin rural area has been identified as overused due to the historical development of the groundwater system without a water licensing regime (Fitzgerald 2021). As previously discussed, the NT Government has introduced new water licensing requirements to quantify and ensure sustainable levels of extraction.

4.5 Assigning risks for changes in allocation

Summary of actions under the NWI

Under the NWI, parties agreed to clearly assign risk arising from future changes in the availability of water for the consumptive pool. Jurisdictions could adopt the risk assignment framework specified in the NWI or an alternative risk sharing formula where the affected parties agree to this on a voluntary basis. The NWI framework assigns risk between users and the government for reductions in water availability for consumptive use arising from circumstances such as climate change and variability, bushfire, new knowledge and policy change.

Previous findings (2021)

In 2021, the Commission found that only New South Wales and Queensland had adopted the risk sharing framework specified in the NWI (PC 2021a, pp. 34–35). South Australia has implemented an alternative risk assignment framework in accordance with paragraph 51 of the NWI. However, no other jurisdiction has introduced a formalised NWI-compliant risk framework. Moreover, no jurisdiction has undertaken changes to their risk assignment framework since 2014. Western Australia and Tasmania have signalled an intention to introduce formalised NWI-compliant frameworks at different times, but no progress has been made.

Assessment (2024)

No jurisdictions have introduced changes to their risk assignment frameworks since 2021.

Under paragraph 48 of the NWI, entitlement holders are to bear the risks of any reduction against their entitlement, including less reliable water allocation due to climate change. However, inquiry participants have highlighted shortcomings in the application of the NWI risk assignment framework (LVW, sub. 21, p. 7; MDBA, sub. 36, p. 3; NSWIC, sub. 16, p. 16 and sub. 88, pp. 8–9). As noted in the Commission's 2021 report, a renewed NWI must articulate how risk assignment should be implemented by jurisdictions and how rebalancing (chapter 3) would interact with the risk assignment framework.

4.6 Interception

Summary of actions under the NWI

Under the NWI, parties agreed to assess the significance of water intercepting activities (such as farm dams and bores, intercepting and storing of overland flows – or floodplain harvesting – and large-scale plantation forestry), and apply appropriate planning, management and regulatory measures to protect the integrity of the entitlements system and achieve environmental objectives, where necessary.

Under the Basin Plan, water resource plans are required to consider interception risks. Where interception activities are identified to be of a medium to high risk to water resources (in terms of potential impacts), water resource plans must set out processes for monitoring and managing the interception activity to ensure they meet SDLs (MDBA 2017, pp. 1–2; NSW DOI 2018). Water resource plans must then be accredited.

The process for reviewing interception activities and their associated risks to water systems varies across jurisdictions.

Previous findings (2021)

In 2021, the Commission found that jurisdictions had largely achieved the requirement to assess risks to water for most potential intercepting activities (PC 2021a, pp. 44–47). However, the Commission raised concerns that some major interception activities were not licensed or adequately recorded, highlighting the importance of accurate measurement and accounting of interception activities. Improvements were required to support the incorporation of interception activities into entitlement arrangements.

In its 2021 renewal advice for the NWI, the Commission recommended adoption of a risk-based approach to managing significant water interception activities, with the expectation that activities be incorporated into entitlement frameworks in fully or overallocated systems (PC 2021a, pp. 77–78).

Assessment (2024)

Other than in New South Wales and Queensland, little progress has been made with interception activities since 2021.

New South Wales



The New South Wales floodplain harvesting licensing rollout is complete in the Border Rivers, Gwydir, Macquarie and Barwon–Darling valleys, covering 80% of the volume of water taken through floodplain harvesting in New South Wales. Licensing in the Namoi valley is ongoing. Licensing of floodplain harvesting in all five northern valleys is expected to reduce the amount being harvested from floodplains by approximately 70 GL per year on average. It will also return several catchments to within sustainable limits of extraction when complete.

Incorporating floodplain harvesting into the licensing framework is a step in the right direction, providing the government with a mechanism to measure and regulate previously unaccounted for extractions. However, concerns have been raised about the accuracy of historic floodplain harvesting estimates, which were used to determine changes to baseline diversion limits (BDLs) and SDLs (PC 2023b, p. 140). Until very recently, there has not been metering and compliance of extractions in unregulated rivers and floodplain harvesting across northern New South Wales. The previous paucity of data on these activities had undermined the government's ability to estimate BDLs. As noted by the Inspector-General of Water Compliance (sub. 80, p. 7), measurement and accounting of all interception activities underpins effective water management.

Queensland



The decision to license take from overland flows in Queensland is based on the Government's assessed risk of the amount of activity occurring, or likely to occur, in a catchment. The Queensland Government has prioritised the implementation of licensing in the Queensland portion of the Murray–Darling Basin, where the risk to water resources is high. The *Border Rivers and Moonie water plan 2019* requires the certification and licensing of existing overland flow take, which is expected to be completed in 2024.

The introduction of Queensland's *Non-urban water measurement policy* in 2022 requires all overland flow entitlement holders to have a farm-scale measurement plan to document how water take is determined. Relevant amendments to the *Water Act 2000* (Qld) were passed in 2023, and the policy is expected to come into effect in 2024.

4.7 Integrating surface water and groundwater management

Summary of actions under the NWI

An objective of the NWI is 'recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource'. Jurisdictions agreed, in preparing water plans, to assess the level of connectivity between surface water (including overland flow) and groundwater systems.

In the Murray–Darling Basin, the Basin Plan requires Basin jurisdictions to assess the nature of connections between surface water and groundwater resources in their water resource plans.

Previous findings (2021)

Jurisdictions have made significant progress since 2004 in recognising physically connected systems, with increasing recognition of interconnected groundwater and surface water systems in water plans. Several jurisdictions had updated their water management approaches in light of new information. In 2017 and 2021, the Commission found jurisdictions had largely achieved the requirements of the NWI commitment (PC 2017, pp. 67–76, 2021a, pp. 47–49) and noted that detailed assessment was required to come to a definitive conclusion, but that was beyond the scope of the inquiry. It is also beyond the scope of the current inquiry to conduct this more detailed assessment.

Assessment (2024)

New South Wales



Increased recognition of the connectivity between surface and groundwater sources has led to the introduction of cease-to-pump rules for some users in the Hunter unregulated and alluvial water sources 2022 water sharing plan. Access rules in the Namoi groundwater sources 2021 have also been changed to protect connected water sources and associated assets. These measures reflect improved management of water systems in response to scientific assessments, as specified in the NWI.

In 2023 the New South Wales Department of Planning and Environment published a *Guide to groundwater management in NSW* (NSW DPE 2023b). The Guide provides management principles to help ensure groundwater and surface water resources are integrated in water sharing plans, and about how to manage groundwater dependent ecosystems.

Victoria



The Victorian Government's *Groundwater management 2030 statement of priorities*, developed in 2023, includes plans for technical assessments of groundwater systems to better understand connections between systems and inform management and the development of a 10-year monitoring strategy by 2025 (although improved understanding of connectivity between groundwater and surface water systems is not explicitly articulated). Regional catchment strategies developed for the period 2021–2027 recognise the need for and outline actions and outcomes for integrated management of natural resources at catchment level, including surface, groundwater and biodiversity (Corangamite CMA 2024; Glenelg Hopkins CMA 2024; Goulburn Broken CMA 2024).

Western Australia



In 2023, the WA Government undertook assessments of the Fitzroy River catchment, Gingin Brook and Warren and Donnelly River catchments to better understand groundwater-surface water interactions. The findings will be used to inform water allocation plans for each system.

Tasmania



A key initiative under the Tasmanian Government's *Rural water use strategy* is the Groundwater Assessment Project. The project has resulted in the development of a groundwater risk assessment tool. The tool is designed to assist with mapping and assessing the risks from connecting surface and groundwater systems and incorporating those risks into water resource plans. The assessment included a preliminary assessment of 32 groundwater units and found that six groundwater systems are at high risk.

Northern Territory

In 2022 the Northern Territory completed the *Beetaloo strategic regional environmental baseline assessment* (NT DEPWS 2023f) providing a ‘detailed understanding of groundwater recharge, flow, levels of connectivity and discharge – which will feed into water allocation plans to manage sustainable groundwater use’ (NT DEPWS 2022a).

4.8 Renewal advice

NWI renewal advice in chapter six of the Commission’s *National Water Reform 2021 inquiry report* remains relevant. The Commission extends some of that advice below.

NWI renewal advice 6.2: Water planning

UPDATED IN 2024

In renegotiating the National Water Initiative (NWI), state and territory governments should ensure that water planning provisions are maintained and enhanced.

Priorities to improve water planning are to:

- better specify measurable and well-informed cultural and environmental outcomes
- improve engagement with Traditional Owners and communities, including for governments to meet their commitments to priority reforms under the National Agreement on Closing the Gap and to develop partnerships for shared decision-making.
- include principles to frame the process for assessing and reflecting the relative values placed by communities on environmental, social and economic outcomes to inform the trade-offs that have to be made in water planning. This process should be transparent, evidence-based and involve effective engagement with stakeholders.
- include principles for independent review of water plans. While the review processes would be determined by jurisdictions, the NWI could set out principles for reviews to promote their need to be robust and fit for purpose, focused on achieving the greatest net benefit and how to apply effective stakeholder engagement.
- better take account of connectivity between systems.

Jurisdictions should continue to have discretion as to whether a plan is necessary and the effort put into its preparation, in accordance with paragraph 38 of the NWI. However, where a plan is not prepared for a water region, a renewed NWI should provide greater guidance on how contingent allocation frameworks are developed to be fit-for-purpose and appropriately manage the risk of overuse. In addition, where a water plan is not prepared, jurisdictions should:

- publish a transparent justification of why the costs of a plan outweigh the benefits; and
- set a clear trigger for developing a plan when circumstances change.

Processes to better account for climate change are also required, including that:

- water plans include priorities, actions and rules that cover drought conditions, as well as mechanisms for dealing with more extreme scenarios, including clear triggers, roles and responsibilities for actions and a hierarchy of uses
- water quality issues are better incorporated into water planning, particularly in drought scenarios

NWI renewal advice 6.2: Water planning

UPDATED IN 2024

- water planning processes in relatively undeveloped and developing water systems take climate change into account in ways that manage the risk of less water
- as water plans reach the end of their planning cycle, review processes promote improved water use and system operation to lessen risks in meeting the agreed environmental and consumptive objectives
- a process for rebalancing between environmental and consumptive uses as a result of climate change is developed. Rebalancing due to climate change should occur when there is sufficient evidence that the expected benefits will outweigh the likely costs. Where this occurs, governments should ensure that a water plan review assesses the feasibility of the objectives of the plan, sets new objectives that are realistic under climate change (including environmental, cultural and consumptive objectives), selects the most cost-effective option for meeting them and agrees a pathway to transition to the new balance. The process requires effective community partnerships and engagement, must be informed by the best available environmental, social and economic data and should be transparent
- there are clear provisions for allocating risk, with water access entitlement holders continuing to bear the risks to the consumptive pool arising from climate change and periodic natural events (as reflected in paragraph 48 of the NWI)
- climate modelling is undertaken at the system scale, based on the best available data and subject to on-going reviews and refinements. The models and information should be made publicly available and be subject to independent peer review or accreditation.

4.9 Annex

National Water Initiative water access and entitlements framework outcomes (section 25)

The Parties agree that, once initiated, their water access entitlements and planning frameworks will:

- i) enhance the security and commercial certainty of water access entitlements by clearly specifying the statutory nature of those entitlements;
- ii) provide a statutory basis for *environmental and other public benefit outcomes* in surface and groundwater systems to protect water sources and their dependent ecosystems;
- iii) be characterised by planning processes in which there is adequate opportunity for productive, environmental and other public benefit considerations to be identified and considered in an open and transparent way;
- iv) provide for adaptive management of surface and groundwater systems in order to meet productive, environmental and other public benefit outcomes;
- v) implement firm pathways and open processes for returning previously overallocated and/or overdrawn surface and groundwater systems to *environmentally-sustainable levels of extraction*;
- vi) clearly assign the risks arising from future changes to the consumptive pool;

- vii) in the case of water access entitlements, be compatible across jurisdictions to improve investment certainty, be competitively neutral and to minimise transaction costs on water trades (where relevant);
- viii) reflect regional differences in the variability of water supply and the state of knowledge underpinning regional allocation decisions;
- ix) recognise indigenous needs in relation to water access and management;
- x) identify and acknowledge surface and groundwater systems of high conservation value, and manage these systems to protect and enhance those values; and
- xi) protect the integrity of water access entitlements from unregulated growth in interception through land-use change.

5. Water markets and trading

This chapter considers progress in achieving outcomes under element 2 of the National Water Initiative (NWI) – water markets and trading.



Under this element, all jurisdictions agreed to a common set of objectives, outcomes and actions to facilitate the development of efficient water markets in Australia, building on previous reform efforts. The NWI broadly focused on the ‘progressive removal of barriers to trade in water’ and other arrangements to facilitate an open trading market.¹

The NWI outlined action areas designed to achieve the following outcomes:²

- facilitate the operation of efficient water markets and the opportunities for trading, within and between States and Territories, where water systems are physically shared or hydrologic connections and water supply considerations will permit water trading;
- minimise transaction costs on water trades, including through good information flows in the market and compatible entitlement, registry, regulatory and other arrangements across jurisdictions;
- enable the appropriate mix of water products to develop based on access entitlements which can be traded either in whole or in part, and either temporarily or permanently, or through lease arrangements or other trading options that may evolve over time;
- recognise and protect the needs of the environment; and
- provide appropriate protection of third-party interests.




A summary of the Productivity Commission’s assessment framework (appendix B) – which does not map perfectly against the action items – and progress against it is in table 5.1. The notes to the table indicate which assessment items relate to which NWI actions and outcomes.

Table 5.1 – Assessment summary: water markets and trading

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Water markets and trading			
Removing unwarranted trade barriers (section 5.1)^c	Largely achieved 	Largely achieved 	Unwarranted trade barriers have been almost entirely removed or significantly reduced. There has been progress in removing remaining unwarranted barriers to water trading, yet interstate policy bans and long-standing trade barriers persist. Barriers also persist for trading between rural and urban water sectors.

¹ NWI paragraph 23 v).

² NWI paragraph 58 i-v).

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Water markets and trading			
Publicly accessible and reliable water registers (section 5.2)^d	Largely achieved 	Largely achieved 	Most jurisdictions have publicly accessible and reliable water registers and invest in improvements according to user needs. While Victoria has implemented comprehensive dashboards offering detailed information on water allocations, market prices, and ownership, change in other jurisdictions has been minimal.
Reducing transaction costs by improving water market information (section 5.3)^e	Largely achieved 	Largely achieved 	Jurisdictions continue to invest in enhancing water market information alongside water registers.
Compliance with trade approval service standards (section 5.4)^f	Achieved 	Achieved 	Murray–Darling Basin states have consistently met the standards for processing times for trade approvals. Other jurisdictions vary in approach, with better outcomes achieved where standards are established and monitored.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraphs 60 and 62 and Schedule G. **d.** NWI paragraph 59. **e.** NWI paragraph 58 ii). **f.** Subsequent ministerial agreement, builds upon NWI paragraph 58 ii).

5.1 Removing unwarranted trade barriers

Summary of actions under the NWI

Jurisdictions agreed to establish compatible institutional and regulatory arrangements that facilitate intra and interstate trade that are free from barriers. To this end, principles for trading rules (Schedule G to the NWI) were agreed that specify that restrictions on extraction, diversion or use of water resulting from a trade can only be used to manage environmental, hydrological, water delivery and related issues, and not to protect production, water infrastructure use or employment in particular locations or industries where water is being traded from, or to. The NWI also required the immediate removal of institutional barriers to temporary trade, removal of barriers to permanent trade by 2014 and that no new barriers be imposed.³

Previous findings (2021)

Reforms over the past 30 years, most crucially to create property rights to water that are distinct from land, and caps on the amount of water that can be consumed (consumptive use), have underpinned the creation of water markets. Entitlement holders can now temporarily trade their water rights (e.g. for a single season,

³ NWI paragraph 60.

known as an allocation trade) or permanently transfer them (entitlement trade) (box 5.1). A growing range of diversified tradeable products enable the transfer of water access and use rights across space and time.

Box 5.1 – Water trades can be temporary or permanent

Water trades involve the buying, selling, or leasing of water rights, either in full or in part, at a specific time. There are two main types of water trade:

Entitlement trade

Entitlement trade (also known as ‘permanent trade’) involves the permanent transfer of water entitlements. That is, an entitlement trade occurs when an entitlement holder decides to sell their water rights permanently to another water user.

Allocation trade

Allocation trade (also known as ‘temporary trade’) refers to the trade of a specific volume of water allocated to a water access entitlement within a given period. Entitlement holders have the flexibility during a particular ‘water year’ (1 July to 30 June) to use their water allocation, trade their allocation with other water users or, depending on the jurisdiction’s rules, carry forward the allocation to the next water year. For example, an entitlement holder may use 70% of their allocation, trade 15% to other users, and carry 15% over to the next water year. Water managers decide allocations against entitlements, which change according to rainfall, inflows into storages and how much water is already stored.

Source: BOM (2024a); MDBA (2023b).

In its 2021 assessment, the Commission found that the removal of unwarranted trade barriers had been largely achieved by all jurisdictions, noting that:

- they have been largely eliminated or significantly diminished
- trade has started to emerge in systems where it was previously absent, such as in the Northern Territory.

The Commission found that there are still some existing policy bans and barriers to trade between sectors. For example, trade out of irrigation districts into urban use, and between the environment and other uses.

Implementation of NWI-consistent trading frameworks has been slow in some jurisdictions, particularly interstate water trade between New South Wales and the Australian Capital Territory. The Commission noted that discussion about trade arrangements had been ongoing for over a decade without significant progress.

The Commission advised that water market arrangements should focus on cost effectiveness and simplicity where possible, and be tailored to need, with an eye towards expansion of water trading in the future, beyond the highly complex and sophisticated water market operating in the Murray–Darling Basin.

Assessment (2024)

Noting the 2021 assessment that found that the removal of unwarranted trade barriers had been largely achieved by all jurisdictions, some trade restrictions and long-standing interstate trade barriers persist. Most notably, implicit or explicit directions from governments to water utilities not to purchase or transfer water for urban use continue to operate (chapter 3). On interstate trade, discussions about trade between New South Wales and the Australian Capital Territory continue, having been ongoing for over a decade.

Below are some examples of jurisdictions' progress, maintenance or backsliding under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

Murray–Darling Basin

The most significant reforms to remove water trade barriers since the commencement of the NWI have occurred in the Murray–Darling Basin, since 2014 (PC 2021a, p. 53). By volume, over 80% of water allocation trade activity occurs in the southern Basin, with temporary (allocation) trades being more common than permanent (entitlement) trades (figure 5.1). Water trade in Australia is generally increasing over time (PC 2021e, p. 7). The recent water trade data indicates a decrease in allocation water trade transactions in some areas outside the Murray–Darling Basin for the 2021-22 period compared to 2019-20 (table 5.2). This may reflect reduced reliance on trade during a year of increased rainfall.

In 2021 the Australian Competition and Consumer Commission (ACCC), in its Murray–Darling Basin water market inquiry, flagged concerns about perceptions of market manipulation and a lack of confidence among market participants in the Murray–Darling Basin, and that this is presenting as a barrier to trade (ACCC 2021). The ACCC did not find actual evidence of participants engaging in price manipulation, but some participants in this inquiry have raised similar concerns (Cobram Estates, sub. 20 attachment, pp. 4-5; NFF, sub. 32, p. 2; NSWIC, sub. 16, p. 21).

In response to the ACCC's concerns, the Australian Government introduced reforms to the *Water Act 2007* (Cth) (Water Act) due to commence on 1 July 2024, through the *Water Amendment (Restoring Our Rivers) Act 2023* (Cth). The reforms provide additional powers and functions for the ACCC, Inspector–General of Water Compliance (IGWC), and the Bureau of Meteorology (BOM) that enhance water market integrity and information transparency (ACCC, sub. 11, p. 3-4). The reforms include the introduction of a new water market hub, serving as a digital platform for national water data management, along with a new water markets website offering real-time updates on water market activity. They also implement new water market data standards to enhance transparency and accessibility (DCCEEW 2024j).

The Australian Government is also committing funds to support water market reform. In the 2023-24 Budget, the Australian Government provided \$32.7 million from 2023-24 to 2026-27 and ongoing annual funding of \$3.4 million from 2027-28 for the national Water Data Hub, new water markets website, and Water Markets Data Standards (DCCEEW 2023f, p. 5). This followed the 2022-23 Budget, which provided \$31.6 million from 2022-23 to 2025-26 for Australian Government agencies (ACCC, IGWC and the Australian Government Department of Climate Change, Energy, the Environment and Water) to implement the regulatory framework (Plibersek 2022).

Table 5.2 – Water allocation trade summary by region and resource type^a

Region	Resource type	Transactions		Trade with market rate price reported ^c (%)		Volume (GL)		Estimated turnover ^d (\$m)	
		2019-20	2021-22	2019-20	2021-22	2019-20	2021-22	2019-20	2021-22
Southern MDB									
	Surface water	28,551	23,089	57	56	5,527	7,510	2,100	332
Northern MDB									
	Surface water	728	623	30	47	190	319	10	16

Region	Resource type	Transactions		Trade with market rate price reported ^c (%)		Volume (GL)		Estimated turnover ^d (\$m)	
		2019-20	2021-22	2019-20	2021-22	2019-20	2021-22	2019-20	2021-22
MDB Groundwater^b									
	Groundwater	1,391	412	60	54	291	116	57	8
Rest of Australia									
	Surface water	2,517	1,209	15	26	239	156	10	34
	Groundwater	417	179	16	30	28	9	3	2
All Australia									
	Surface and Groundwater	33,604	25,512	53	54	6,275	8,111	2,180	392

a. In 2021-22, the most recently available year of data, these were 86% of all trades (allocation and entitlement) by volume. **b.** The Murray–Darling Basin groundwater systems overlap the northern and southern Basins. **c.** Allocation trade market rate price included transactions with a reported price above \$5/ML and below \$10,000/ML. **d.** For the market turnover estimate, identified environmental transfers have been excluded.

Source: BOM (2021a, 2023a).

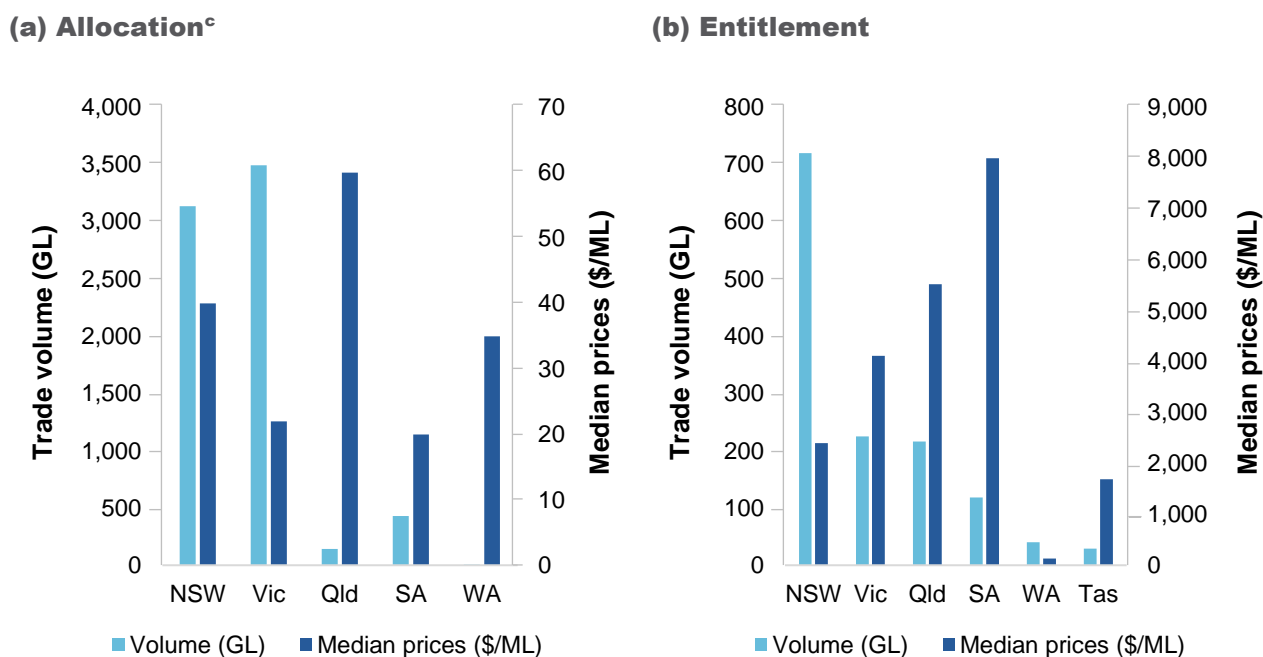
Table 5.3 – Water entitlement trade summary by region and resource type^a

Region	Resource type	Transactions		Trade with market rate price reported ^c (%)		Volume (GL)		Estimated turnover (\$m)	
		2019-20	2021-22	2019-20	2021-22	2019-20	2021-22	2019-20	2021-22
Southern MDB									
	Surface water	4,320	4,703	52	55	794	477	2,700	1,580
Northern MDB									
	Surface water	431	414	42	39	441	305	1,500	1,350
MDB Groundwater^b									
	Groundwater	874	714	38	34	184	153	250	430
Rest of Australia									
	Surface water	2,757	2,039	20	14	318	198	430	410
	Groundwater	1,701	1,383	14	14	224	190	220	180
All Australia									
	Surface and Groundwater	10,083	9,253	35	38	1,961	1,323	5,100	3,950

a. In 2021-22, the most recently available year of data, these were 16% of all allocation trades by volume. **b.** The Murray–Darling Basin groundwater systems overlap the northern and southern Basin. **c.** Entitlement trade market rate price included transactions with a reported price above \$50/ML and below \$20,000/ML.

Source: BOM (2021a, 2023a).

Figure 5.1 – Water trade summary for FY 2022-23^{a,b}



a. Both allocation and entitlement water trade volumes in Gigalitre (GL) for FY 2022-23 (except for the NT). ACT’s trade volumes data are included in the NSW total. These values are presented as one-way trade volumes, from the perspective of the seller’s location, to prevent double counting. **b.** Median prices \$ per ML indicates mid-point of transaction prices. **c.** Tasmania is not shown in the figure. Trade prices in Tasmania are very high price (median price \$1500/GL) but for low volumes of allocation trade (5.8 GL).

Source: BOM (2024e).

New South Wales

The NSW Government has implemented several initiatives to enhance water markets and trading outside of the Murray–Darling Basin. The Commission understands that coastal New South Wales water trading has been reviewed to remove trade barriers while protecting environmental assets (NSW Government, personal communication). A new water allocation trade rule was issued in 2023 for mines in the Special Areas of Sydney’s drinking water catchment to consider incidental surface water use (NSW Government 2023a). This rule facilitates temporary trading for extractive water users in the greater metropolitan area to tackle a perceived barrier for water users located outside the Murray–Darling Basin. In 2023, the NSW Government also combined some groundwater sources and permitted trade within the combined pool (NSW Government 2023b).

The New South Wales Irrigators’ Council raised concerns about the current regulation of trade in coastal areas of New South Wales.

NSW coastal water users note the current stifled nature of water trading and water markets in their regions, both in regulated and unregulated river sources. In water sharing plans, interconnected coastal river systems have been broken down into small trading areas based on types of flows. Consequently, limited trading takes place in these areas, hindering the market system. As a result of limited trading, water prices are lower than normal. (sub. 16, p. 22)

The NSW Government has also implemented restrictions on the trade of allocations or entitlements held under floodplain harvesting licenses, through water sharing plan provisions (NSW DPIE 2022a). The

government acknowledges that these restrictions may conflict with the NWI objective of removing trade barriers. However, the NSW Government justifies this restriction based on the permanent nature of floodplain harvesting infrastructure (e.g., on farm dams – which would need to be filled in or destroyed), rather than an arbitrary decision to limit trade (NSW Government, pers. comm.).

Victoria

Victoria has completed an investigation into establishing an urban water market for South Central Victoria, encompassing Melbourne and nearby towns. The Commission understands that work is underway to create a pooled urban water resource by combining the Yarra-Thomson system and the Victorian Desalination Project (Victorian Government, pers. comm.). The pooled resource aims to benefit both metropolitan and regional urban water corporations, such as Melbourne, Geelong, Gippsland and other towns in the region, through the development of a common type of water entitlement – the south-central pool entitlement, to create flexibility across the system. Additionally, trading rules in various water systems are under development, including for western Victoria, for state-wide unregulated surface water trading rules, and for groundwater systems where connectivity with surface water is present (Victorian DELWP 2016, 2022a).

Queensland

In Queensland, progress has been made in enhancing water trading markets through the release of the *Queensland Water Markets Optimisation Action Plan* (Qld DRDMW 2021a).

Northern Territory

The Northern Territory continues to progress water trading opportunities within areas governed by declared water allocation plans (chapter 4).

An intergovernmental agreement, currently under negotiation between Western Australia and the Northern Territory to enable the use of water from Lake Argyle for proposed irrigated development in the Northern Territory, may provide further inter-jurisdictional trade opportunities in the future.

5.2 Publicly accessible and reliable water registers

Summary of actions under the NWI

States and territories agreed to implement compatible, publicly accessible, and reliable registers for all water entitlements and trades (both permanent and temporary). The agreement stipulated that these registers must adhere to a set of guidelines (Schedule F to the NWI). These guidelines include ensuring the registers meet a sufficient standard to promote secure entitlements, providing accessible information (including trade prices), and being administered in a manner that seeks to minimise transaction costs for market participants.⁴ The Parties also agreed that water registers should be administered according to specified procedures and protocols, aligning with land title office manuals and related guidelines.

Previous findings (2021)

In 2021, the Commission found that while publicly accessible and reliable water registers have largely been achieved by jurisdictions, some still have limited accessibility.

Assessment (2024)

Noting that most jurisdictions have achieved compatible, publicly accessible, and reliable water registers, compliance with Schedule F to the NWI varies. Improvements are still needed to ensure these registers meet the reliability and accessibility requirements of users (finding 5.1). For example, improvements to registers can help support market outcomes by improving ease of access, search and information availability by adding:

- information about the licence holder (with consideration given to balancing privacy, wellbeing, and personal safety concerns, with options to exclude information from the register or to choose not to disclose certain information (NSW IPC nd))
- information about other interests in the licence (e.g. registered mortgages)
- an ability to search the register by location of water entitlement or entitlement holder name (instead of needing to know the licence number in order to search)
- publicly available information without requiring the payment of fees.

Making these changes would increase the efficacy of registers in supporting trade in water entitlements. Such changes to water registers would be in line with information contained in other government registers, like registers of land property title, the Australian Business Registry and the Register of Radiocommunications Licences (table 5.4). Jurisdictions could also consider including information on registers that would assist in assessing progress towards meeting the National Agreement on Closing the Gap Inland Waters Target, currently in development (chapter 2).

Table 5.4 – Information availability in state and territory water registers and other government registers

	Freely available	Provides key information ^a	Searchable by key information ^b	Prices and details of trade	Location details
New South Wales	Yes	Yes (Limited information available for general public)	Searchable by licence number.	Yes, list of trades and summary reports (e.g.	No

⁴ Relevant to outcomes in paragraph 58 ii), iii) and v) of the NWI.

	Freely available	Provides key information ^a	Searchable by key information ^b	Prices and details of trade	Location details
				volume of trade by region, including prices) are published.	
Victoria	No (Details of largest water share owners published. Details of licences is available for a fee)	Yes, for a fee.	Searchable by licence number.	Yes, list of trades and summary reports (e.g. volume of trade by region, including prices) are published.	Yes, for a fee
Queensland	No (Details of licences is available for a fee).	Yes, for a fee.	Yes, for a fee.	No, but summary reports of trade activity are published.	Yes, for a fee.
Western Australia	Yes	Yes, (some information available, with additional information available for a fee)	Yes (searchable by location/map and licence type)	No	Yes
South Australia	Yes	Yes (Limited information available for general public)	Searchable by licence number.	Yes	Yes
Tasmania	Yes (for irrigation rights)	Yes (irrigator-specific register with business identifiers, securities, entitlements and allocations)	Yes	Yes (e.g. trading overviews with numbers, total and average volume of irrigation districts)	Yes (by region)
Northern Territory	Yes	Yes (can extract lists of all licences categorised by water source, business name of licence holder)	Yes	Yes (details of the trade are reported in a separate trade register including. water resource, management)	Yes

	Freely available	Provides key information ^a and type via online map tool)	Searchable by key information ^b	Prices and details of trade zone, volume). Price of trades not reported.	Location details
Australian Capital Territory	Yes	Yes	Yes	N/A ^d	Yes
Registers of land property title^c	No	Yes, for a fee	Yes	Yes	Yes
Australian Business Register	Yes (with additional information available for a fee)	Yes	Yes	N/A	Yes
Registers of Radiocommunications Licences	Yes	Yes	Yes	No	Yes

a. Provides key information such as name, address, entitlement held, licence number. **b.** Searchable by key information such as region, location, type of entitlements. **c.** Each state and territory's land registry maintain their Torrens Register, which records interests in land titles within that jurisdiction. **d.** No trades have been reported within the ACT.

Source: WaterNSW (2023, 2024a); Victorian Water Register (2024a, 2024b, 2024d, 2024e); Qld DRDMW (2021b, 2024a, 2024c); WA DWER (2024e, 2024f); SA DEW (2024f); WaterConnect (nd); Tasmanian Irrigation (2024b, 2024a); NT Government (2016b, 2024c); ACT Government (2021b, 2021c); ARNECC (2024); ABR (2024); ACMA (2024).

Victoria

Victoria has further developed its water register, introducing new dashboards that provide information on allocations, market prices, ownership, product types, and water availability (Victorian Water Register 2024f).

South Australia

South Australia has amended laws relating to its water register to enable water entitlements to be used as a financial security, and for financiers to recover in the event of default. These amendments also improve arrangements for subdividing, agency and joint ownership for water licences (SA Government 2022).



Finding 5.1

Further improvements can be made to trade registers to provide necessary information to market participants

Most state and territory governments have implemented water registers that comply with the NWI. But further improvements, such as ensuring that water registers include current entitlement and allocation information, real time (or recent) trade data, and that registers are freely accessible by the public, and ideally, easy to search, would increase the efficacy of registers in supporting trade in water entitlements

5.3 Reducing transaction costs by improving water market information

Summary of actions under the NWI

High transaction costs hinder market trading. Minimisation of transaction costs, by facilitating “good information flows”, was a specific outcome under the NWI.⁵ To this end, the establishment of water registers was a key NWI action (section 5.2). This section considers additional sources of market information, such as the content and interpretation of trade rules, historical trends and drivers of water trade, and information on water resource quality and accessibility. In addition to the content of information, the mode of communication and organisation of information can lower transaction costs.

Previous findings (2021)

In 2021, the Commission found that jurisdictions had largely achieved their NWI commitments, investing in improvements in water market information to complement the information in water registries.

The Commission advised governments to prioritise investment in services that improve market information to circumstances where there were clearly identifiable benefits from greater information (e.g. systems with high trade volumes) and where market failure means the information is not provided privately. The Commission noted that stakeholders had complained that a lack of information on water markets was a hindrance to trade, and that this suggests previous investments may not have proven effective or adequate.

The BOM’s work on water market information has enhanced trade data accessibility in jurisdictions with lower trade volumes, though challenges persist in higher-volume regions. BOM’s online platform provides a dashboard, general information on water markets, the national water account and annual review and analysis of water trading activity in Australia.

Assessment (2024)

While jurisdictions continue to invest in improvements in water market information, the ACCC, in its Murray–Darling Basin Water Markets Inquiry, found that there was a lack of quality, timely and accessible information about water markets (sub. 11, p. 3). The NSW Irrigators’ Council supported the ACCC’s findings (sub. 16, p. 21).

⁵ NWI paragraph 58 ii).

The Martuwarra Fitzroy River Council highlighted the importance of knowledge to the operation of water markets. This supports the importance of transparent market information and water registers. The Council said:

Trading in a water market requires specialised knowledge making it more accessible to those who do so regularly compared to those who do so intermittently. Investors are far more likely to operate regularly compared to farmers, for example, or to have ‘people’ who do it for them. The same rules apply to both types of operators, but incomplete knowledge makes water markets far less accessible for water users compared to investors. (sub. 75, p. 16)

As noted in section 5.1, new powers and functions for the ACCC, IGWC and BOM, aimed at increasing transparency, integrity and confidence in water markets in the Murray–Darling Basin, are due to commence on 1 July 2024. The ACCC is preparing to enforce new water market integrity provisions and a water market intermediaries code of conduct within the Basin (sub. 82, p. 1).

In its second submission to this inquiry, the ACCC emphasised the importance of existing protections and transparency measures for water users and market participants in the Murray–Darling Basin under the Water Act framework. These include regulations on termination fees, barriers to trade, and monitoring of rural water charges (sub. 82, p. 4).

The ACCC highlighted the potential for the extension of similar protections to water users outside the Basin through a renewed NWI to ensure equitable market access and efficient resource management.

This is important to support efficient charging and resource use, as irrigation activity and trade in water rights expand outside of the Basin. The ACCC supports explicitly recognising that water trading and markets are tools to increase efficiency within the water resource management framework (renewal advice 7.1) and recommends that the advice could explicitly refer to the principle that water market and trade arrangements will reflect and operate within regularly reviewed ecological tolerances and system limits. (sub. 82, p. 4)

Currently, at a national level, the Water Act gives BOM the responsibility for compiling and disseminating comprehensive water information, including on trading and markets. BOM’s water markets dashboard and Australian Water Markets reports provide the most centralised and comprehensive set of market information.

Some state and territory governments are undertaking work to improve the quality and accessibility of trade-related information. As the Commission noted in 2021, governments should continue to invest in water market information in cases of established public benefit and/or market failure.

New South Wales



In New South Wales, WaterNSW is upgrading its digital services for processing trade applications and water account management. This is intended to integrate existing systems, introducing an online Customer Portal for groundwater allocation trade submissions and inquiries. Additionally, work is also underway to increase daily updates to BOM for real-time trade information in New South Wales (NSW Government, pers. comm.).

Victoria



Victoria has improved its water market information by annually disclosing owners holding 2% or more of high reliability water shares in the Goulburn and Murray systems. Additionally, updates on River Murray delivery risks, such as the risk of being unable to deliver water allocations (due to delivery and/or system shortfalls) to water users downstream of the Barmah Choke and jurisdictional actions have been published (Victorian DELWP 2024).

Improved allocation trade price information, particularly for the two Victorian Murray trading zones (above and below the Barmah Choke), is accessible on the Victorian Water Register website along with more detailed pricing summaries.

Queensland

Queensland has started publishing seasonal water assignment price data daily for both supplemented and unsupplemented water, and this reflects a positive step towards transparency and accessibility (Qld Government, pers. comm.).

Tasmania

Tasmania has allocated funds for developing a new water information management system, which aims to enhance the accessibility, security, and functionality of water licensing information (Tasmanian Government, pers. comm.).

5.4 Compliance with trade approval service standards

Summary of actions under the NWI

This action is designed to minimise market transaction costs. Following agreement by COAG, the former Natural Resources Management Ministerial Council (NRMMC) set service standards for the Murray–Darling Basin jurisdictions in 2009. These standards require at least 90% of water allocation trade applications to be processed within 5-20 business days, depending on the complexity of the trade. This initiative was intended to promote faster processing of trades and is aligned with the NWI outcome of minimising transaction costs.

Previous findings (2021)

In 2021, the Commission found that the Murray–Darling Basin states have consistently met the standards for processing times for trade approvals, with other jurisdictions generally monitoring more informal approval standards.

Assessment (2024)

All jurisdictions have standards or other arrangements in place that aim to facilitate efficient processing of trades (table 5.5).

New South Wales, Victoria, Queensland and South Australia are continuing to meet the above standards for processing times for trade approvals as agreed by the NRMMC (Qld DRDMW 2024b; Victorian Water Register 2024c; WaterConnect 2024; WaterNSW 2024b).

Table 5.5 – Processing time for water trades
Performance of jurisdictions against COAG standards, 2024

	Allocation trade	Entitlement trade
New South Wales	<ul style="list-style-type: none"> • 99% of trades (excluding South Australia) within 10 days • 98% of trades involving South Australia within 20 days • 99.5% of intrastate trades within 5 days 	No information available
Victoria	<ul style="list-style-type: none"> • 99% of trades involving NSW within 10 days • 99% of trades involving SA within 20 days 	99.9% of trades within 10 days

	Allocation trade	Entitlement trade
	<ul style="list-style-type: none"> • 97% of intrastate trades within 5 days 	
Queensland	<ul style="list-style-type: none"> • 92% of seasonal trades within 5 business days • 86% of permanent trades within 10 business days 	No information available
Western Australia	Risk based water trade processing applies. <ul style="list-style-type: none"> • 42 days for low-risk applications (target 65 days) • 57 days for medium risk applications (target 75 days) • 79 days for high-risk applications (target 95 days) 	
South Australia	95% of trades processed within 10 business days	100% of trades within 20 business days
Tasmania	Tasmania does not have specific targets for water trade approvals.	
Northern Territory	<ul style="list-style-type: none"> • The processing time for trades varies. • Applications requiring public advertising take an average of 28 days • Applications not requiring public advertising take an average 12 days (target 20 days). • The target/expected timeframe is 28 days for licence holders and 120 days for non-licence holders. 	
Australian Capital Territory	There have been no reported trades within the ACT	

Source: WaterNSW (2024b); Victorian Water Register (2024c); Qld DRDMW (2024b); WaterConnect (2024); WA Government (pers. comm.); NT Government (pers. comm.).

In the Northern Territory, processing standards have been developed and are monitored for trading entitlements. Other states do not have specific targets for water trade approvals. Tasmania has administrative arrangements to expedite time-sensitive, short-term trade approvals. Western Australia applies risk-based processing targets for all types of water license applications.

The experience of the Murray–Darling Basin states and the Northern Territory, as set out in table 5.5, demonstrate the benefit of having set targets for processing trade applications, with similar processing times that support market participants seeking to trade. To encourage further improvements in water trading systems in Australia, the ACCC has recommended that governments consider implementing mandatory trade approval standards for all trade approval authorities, and regular reporting of trade approval processing times to the BOM (ACCC inquiry recommendation 8; Roadmap recommendation 12) (sub. 11, p. 4). The renewal of the National Water Initiative presents an opportunity to consider revised, nationally applicable, trade approval standards.

6. Best practice pricing and institutional arrangements

This chapter considers progress in achieving the following underlying objectives under element 3 of the National Water Initiative (NWI) – best practice water pricing and institutional arrangements:





















- promote economically efficient and sustainable use of water resources, water infrastructure assets and government resources devoted to the management of water
- ensure sufficient revenue streams to allow efficient delivery of the required services
- facilitate the efficient functioning of water markets, including inter-jurisdictional water markets, and in both rural and urban settings
- give effect to the principles of user-pays and achieve pricing transparency regarding water storage and delivery in irrigation systems and cost recovery for water planning and management
- avoid perverse or unintended pricing outcomes
- provide appropriate mechanisms for the release of unallocated water.







The NWI outlined seven action areas against these outcomes (paragraphs 13-16), and for the purposes of assessment, these are grouped under the following headings.

- Best practice pricing and regulation: to achieve efficient pricing, states and territories should allow independent economic regulators to set prices in a way that achieves upper bound pricing and avoids monopoly rent being earned (NWI paragraphs 65, 66, 77).
- Investment of new and refurbished infrastructure: to ensure prudent allocation of public funds for water infrastructure, States and Territories should establish institutional arrangements that support the evaluation of economic viability of proposed infrastructure projects prior to investment (NWI paragraph 69).
- Cost recovery for water planning and management: the implementation of charges to recover the costs of water planning and management from users (NWI paragraphs 67,68).
- Environmental externalities of water use: using regulation and, where feasible, markets and/or pricing to manage environmental externalities (NWI paragraph 73).
- Release of reallocated water: the use of market-based mechanisms for the release of unallocated water (NWI paragraphs 70, 71, 72).
- Separation of water management from service delivery: the institutional separation of water resource management from regulation (NWI paragraph 74).
- Performance benchmarking: transparency measures, such as public reporting of: subsidies paid to service providers, including community service obligations (CSOs); the extent to which the cost of water planning and management activities are recovered from users (NWI paragraphs 75, 76).

A summary of the Productivity Commission’s assessment framework (appendix B) – which does not map perfectly against the action items – and progress against it is in table 6.1. The notes to the table indicate which assessment items relate to which NWI outcomes.

Table 6.1 – Assessment summary: best practice pricing and institutional arrangements

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Best practice pricing and regulation (section 6.1)^c			
Urban water: regulated	Partially achieved 	Partially achieved 	Pricing outcomes are comprehensively being met in New South Wales, Victoria and the Australian Capital Territory. Queensland (bulk water) and Western Australia should introduce more robust independent economic regulation and Tasmania should remove limitations placed on the independent regulator.
Urban water: not formally regulated	Largely achieved 	Largely achieved 	Under-pricing likely to be continuing for regional utilities in Queensland and New South Wales and subsidies are not being structured as transparent Community Service Obligations.
Rural water: government owned	Partially achieved 	Partially achieved 	Queensland is moving further away from full cost recovery. Pricing outcomes in other jurisdictions have not undergone any significant change since 2021.
Rural water: user owned	Achieved 	Achieved 	Consistent with the Commission's previous inquiries, it has not directly considered pricing outcomes.
Rural water: cross jurisdictional	Partially achieved 	Partially achieved 	No substantial changes have been observed since 2021.
Investment in new and refurbished infrastructure (section 6.2)^d			
Urban	Partially achieved 	Partially achieved 	Since 2021, some major projects have received public funding that were not assessed for economic viability through a comprehensive benefit-cost analysis. Other major projects have been funded despite unfavourable benefit-cost analysis.
Rural	Partially achieved 	Partially achieved 	Project assessment is not transparent in many cases. Governments have continued to publicly fund irrigation infrastructure for private benefit.
Other pricing and institutional arrangements (sections 6.3-6.6)			
Cost recovery for planning and management^e	Partially achieved 	Partially achieved 	No substantial changes have been observed since 2021.
Environmental externalities of water use^f	Achieved 	Achieved 	No substantial changes have been observed since 2021.
Release of unallocated water^g	Largely achieved 	Largely achieved 	No substantial changes have been observed since 2021.

NWI commitment	2021 assessment and progress indicator ^a	2024 assessment and progress indicator	Comments – progress since 2021
Separation of functions ^h	Achieved 	Achieved 	The Australian Capital Territory has recently rearranged functions between a new Office of Water and the Environmental Protection Authority to strengthen separation of regulatory enforcement and water management policy.
Performance benchmarking (section 6.7)ⁱ			
Urban	Achieved 	Achieved 	The ongoing National Performance Report Indicator Review is well-placed to improve outcomes from benchmarking.
Rural	Terminated 	Terminated 	Rural benchmarking was discontinued in 2014.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **Terminated:** Requirement discontinued (grey shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraphs 65, 66, 77 **d.** NWI paragraph 69 **e.** NWI paragraphs 67,68 **f.** NWI paragraph 73 **g.** NWI paragraphs 70, 71, 72 **h.** NWI paragraph 74 **i.** NWI paragraphs 75, 76.

6.1 Best practice pricing and regulation

Summary of actions under NWI

Under the NWI, jurisdictions agreed to bring into effect cost-reflective and consumption-based pricing policies for water storage and delivery in rural and urban systems to facilitate efficient water use and trade in water entitlements. Jurisdictions also agreed to use independent pricing regulators to set or review prices, or price setting processes, for water storage and delivery by government water service providers on a case-by-case basis. All providers, regardless of ownership are required to publicly review and report on pricing, and to report subsidies.

This section assesses implementation of the full cost recovery provisions of the NWI, including how pricing policies – as well as independent economic regulation – support full cost recovery. Adopting pricing policies to achieve full cost recovery is designed to ‘ensure business viability and avoid monopoly rents (including recovery of environmental externalities)’,¹ in order to ‘facilitate water use efficiency and innovation in urban and rural areas’.² Recognising that economic viability may be more difficult to establish in some regional areas,³ the NWI contains different cost recovery requirements for metropolitan⁴ providers and other rural⁵ and regional⁶ providers.

¹ NWI paragraph 65 ii).

² NWI paragraph 23 viii).

³ NWI paragraph 66 v).

⁴ Water and wastewater services provided in metropolitan urban areas having in excess of 50,000 connections.

⁵ Water services provided mainly for irrigated agriculture and industrial users which is delivered via a mix of bulk water services and distribution services.

⁶ Water and wastewater services provided to regional urban areas with fewer than 50,000 connections.

Metropolitan urban service providers are required to achieve 'continued movement towards upper bound pricing' whereas all other rural and regional service providers are only required to achieve lower bound pricing (box 6.1). In cases where full cost recovery is unlikely to be achievable in the long term, and a CSO is deemed necessary, the NWI requires that the size of any CSO is reported publicly and that, where practicable, jurisdictions consider alternative management arrangements aimed at removing the need for an ongoing subsidy.⁷

Furthermore, the NWI pricing principles clearly distinguish between investment decisions made prior to a 'legacy date'⁸ (no later than 1 January 2007) and decisions made after that date (new capital expenditure).

For the 'recovery of legacy capital expenditure': ... on the assumption that assets are to be retained, charges will achieve cost recovery by way of a depreciation charge or annuity charge and a positive return on an asset value used for price setting purposes as at the legacy date. (NRMMC 2010, p. 7)

Assets built after the legacy date will be charged to achieve full cost recovery, including a return on capital (dividend), and a return of capital (capital plus dividend).

The NWI also required jurisdictions to have independent bodies in place for the setting of prices by publicly owned service providers, and for reviewing and reporting on the prices by all water service providers, to ensure they meet the cost recovery provisions of the NWI (box 6.2).⁹

Box 6.1 – Upper and lower bound pricing

Upper and lower bound pricing were defined in the National Water Initiative as follows:

- **Upper bound pricing** — the level at which, to avoid monopoly rents, a water business should not recover more than the operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes (TERs), provision for the cost of asset consumption and cost of capital, the latter being calculated using a weighted average cost of capital.
- **Lower bound pricing** — the level at which to be viable, a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or TERs (not including income tax), the interest cost on debt, dividends (if any) and make provision for future asset refurbishment/replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market outcome.

Both upper bound and lower bound pricing include a provision for asset refurbishment and replacement, but upper bound pricing also requires the water service provider to earn a commercial rate of return on capital to reflect competitive neutrality. Pricing at the lower bound is necessary but not sufficient to achieve upper bound pricing.

Source: PC (2021a, p. 73).

⁷ NWI paragraph 66 v) c).

⁸ Defined by jurisdictions as capital expenditures on assets made before the 'line in the sand' was drawn.

⁹ NWI paragraph 77.

Box 6.2 – Current regulatory and pricing process across urban and rural jurisdictions

- **Victoria, South Australia, Tasmania** and the **Australian Capital Territory** have independent economic regulation including price or revenue setting powers for all utilities. South Australia's economic regulator can be given directions by the SA Treasurer on how it performs its water pricing role.
- **New South Wales** has independent economic regulation including price setting powers for Sydney Water, Hunter Water, and the Central Coast Council and to Water NSW and the Water Administration Ministerial Corporation providing water to farmers, irrigators, and industrial users. But there is no economic regulator for most other regional council owned providers, with the Independent Pricing and Regulatory Tribunal (NSW IPART) not having powers to set prices for regional areas currently serviced by local water utilities (local government).
- **Queensland** (for Seqwater – the Queensland bulk water supply authority) and **Western Australia** have independent economic regulators, but they do not have price-setting power. Instead, they must be asked by the state government to perform a review of prices. Water retailers in Queensland are not subject to economic regulation, although Seqwater, which supplies water retailers in the south-east Queensland region, is subject to price recommendations from the regulator.
- The independent economic regulator in the **Northern Territory** enforces compliance with the government's pricing determination as well as administers the water license application i.e. issued for 40 years with provision for reassessment every five years. Licenses are required for providing urban water and sewerage services as well as for water extraction from a river/stream or a dam for farming or other commercial purposes. The Northern Territory economic regulator does not have any price-setting power over the state wide provider – the Power and Water Corporation.

Assessment framework

To comprehensively assess price setting and regulatory aspects among the diverse landscape of utility services, the Commission has categorised utility providers into two main groups: **urban** and **rural**. Within the urban category, there are two additional sub-classifications: **urban-regulated** and **urban-not formally regulated**. On the other hand, rural providers fall into three distinct categories: **government-owned**, **user-owned**, and **cross-jurisdictional**.

Urban water services that are formally regulated

Urban water service providers that are formally regulated include most metropolitan water providers, larger regional urban water providers, and the urban water operations of most jurisdiction-wide water service providers.

Previous findings (2021)

In 2021 the Commission noted that pricing practices for businesses subject to formal price regulation including those in New South Wales, Victoria and the Australian Capital Territory are generally consistent with upper bound pricing.

South-east Queensland's bulk water provider, Seqwater (that in turn provides water to water retailers) has prices recommended by the economic regulator, the Queensland Competition Authority (QCA).¹⁰ These

¹⁰ Metropolitan and regional water retailers in other parts of Queensland were not subject to regulation. This is covered in the next section on providers that are not formally regulated.

recommendations are considered by government in determining prices. In Western Australia, the prices for state owned water providers are set by government, with private providers able to determine their own prices. The Western Australia Economic Regulatory Authority (WA ERA) can conduct price reviews to inform government decisions, when requested by government.

In practice, the Queensland Government has accepted the prices recommended by the QCA. However, in Western Australia, the government has not accepted the prices recommended by the WA ERA, leading to prices that do not reflect full cost recovery.

In Tasmania the price setting processes were in line with full cost recovery. However statutory limitations on the size of allowable price movements from period to period prevented it from being achieved. While Tasmanian providers had not been consistently pricing at upper bound levels, as the Commission noted in its 2017 National Water Reform inquiry, they were subject to government commitments to increase prices over time – which is broadly consistent with the NWI’s requirement to achieve ‘continued movement towards upper bound pricing’.

In South Australia, the Commission noted (PC 2021a, p. 80) that the revenue-setting process of the Essential Services Commission of South Australia (ESCOSA) could be subject to ministerial direction. The SA Minister for Environment and Water can direct SA Water – a wholly Government of South Australia owned water services provider – to undertake certain capital and operational expenditures and ESCOSA is subject to a pricing order, issued by the SA Treasurer, that requires it to allow SA Water to recover those expenditures specified in the Minister’s direction. Any expenditures directed by the SA Minister for Environment and Water are then recovered from SA Water’s customers, without independent scrutiny of those expenditures. However, ministerial directions under section 6 of the *Public Corporations Act 1993* (SA) are generally publicly gazetted, enabling the public to form a view on the direction.

Assessment (2024)

Little change or progress has been made by jurisdictions in implementing cost-reflective and consumption-based pricing since the Commission’s 2021 assessment.

Some jurisdictions have strong institutional arrangements for determining water prices. However, others appear to be moving away from price levels that reflect the cost of water service provision (finding 6.1), for reasons other than meeting policy objectives through a transparent community service obligation.

Jurisdictions need to recommit to independent economic regulation through a renewed NWI. Some have not fully implemented independent economic regulation of water utilities, resulting in costs being borne by those who do not benefit from water use. Price settings in these jurisdictions risk not supporting efficient water use, not appropriately signalling need for investment, and not promoting financial viability of the water industry, to the detriment of economic, social and environmental wellbeing. This reaffirms the Commission’s renewal advice (11.2) for best practice economic regulation. This renewal advice was also supported by participants, including the ACCC (sub. 11, p. 6), SACOSS (sub. 23, p. 8) and WSAA (sub. 15, p. 12).

Below are some examples of jurisdictions’ progress, maintenance or backsliding under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

New South Wales, Victoria and the Australian Capital Territory

Pricing processes and economic regulation in New South Wales, Victoria, and the Australian Capital Territory generally meet NWI requirements.

The Commission notes that the New South Wales Independent Pricing and Regulatory Tribunal (NSW IPART) – the economic regulator in New South Wales – implemented the 3Cs framework (customers, costs, credibility) in November 2022 to improve efficiency of New South Wales water service providers and address key challenges like climate change and a growing population. The high-level objectives of the 3Cs framework are:

- broaden price monitoring capabilities to safeguard customers' long and short term interests
- provide greater flexibility to water users to tailor services to better achieve customer expectations
- provide new incentives for water businesses to demonstrate ambition in the delivery of services and outcomes that matter most to customers, and hold them accountable for meeting their commitments to customers (NSW IPART 2022).

Victoria has continued to use the 'PREMO' framework (Performance, Risk, Engagement, Management and Outcomes), which was previously assessed (PC 2021a, p. 197) as giving a strong emphasis to consumer engagement. This is consistent with the Commission's renewal advice (11.2) that regulatory decisions should promote the long-term interests of consumers.

Queensland

The QCA remains empowered to recommend prices for Seqwater and no other water providers. The Queensland Government sets Seqwater prices and rate of return in line with the QCA recommendations (Queensland Government 2022). Most recently the QCA's 2022-2026 Seqwater pricing investigation recommended that bulk water prices should increase by 2.14% for each of the four years within the assessment period (QCA 2022, p. 98). While the government accepted the recommended QCA price increase for 2022-2026, it deferred the QCA's price review for year 2021-2022 as a COVID-19 relief measure, causing the planned price increase to roll forward by one additional year (QCA 2022, p. 2).

The QCA is currently conducting a price monitoring investigation into the Gladstone Area Water Board – the bulk water provider for the Gladstone region. The investigation may make findings about revenue settings needed to recover efficient costs, but will not set or recommend prices. Other water suppliers in Queensland are (still) not subject to price regulation.

Western Australia

The most recent pricing recommendations provided to the WA Government regarding Water Corporation prices were provided by the WA ERA in 2017. The WA Government has not requested a price inquiry since that time. The 2017 WA ERA price review highlighted cross-subsidies between water services and wastewater services, as well as cross-subsidies between metropolitan and regional customers. The review found that in 2017 the average annual bill for wastewater was about \$407 (around \$492 in 2023 dollars) higher than the efficient estimate, and the average annual bill for water supply was about \$28 lower (around \$34 in 2023 dollars) (PC 2021a, p. 82).

South Australia

The practice of the SA Water Minister directing SA Water to invest in certain infrastructure projects continues. Investment subject to ministerial direction allows SA Water to recover the costs of directed

expenditure. This undermines the independence of economic regulation and risks imposing additional costs on customers. However, ministerial directions under section 6 of the *Public Corporations Act 1993* (SA) are generally gazetted – and therefore transparent – enabling the public to form a view on the direction.

The South Australian Council of Social Service (SACOSS) suggested that:

It is therefore vital to ensure that expenditure proposed in [the 2024-28 Regulatory Business Plan], including expenditure directed by the Minister . . . is prudent, efficient, and no more than necessary for the safe and reliable provision of water network services. (sub. 23, p. 8)

SACOSS also noted that these directed projects may displace other water expenditure plans that had been developed in partnership with communities. Additionally, SACOSS emphasised that risks should be allocated equitably to consumers (sub. 23, p. 8).

Tasmania

While the Office of the Tasmanian Economic Regulator have price setting power, they remain constrained by the memorandum of understanding between the state government, council and Taswater that caps price increases at 3.5% each year over the regulatory period between 2022 – 2026 (Tasmanian Economic Regulator 2022b, p. 1). This is well below TasWater's estimate of a 6.5% annual increase to achieve full cost recovery by 2025-26 (Tasmanian Economic Regulator 2022b, p. 1).

Urban water not formally regulated

Urban water service providers that are not formally regulated include urban water services provided by councils or council-owned corporations in New South Wales and Queensland (metropolitan retail providers in Queensland and regional providers in both states), and the urban water operations of the jurisdiction-wide water service provider in the Northern Territory. For the purpose of the assessment, 'light touch' regulation such as price and service monitoring are not considered to be formal regulation.

Previous findings (2021)

The Commission previously noted that most funding provided to the unregulated local water utilities in the Northern Territory, New South Wales and Queensland are not fully compliant with the requirements of the NWI. The Commission's renewal advice in 2021 recommended that all jurisdictions agree to provide transparent CSOs with the clear intention of utilities achieving full cost recovery.

Assessment (2024)

The Commission remains of the view that unregulated utilities in the Northern Territory, New South Wales and Queensland need to adopt consistent measurement and reporting guidelines that are compliant with the NWI. Subsidies should be provided in the form of transparent CSOs instead of capital grants (box 6.3). Finally, state and territory governments should introduce independent economic regulation for metropolitan utilities that are not currently regulated.

New South Wales

Based on the economic real rate of return (ERRR), the NSW Government has previously stated that the majority of unregulated local water utilities have been recovering full cost (PC 2021a, p. 86). While it was noted by the Commission in 2021 (PC 2021a) that water pricing by unregulated local water utilities is not

likely to align with the *NWI Pricing Principles*, the National Performance Report (NPR) has since introduced new indicators that should improve information about pricing and services outcome (box 6.4).

These providers will also be provided over one billion dollars by the NSW Government through the Safe and Secure Water Program (NSW DPIE 2022c, p. 3), but not through transparent CSOs. In addition, this funding, the majority of which has been provided through capital grants, does not appear to have been targeted towards service areas where full cost recovery is not possible, meaning it is unlikely to be in line with the NWI and the *NWI Pricing Principles*.

Queensland and Northern Territory

There has been little progress since 2021 in relation to pricing and regulation settings for the unregulated urban water utilities in Queensland and the Northern Territory. Current arrangements are not fully compliant with the NWI. The Environment Centre NT (sub. 54, p. 11) highlighted the lack of independent economic regulation and funding challenges applied to regional utilities in the Northern Territory. Similarly, the Queensland Audit Office (2024) noted that 48 of Queensland's 77 regional and remote councils are at either a moderate or a high risk of not being financially sustainable.

They further added:

[c]ouncils receive grant funding for their operational needs (conducting day-to-day business) and capital purposes (building and maintaining community assets). Without these grants, most councils would not be able to provide basic services to their communities or maintain their assets. When a council increases its reliance on grants, its ability to be financially sustainable decreases. (Queensland Audit Office 2024, p. 35)

Box 6.3 – Regional and remote services and community service obligations

As noted by some inquiry participants, regional and remote services face challenges resulting from lower population density compared to urban areas. The cost of fixed infrastructure per water connection is higher, and the provision of a comparable standard of service is more costly and, in some cases, either unaffordable or unviable (LGAQ, sub. 12, p. 1, Qldwater, sub. 29, p. 8; SACOSS, sub. 23, p. 3). An inquiry participant also noted that regional and remote areas face inconsistencies in rules and governance, and a lack of clarity on roles and water asset ownership, which makes long-term planning difficult (SACOSS, sub. 23, p. 3).

The NWI contains little guidance on how to manage the challenges of providing safe and reliable drinking water in regional and remote areas beyond paragraph 66v c), which states that:

where full cost recovery is unlikely to be achieved in the long term and a Community Service Obligation (CSO) is deemed necessary, the size of the subsidy is to be reported publicly and, where practicable, jurisdictions to consider alternative management arrangements aimed at removing the need for an ongoing CSO.

However, it is important to note that subsidies, including CSOs – even if they are clear and transparent – can create distortions in decision-making, such as by reducing incentives for water utilities to improve efficiency or make investment decisions in the long-term interests of water users and bill payers.

In 2021 the Commission provided renewal advice, including a clear outline of the objective or rationale of a CSO in a renewed NWI, followed by consideration of how that CSO is funded for utilities to provide services in otherwise unviable locations (PC 2021b, p. 175, Renewal advice 12.4). In 2024, the Commission reiterates this advice that CSOs should be designed to ensure affordable access to a basic level of service, in areas where such service provision would not otherwise exist. In the pursuit of sustainable funding and efficient service delivery, CSOs should include operational subsidies that allow the utility to achieve and maintain lower bound cost recovery, subject to:

- there being no other more cost-effective means to supply a basic level of service (such as self-supply)
- the utility charging a price considered to be affordable.

This renewal advice is supported by inquiry participants such as the NSW Irrigators' Council (sub. 88, p. 29). The Commission advised in its 2021 report that, where concerns about the affordability of water services relate specifically to concerns for vulnerable community members rather than the costs of provision overall, these should continue to be addressed through separate policy tools, such as concessional rebates provided by governments for certain groups, including pensioners (PC 2021d, p. 32).

Box 6.4 – Updated NPR indicators should improve information about pricing and service outcomes

In the 2017 inquiry, the Commission noted that the primary metric used by the NPR for measuring cost recovery among urban water service providers – the ERRR – was not consistent with the *NWI Pricing Principles* (PC 2017, p. 393).

Since then, a review of the NPR has resulted in revised indicators that have a stronger focus on the asset base of the water service provider. For example, new indicators include the Return on Assets and

Box 6.4 – Updated NPR indicators should improve information about pricing and service outcomes

Return on Equity, and there is new treatment of developer charges and contributed assets in the calculation of revenue and capital expenditure (BOM 2023c, pp. 83, 84, 65). These changes should provide a more accurate picture of the proportion of investment in assets incurred by service providers and better demonstrate cost-reflective pricing for water users.

The review also considered expanding national reporting requirements to smaller utilities to increase transparency and benchmarking. As agreed with the NPR Technical Reference Group, service providers with under 10,000 connections will be required to report to a subset of indicators from 2024-25 (BOM 2023c, p. 2). Expanding the subset will be considered in coming years and annual memos will clarify reporting requirements for providers with fewer than 10,000 connections (BOM 2023c, p. 2).

Rural water: government owned

Rural water services owned by governments includes all services regardless of whether they are subject to economic regulation as there are only a small number of large providers in this category.

For the purposes of this assessment, 'rural water' refers to water provided mainly for irrigated agriculture, which is delivered via a mix of bulk water services¹¹ and distribution services¹² operated by government corporations and private providers (often member corporations or trusts).

The absence of dedicated water services for irrigated agriculture in the Northern Territory and the Australian Capital Territory for the period 2021–2024, means those jurisdictions have not been included in this assessment.

Previous findings (2021)

The Commission (2021a, p. 95) previously noted that New South Wales and Victoria have largely achieved full cost recovery. However, the transition to full cost recovery in Queensland has slowed and is at risk of backsliding. In Western Australia, the last pricing inquiry conducted by the WA ERA in 2017 estimated that irrigation customers contribute less than 30% towards the estimated efficient cost of supply. Additionally, there is a need for more transparent information regarding prices and costs for irrigation services in Tasmania and South Australia to assess whether actual revenues are sufficient to fund efficient maintenance of assets.

Assessment (2024)

Most jurisdictions have not changed their approach to the pricing of bulk water services since the Commission's 2021 assessment.

¹¹ Bulk water services entail the harvesting and storage of water using infrastructure (such as dams), and the transport of that water to users (primarily through natural watercourses) often over large distances. Bulk water infrastructure and service providers are owned by state governments.

¹² Distribution water services transport water via a network of pipes and/or channels to properties located away from a natural watercourse or bulk water extraction point. Depending on the jurisdiction, distribution infrastructure is owned by government and/or irrigators.

In Queensland, water prices recommended by the QCA, were previously implemented by the Queensland Government, but this practice has been wound back since 2021. The Queensland Government has required Seqwater and Sunwater to provide a 15% discount to all irrigators (and an additional 35% discount for irrigation of horticulture crops) on the prices recommended by the QCA (Qld DRDMW 2021). The Commission understands that the Queensland Government considers these arrangements to be NWI compliant through the provision of CSOs by Seqwater and Sunwater, originally designed as COVID-19 relief measures.

While government payments in the form of a community service obligation are justified under the NWI in some circumstances, these particular payments do not meet the suggested criteria. Specifically, the provision of irrigation water by Seqwater and Sunwater are not ‘small community services that will never be economically viable but need to be maintained to meet social and public health obligations’ (paragraph 66.v of the NWI).

Rural water: User owned

User-owned irrigation distribution networks are not subject to formal regulation. They tend to have sufficient incentives to set prices that include the associated costs to maintain the infrastructure network (ACCC 2016, p. 42). For this reason, the Commission has not directly considered the pricing outcomes in its assessment of progress for New South Wales, South Australia and Western Australia, where distribution networks are user-owned.

These networks have a degree of market power and could theoretically engage in discriminatory pricing behaviour. In the Murray–Darling Basin, however, regulation is in place to limit the abuse of market power via water charges rules (PC 2017, p. 258). The Commission has not been made aware of concerns about privately-owned irrigation networks exercising market power in the course of this inquiry.

Rural water: cross jurisdictional

Cross-jurisdictional government-owned rural water providers include River Murray operations and the Border Rivers Commission.

Previous findings (2021)

In its 2021 inquiry, the Commission (2021a, p. 98) noted that more transparency is needed about which costs are passed through to irrigators, and how costs are passed on, particularly in Queensland and South Australia.

Coordination between jurisdictional regulators is important to support the consistent pass through of costs to entitlement holders regardless of where those entitlements are held. Existing state-based regulators have the expertise to scrutinise pass-through costs from cross-jurisdictional providers and provide some indirect scrutiny through existing price setting processes in New South Wales and Victoria.

Assessment (2024)

The Commission maintains the view that jurisdictions have partially achieved the relevant NWI outcomes. Existing economic regulators are well placed to ensure that only efficient costs are passed through to water users.

6.2 Investment in new or refurbished infrastructure

Summary of actions under NWI

Jurisdictions agreed under the NWI that investment in new or refurbished water infrastructure would only proceed where assessed as economically viable and ecologically sustainable prior to the investment occurring. The NWI did not prescribe any additional actions to support the delivery of these outcomes.

Urban infrastructure

The Commission has considered a range of institutional elements that can support investment in economically viable and ecologically sustainable urban water infrastructure. These include:

- governance arrangements that promote robust decision making by service providers
- clear institutional responsibilities around investment planning processes
- rigorous independent review of investment decisions to ensure economic viability, including in cases of government investment
- independent assessments to ensure ecological sustainability (including environmental impact assessments)
- government subsidy programs that do not distort investment decisions.

Previous findings (2021)

The Commission's assessment in 2021 was that this requirement of the NWI was partially achieved. Although some jurisdictions had improved their decision-making frameworks, a small number of major projects appeared to be inconsistent with the NWI and the majority of the projects were not being subjected to independent economic scrutiny.

Developments since 2021

Since 2021, the Australian Government and the state and territory governments have allocated funds to several major urban infrastructure projects (table 6.2) that have not been assessed for economic viability through a comprehensive benefit-cost analysis (finding 6.2).

Table 6.2 – Major urban infrastructure projects since 2021

Project name and jurisdiction	Government funding and contribution	Benefit-cost analysis undertaken and publicly available	Subject to independent scrutiny
Dingley recycled water scheme (Vic)	Vic Gov (\$24.829 million). South East Water Corporation (\$47.171 million).	Yes, but not publicly available. Benefit cost ratio (BCR): 2.2.	No.
Muddy gates storm water harvesting schemes (Vic)	Vic Gov (\$1.4 million). Melbourne Water (\$25.8 million). City of Casey (\$2.925 million).	No. However, a cost analysis comparing alternative options was undertaken.	No.

Project name and jurisdiction	Government funding and contribution	Benefit-cost analysis undertaken and publicly available	Subject to independent scrutiny
	Developers (\$2.06 million).		
Blind Creek at Lewis Part Neutralisation & Storm Water Harvesting Scheme (Vic)	Vic Gov (\$2.5 million). Melbourne Water (\$11.999 million). Knox City Council (\$3.48 million).	Yes, but not publicly available. BCR: 1.17.	Project was included in allocation scrutinised under the pricing submission with the Victorian Essential Services Commission.
Fitzroy to Gladstone Pipeline (Qld)	Qld Gov (\$550 million). Aus Gov (\$433 million).	Yes, redacted version of detailed assessment is in the process of being released. BCR: 1.85.	QCA investigated regulatory cost recovery arrangements that could apply to the project in Nov 2022.
Toowoomba to Warwick pipeline (Qld)	Qld Gov (\$325.9 million).	Yes, but not publicly available. BCR: 0.31.	No.
Cairns Water Security program – Stage 1 (Qld)	Aus Gov (\$107.5 million). Qld Gov (\$107.5 million) (May increase to \$472 million).	Yes, not publicly available.	Infrastructure Australia
Mount Morgan Water Supply Project (Qld)	Aus Gov (\$30 million). Qld Gov (\$40.4 million). Other partners (\$17.8 million).	Yes, not publicly available.	No.
Parkes Shire Council – Parkes Peak Hill Water Supply Scheme (NSW)	Total cost (\$65 million). NSW (\$22 million with a further \$20 million under consideration). Aus Gov (\$11 million). Parkes Shire Council (\$8.7 million).	Yes, but not publicly available. BCR of 8.8 (4% discount rate) 6.3 (7% discount rate) and 4.7 (10% discount rate).	No.
Dubbo Regional Council – Groundwater infrastructure (NSW)	NSW Gov (\$30 million).	No. Have conducted a Triple Bottom Line Assessment. Report unpublished.	No.

Project name and jurisdiction	Government funding and contribution	Benefit-cost analysis undertaken and publicly available	Subject to independent scrutiny
Lachlan Shire Council - Condobolin Water Security (NSW)	NSW Gov (\$20 million).	No. A financial appraisal was undertaken.	No.
Bathurst Water Harvesting and Winburndale pipeline (NSW)	NSW Gov (\$20 million).	No.	No.
Alkimos Seawater Desalination Plant (WA)	WA Gov (\$2.8 billion).	No.	Infrastructure WA reviewed the proposal and provided advice. A summary of this advice was published.
Katherine PFAS water treatment plan (NT – remote)	Aus Gov (\$27 million).	No. Emergency response to maintain basic level of service.	No.
Laramba water quality upgrade (NT – remote)	NT Gov (\$7 million).	No.	No.
Remote sites – disinfection upgrades (NT – remote)	NT Gov (\$8.6 million).	No.	No.
Darwin Region Water Supply Infrastructure Program Stage 1 (NT)	NWGA (\$300.6 million). NT Gov (\$27 million).	Yes. BCR: 1.0 (discounted at 7%).	No.
Yulara Water Supply Project (NT)	NWGA (\$13.2 million). NT Power and Water Corporation (\$5 million).	No.	No.

Source: States and territories (personal communications); Infrastructure WA (2023). Each jurisdiction was requested to identify the largest (by total capital expenditure) three urban and three rural infrastructure projects that have occurred since the Commission's last review of the NWI. Some jurisdictions took different approaches to providing detail about projects, and this is reflected in the table.

Assessment (2024)

From jurisdictions' responses to information requests, the Commission understands that there is no publicly available benefit-cost analysis for the Muddy Gates Storm Water Harvesting Scheme in Victoria, and the Bathurst Water Harvesting and Winburndale pipeline project in New South Wales (table 6.2). Additionally other projects that have been subject to a benefit-cost analysis have been approved where economic viability has not been demonstrated (a benefit-cost ratio of less than 1).

The business cases of major water projects have also largely not been independently reviewed to determine whether the analyses were rigorous (or otherwise). The Commission notes that qualified third-party organisations exist in most states and territories to review proposals and provide scrutiny. For example,

Infrastructure Western Australia assesses economic viability and ecological sustainability of major infrastructure proposals in Western Australia and publish a summary report of their findings prior to project approval to enhance transparency. However, not all state governments subject infrastructure proposals to independent scrutiny before funding them.

While projects may be economically viable without undergoing independent scrutiny, the lack of transparency makes an assessment of project costs and benefits impossible and is inconsistent with the intent of the NWI (and good governance more generally).

Governments should recommit to good governance on infrastructure decision making, including robust and transparent decision-making processes, consistent with the Commission's renewal advice (14.1 – 14.2).

Rural infrastructure

In 2021, the Commission considered the following criteria in assessing whether government funding or financing of rural water infrastructure complies with the NWI:

- commitment to full cost recovery from users, with any government grants or subsidies transparently reported and limited to the extent of public benefits provided by a project
- economic viability demonstrated through benefit-cost analysis (with a robust benefit– cost ratio greater than one), with the analysis published to allow assumptions to be scrutinised
- NWI planning and entitlements frameworks in place prior to the project being constructed, and NWI compliance a condition of government funding.

Previous findings (2021)

The Commission previously noted its concerns about government funding for projects that are not economically viable, and about the quality of business cases for major rural water infrastructure more generally (2021a, p. 110). Also highlighted was the risk of major developments funded by governments being underutilised, not providing net benefits to the Australian community, and ultimately imposing a range of long-term costs on water users, communities, and taxpayers.

The Commission in 2017 noted concerns about the quality and transparency of project assessment processes in assuring ecological sustainability and economic viability (PC 2021a, p. 108).

The Commission advised that this NWI commitment had only been partially achieved and had been backsliding since its previous assessment in 2017 (PC 2021a, p. 110).

Developments since 2021

Since 2021, both Australian and state governments have continued to fund irrigation infrastructure projects that have large private benefits, but many without publicly available cost-benefit analyses detailing the distribution of costs and benefits, potentially distorting trade and investment decisions (table 6.3).

Table 6.3 – Rural irrigation infrastructure projects since 2021

Project name and jurisdiction	Government funding and contribution	Benefit-cost analysis undertaken and published	Subject to independent scrutiny
Scottsdale Irrigation Scheme (Tas)	Aus Gov (\$25.3 million). Tas Gov (\$32 million).	Yes, not publicly available. BCR: 1.3.	No.
Don Irrigation Scheme (Tas)	Aus Gov (\$54.4 million). Tas Gov (equity).	Yes, not publicly available. BCR: 2.6.	No.
Greater Meander Irrigation Scheme Augmentation (Tas)	Aus Gov (\$12.2 million).	Yes, not publicly available. BCR: 1.1.	No.
GMW water efficiency project (Vic)	Aus Gov (\$177.5 million).	No. However, an assessment of the project's value for money and socio-economic impact was undertaken.	No.
Western Irrigation Network (Vic)	Greater Western Water (\$68.23 million). Aus Gov (\$48.07 million).	Yes, not publicly available. BCR: 1.42.	No.
East Grampians Rural Water Supply Project (Vic)	Vic Government (\$32 million). Aus Gov (\$32 million). Grampians Wimmera Mallee Water (\$21.2 million).	Yes, not publicly available. BCR: 2.2.	No.
Murrumbidgee Irrigation Automation Finalisation project (NSW)	Aus Gov (\$126.48 million).	No. However, an economic effects study was completed, based on BCA principles.	No.
Nap Nap Station Water Efficiency Program (note: this is a rural project but is Stock & Domestic, not Irrigation) (NSW)	Aus Gov (\$2.39 million).	No. Economic analysis was completed, assessment process considers cost-effectiveness.	No.
South Australia connections package (comprising 10 projects) (SA)	Total cost (\$63.4 million). SA Gov (\$0.7 million). Aus Gov (\$14.069 million).	No, Projects evaluated against NWGA eligibility criteria and a high level assessment of project benefits undertaken.	No.
Rookwood Weir (Qld)	Total cost (\$568.9 million). Aus Gov (\$183.6 million). Qld Gov (\$183.6 million). Remaining funded by Sunwater.	Yes, publicly available. BCR: Between 0.3 and 1.6.	No.
Paradise Dam improvement Project (Qld)	Aus Gov (\$600 million). Qld Gov (\$600 million).	Yes, currently being undertaken.	Infrastructure Australia.

Project name and jurisdiction	Government funding and contribution	Benefit-cost analysis undertaken and published	Subject to independent scrutiny
Northern Midlands irrigation Scheme (Tas)	Aus Gov (\$108.9 million). Tas Gov (\$72.2 million). Other partners (\$36.7 million).	Yes, not publicly available.	Infrastructure Australia.

Source: State and territories, (pers. comm.). Each jurisdiction was requested to identify the largest (by total capital expenditure) three urban and three rural infrastructure projects that have occurred since the Commission's last review of the NWI. Some jurisdictions took different approaches to providing detail about projects, and this is reflected in the table.

Assessment (2024)

The Commission remains concerned about the quality and transparency of project assessment processes in assuring ecological sustainability and economic viability of rural water infrastructure projects.

In response to requests for information about major government-funded rural water projects, governments indicated that they (or the relevant water utility) had assessed these projects as providing net benefits. However, the underpinning analyses were not published (often citing commercial-in-confidence restrictions) and were unavailable for public feedback or scrutiny.

The Australian Government established the National Water Grid Authority (NWGA) in October 2019. The NWGA is responsible for coordinating the Australian Government's \$3.5 billion National Water Grid Fund, a rolling ten-year water infrastructure program focused on improving water access and security. Since 2022, the fund has had three strategic objectives, focused on providing safe and reliable water for regional and remote communities, generating public benefit through responsible investment in water infrastructure for productive use and building resilient water infrastructure that is environmentally sustainable and culturally responsive (Australian Government 2022, p. 5).

The Australian Government *National Water Grid Investment Framework* was updated in October 2022. The framework's investment principles include:

- projects should be of demonstrable public benefit and have a national interest element
- there must be strong state or territory government support, including funding contributions and involvement of other parties where appropriate
- the investment should provide the highest net benefit of all options available, taking into account economic, social and environmental impacts
- projects should address circumstances that cannot be effectively addressed by proponents, states and territories or other stakeholders alone
- projects should align with the NWI principles including appropriate cost recovery and transparent subsidies
- project development must include engagement with the First Nations communities of potentially affected areas, to comprehensively identify and manage impacts on cultural heritage
- a consistent, robust analysis of costs and benefits should be used and an assessment of appropriate funding and financing arrangements undertaken
- projects should include early Australian Government involvement in project identification and development (Australian Government 2022, p. 6).

These principles are clear, and broadly consistent with the factors set out in the Commission's renewal advice 14.2 on infrastructure development, including alignment with cost recovery pricing, demonstrable public benefit, benefit-cost analyses and engagement with First Nations communities. Where funded infrastructure projects do not meet these broad outcomes, such projects are likely to be inconsistent with the NWI's user-pays principle. Like other industry assistance, such subsidies may distort investment decisions

and impose costs on the broader community by diverting water resources to less productive uses and reduce incentives to improve efficiency.

However, the relative importance of each criterion, and the way in which they are weighted in arriving at decisions, is not transparently explained.

Additionally, the NWGA framework adopts a broad perspective of what constitutes public benefits, to include benefits not generally included in economic analyses, such as secondary impacts like job creation or regional development (Australian Government 2022, p. 10).¹³

Further, providing subsidies for infrastructure projects can create a risk that other, more cost-effective means to enable regional economic growth or to improve water security are not considered. As noted by Australian Academy of Technological Sciences and Engineering:

[t]he current practice of Commonwealth grants for specific projects creates perverse incentives for states to undertake projects that attract grants even if they may be less economically favourable overall. (sub. 5, p. 2)

The Commission maintains the view that government commissioning of new irrigation infrastructure requires improvement in rigour and transparency of assessment, in all jurisdictions (finding 6.2). Overall, this assessment reaffirms the Commission's renewal advice (14.1 – 14.2), highlighting the importance of investments being assessed as economically viable and ecologically sustainable, with decisions informed by comprehensive cost benefit analyses and independent scrutiny. Other participants in the inquiry have also supported this advice, including the ACCC (sub. 11, p. 2), the Central Land Council (sub. 44, attachment 1, pp. 28-29), National Farmers' Federation (sub. 32, attachment 1, p. 14), and the New South Wales Irrigators' Council (sub. 88, p. 31).

6.3 Cost recovery for water planning and management activities

Summary of actions under the NWI

An intended outcome of the NWI is to promote economically efficient and sustainable use of government resources devoted to the management of water.¹⁴ To support achievement of this outcome, the NWI requires jurisdictions to:

- bring into effect consistent approaches to pricing, and attribute costs of water planning and management, including those underpinning water markets and that can be reasonably attributed to water access entitlement holders
- report publicly on cost recovery for water planning and management as part of annual reporting requirements.¹⁵

¹³ Care must be taken when selecting infrastructure projects based on secondary impacts because flow-on economic impacts may represent a transfer between parts of the community (for example, between two geographic regions) rather than an overall net benefit. Predictions of secondary benefits tend to yield results with wide margins of error and that double-count primary and secondary benefits. The Australian Transport Assessment and Planning Guidelines recommends that benefits and costs are measured directly, as close to their source as possible (ATAP 2022, p. 13).

¹⁴ NWI paragraph 64 i) c).

¹⁵ NWI paragraphs 67-68.

Assessment framework and previous findings (2021)

The 2010 *NWI Pricing Principles* set out how water planning and management costs are to be attributed (NRMMC 2010). Those principles specify what constitutes a water planning and management activity and outlined principles for: determining the cost-effectiveness of those activities; the allocation and differentiation of costs by region and/or water source; and the treatment of community service obligations.

In 2021 the Commission found that jurisdictions had only partially achieved cost recovery for water planning and management activities, although some jurisdictions had widened the scope of cost recovery.

New South Wales had largely met the compliance requirements. The Commission highlighted the scope to improve arrangements in Queensland, where total planning and management costs were only partially recovered, and the Northern Territory, where there was little to no reporting. The Commission noted that Western Australia had introduced water license fees with a view to implementing a user pays approach to fee setting.

The Commission noted that broad-based levies for cost recovery used in Victoria, South Australia and the Australian Capital Territory are administratively simple, but economically inefficient because they:

- impose less discipline on governments to discern between the costs incurred for water planning and management activities and costs incurred in delivering other policy goals (including those that should instead be funded by governments)
- create cross subsidies (and inequitable outcomes) when levies are set based on the funding requirements across a jurisdiction (or region) rather than the planning and management needs of particular water sources (PC 2021a, p. 113).

Assessment (2024)

No significant changes have been observed since the Commission's assessment in 2021. The Commission's view remains unchanged – this requirement is partially achieved, with scope for improvement in Queensland, Tasmania, Western Australia and the Northern Territory in terms of reporting the extent to which fees and charges cover water planning and management costs. Scope for improvement also remains to implement a more precise cost recovery system, replacing the current broad-based levies in the Australian Capital Territory and Victoria.

6.4 Environmental externalities of water use

Summary of actions under the NWI

Under the NWI jurisdictions agreed to:

- continue to manage environmental externalities through a range of regulatory measures (such as through setting extraction limits in water management plans and by specifying the conditions for the use of water in water use licences)
- continue to examine the feasibility of using market-based mechanisms in managing both positive and negative environmental externalities associated with water use
- implement pricing that includes externalities where found to be feasible.¹⁶

¹⁶ NWI paragraph 73.

Assessment framework and previous findings (2021)

The assessment of the management of environmental externalities is based on the regulatory measures and charges imposed by jurisdictions.

As the Commission noted in 2021 (2021a, p. 114), management of environmental externalities of water use under the NWI – largely through the imposition of extraction limits and conditions on water licences, including in approvals required under environmental laws – had been achieved when previously assessed.

That said, the Commission noted that levies applied by the Australian Capital Territory, Victoria and South Australia are not well-suited to address specific negative externalities (as they do not facilitate the application of the impactor or polluter pay principle¹⁷). However, they can still raise revenue to address the environmental impacts of water use through other means.

Assessment (2024)

This Commission remains of the view set out in its 2021 assessment that this requirement has largely been achieved, with no significant changes observed or reported since 2021.

6.5 Release of unallocated water

Summary of actions under the NWI

An intended outcome of the NWI is to provide appropriate mechanisms for the release of unallocated water.¹⁸ The NWI provided jurisdictions with the freedom to choose how to release unallocated water, within the context of encouraging sustainable and efficient water use.

Jurisdictions agreed that:

- where a release is justified, it should occur only where alternative ways of meeting water demands, such as through water trading, making use of the unused parts of existing entitlements or by increasing water use efficiency, have been fully explored
- releases should occur through market-based mechanisms (to the extent practicable).¹⁹

Assessment framework and previous findings (2021)

The assessment of the release of unallocated water is based upon the planning systems and market-based mechanisms that are in place in a jurisdiction for the release of unallocated water.

In 2021 the Commission concluded that all jurisdictions use water plans and water resource assessments to inform decisions on the release of unallocated water, while most also use (or legally can use) market mechanisms or a price on entitlements in their release of unallocated water (2021a, p. 119). Western Australia and the Northern Territory are the only jurisdictions not using market-based mechanisms to release unallocated water. However, the NWI recognises that use of market mechanisms may not always be practicable. In summary this NWI requirement has largely been achieved.

¹⁷ Under the impactor pays approach the people whose actions affect the environment are required to pay the cost of activities that ameliorate or prevent environmental damage.

¹⁸ NWI paragraph 64 vi).

¹⁹ NWI paragraphs 70-72.

Assessment (2024)

The release of unallocated water in all jurisdictions is informed by our assessment of the relevant jurisdiction's resource assessments and water plans. The Commission understands that NWI commitments in this area continue to be met by most jurisdictions.

6.6 Separation of water management from service delivery

Summary of actions under the NWI

Under the NWI, jurisdictions agreed that, so far as possible, the roles of water resource management, standard setting and regulatory enforcement and service provision would continue to be separated institutionally.²⁰ This reflected earlier commitments under the 1994 Council of Australian Governments framework and the 1995 National Competition Policy (PC 2017, p. 61).

Assessment framework and previous findings (2021)

The assessment of the separation of functions is based on a consideration of the roles and responsibilities of relevant government agencies in each jurisdiction.

In its previous reports, the Commission noted that the agreed separation of service delivery from government was largely completed across all jurisdictions by 2011 (NWC 2011a), and the National Water Commission (NWC) did not assess progress again in 2014.

Assessment (2024)

The Commission is only aware of one relevant reform in this area since 2021 (in the Australian Capital Territory) and has not further assessed progress in this inquiry.

The Australian Capital Territory has recently rearranged functions between the Director-General of the Environment, Planning and Sustainable Development Directorate and the Environmental Protection Authority, with the establishment of a new Office of Water within the Directorate.

The *Water Resources Amendment Act 2023* (ACT) made amendments to the *Water Resources Act 2007* (ACT) so that the Director-General became responsible for water policy functions, while the Environmental Protection Authority retained responsibility for regulatory functions (ACT Government 2023). These changes in administrative arrangements appear to strengthen the separation between regulatory enforcement and water management policy in the Australian Capital Territory, in a manner consistent with this element of the NWI.

6.7 Performance benchmarking

Summary of actions under the NWI

The NWI requires state and territory governments to report independently, publicly and on an annual basis, benchmarking of pricing and service quality for metropolitan, non-metropolitan and rural water delivery

²⁰ NWI paragraph 74.

agencies.²¹ Jurisdictions agreed to develop a nationally-consistent framework by 2005, with costs of operating the performance and benchmarking systems to be met through recovery of water management costs by jurisdictions.²²

Assessment framework and previous findings (2021)

The Commission's assessment of performance benchmarking has been based on the national reports prepared by the NWC (prior to 2015) and the Bureau of Meteorology (BOM) (since 2015).

In 2021, the Commission (2021a, pp. 120–121) observed that the urban NPR had been published by BOM annually. The Commission further noted that the NPR framework had been subject to a review and a number of recommendations had been made to the Australian Government to improve the NPR framework.

Assessment (2024)

As the Commission noted in 2021, the NPR serves an important role in improving the transparency and accountability of urban water service providers, and in enabling assessment of jurisdictional commitments under the NWI.

The Commission notes that the NPR is currently being amended, and will require additional reporting for water service providers that have fewer than 10,000 metered connections, including information on financial performance and water quality (chapter 9).

6.8 Findings



Finding 6.1

Some governments have moved away from NWI commitments to deliver cost-reflective and consumption-based pricing

Some jurisdictions have maintained or strengthened pricing regulation to focus on the long-term interests of end users, such as the Victorian Essential Services Commission's application of the PREMO water pricing framework (performance, risk, engagement, management, outcomes) and the New South Wales Independent Pricing and Regulatory Tribunal adopting a 3C's approach (customers, costs, credibility).

In some other jurisdictions, NWI pricing arrangements have been significantly eroded or remain well short of best practice. Jurisdictions that lacked independent economic regulation in 2021 have not taken steps to improve water pricing regulation. Further, a number of jurisdictions have weakened independent regulation through:

- applying discounts or price caps to independently determined consumption-based prices
- issuing ministerial directions that affect the decision-making processes of independent regulators
- not using water price monitoring or review powers to determine if greater price regulation is needed.

²¹ NWI paragraph 75.

²² NWI paragraphs 75-76.



Finding 6.2

Some government decision making for major water infrastructure is not fully compliant with the NWI

The NWI requires governments to be satisfied that infrastructure investments are economically viable and ecologically sustainable. To be consistent with these principles, investments should be rigorously assessed, comparing all options available to meet identified needs. Ideally, this would also involve a transparent, independent assessment of proposals.

This is currently not being achieved by all parties to the NWI, and the commitment to these principles appears to be waning.

- A significant proportion of major infrastructure developments funded by governments since 2021 have not been subjected to a transparent assessment of the costs and benefits of the proposal, or to independent scrutiny of business cases.
- Further, a number of successfully funded investment projects – including those funded under the Australian Government’s National Water Grid program – were funded even where the assessed costs of the project outweighed the estimated benefits to the community.

7. Integrated management of water for environmental and other public benefit outcomes

The National Water Initiative (NWI) recognises that water is needed to provide for uses that are not strictly consumptive. It also ensures that environmental and other public benefit outcomes (defined in schedule B to the NWI) associated with water, such as the cultural values of First Nations peoples and recreational opportunities, are accounted for and integrated within planning frameworks.

Jurisdictions agreed to identify the outcomes from the use of environmental water and other public benefits and to develop and implement appropriate, effective and efficient management practices and institutional arrangements to achieve them.

Specifically, this chapter considers progress in achieving the outcomes and objectives under element four of the NWI:¹











... to identify within water resource planning frameworks the environmental and other public benefit outcomes sought for water systems and to develop and implement management practices and institutional arrangements that will achieve those outcomes by:





- i. identifying the desired environmental and other public benefit outcomes with as much specificity as possible (section 7.1);
- ii. establishing and equipping accountable environmental water managers with the necessary authority and resources to provide sufficient water at the right times and places to achieve the environmental and other public benefit outcomes, including across State/Territory boundaries where relevant (section 7.2); and
- iii. optimising the cost effectiveness of measures to provide water for these outcomes (section 7.3).

A summary of the Productivity Commission's assessment framework (appendix B) – which does not necessarily map perfectly against the action items – and progress against them is in table 7.1. The notes to the table indicate which assessment items relate to which NWI actions and outcomes.

¹ NWI paragraph 78.

Table 7.1 – Assessment summary: Integrated management of water for environmental and other public benefit outcomes

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Identification of specific environmental and public benefit outcomes (section 7.1)			
Well defined environmental and other public benefit outcomes^c	Partially achieved 	Partially achieved 	Environmental outcomes are increasingly being specified, but outside the Murray–Darling Basin there are still significant gaps. Other non-environmental public benefit outcomes remain undefined in water plans or defined only at a high level. Some jurisdictions have defined them in state and regional level plans but clear specification of the outcomes and linkages to water management is missing.
Management and institutional arrangements (section 7.2)			
Environmental water managers with accountability^d	Largely achieved 	Largely achieved 	As in 2021, not all environmental water managers are as accountable as they could be. Gaps remain (mostly outside of the Murray–Darling Basin) in reporting achievement of environmental outcomes from using environmental water. More jurisdictions are moving to state and territory wide and regional water strategies which involve annual reporting against commitments.
Joint arrangements for shared resources^e	Achieved 	Achieved 	Several joint arrangement frameworks have been reviewed or revised, including for the Great Artesian Basin, Lake Eyre Basin and the Border Groundwater Agreement between South Australian and Victoria.
Common arrangements for connected surface water and groundwater systems^f	Largely achieved 	Largely achieved 	Jurisdictions continue to invest in understanding groundwater resources to increase effectiveness of water plans in managing risks to connected water systems.
Independent audit, review and reporting of environmental and other public benefit outcomes, and supporting management arrangements^g	Partially achieved 	Partially achieved 	There are limited examples of independent auditing or reviews of environmental water management decisions or outcomes since 2021. Although most jurisdictions report on the condition of their waterways at regular intervals through State of the Environment reporting (exceptions being the Northern Territory, Western Australia and Tasmania) through an agency or body separate to that with responsibility for overseeing water resource plans, the outcomes of environmental water delivery are not always explicitly assessed in these reports.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Environmental water holders able to trade ^h	Achieved 	Achieved 	There has been a small number of trades of environmental water since 2021.
Special requirements for high conservation value assets ⁱ	Achieved 	Achieved 	Ramsar wetlands and other high ecological value sites have been identified through planning and special arrangements made for their protection.
Water recovery for the environment (section 7.3)			
Water recovery options selected primarily on the basis of cost effectiveness ^j	Not assessed	Partially achieved	On the basis of the limited evidence available, jurisdictions are broadly following NWI-consistent processes, but there is scope for more transparency around how options are evaluated.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraph 78 i) **d.** NWI paragraph 79 i) a) **e.** NWI paragraph 79 i) b) **f.** NWI paragraph 79 i) c) **g.** NWI paragraph 79 i) d) **h.** NWI paragraph 79 i) e) **i.** NWI paragraph 79 i) f) **j.** NWI paragraph 79 ii).

7.1 Identification of specific environmental and public benefit outcomes

Summary of actions under the NWI

The NWI parties agreed to identify the desired outcomes of water management for environmental and other public benefits with as much specificity as possible.² This specificity is required to design management arrangements to meet objectives, and to assess whether objectives are being achieved.

Public benefit outcomes are defined broadly in the NWI to include mitigating pollution, public health, Indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values.³

Previous findings (2021)

In 2021, the Commission found that environmental outcomes and benefits were being made more specific as water plans were reviewed and updated. New research and information contributed to greater scientific understanding of environmental benefits, and the impacts of climate change were being modelled and incorporated. The Commission also found that although more could be done, cultural benefits for First Nations peoples were being considered and identified in water plans (chapter 2 in this report provides an assessment of whether these outcomes are being specified in water plans).

² NWI paragraph 78 i).

³ NWI schedule B(i).

However, the Commission noted that despite progress in the identification of environmental and First Nations outcomes, there was little in the way of specification of other public benefit outcomes in water plans. It also found that the drought between 2017 and 2020 exposed weaknesses in setting and achieving environmental, cultural and other public benefit outcomes in some systems during extreme weather events. Extreme climatic conditions, significant levels of extraction and inadequate environmental management in some systems strained ecosystems and revealed instances where specification of environmental and other public benefit outcomes needed to be improved.

Assessment

There has been minimal change since 2021, with environmental outcomes generally well defined in water plans in the Murray-Darling Basin, but to a lesser extent elsewhere.

Other public benefits continue to be described at a high level with limited to no ongoing performance indicators defined for what success looks like. The Commission's NWI renewal advice 8.1 on best-practice environmental objectives and outcomes remains relevant (section 7.4).

While it is less important to specify detailed environmental outcomes for areas where available water has only a small proportion allocated for consumption, as development proceeds the importance increases. Further, climate change (including potentially rapid changes) could lead to a catchment becoming overallocated, threatening environmental objectives. It is therefore important for these environmental and other public outcomes to be specified in water plans so that they can be monitored and action taken if they are no longer being met.

Below are some examples of jurisdictions' progress, maintenance or backsliding under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

New South Wales

New South Wales has updated several water sharing plans (WSPs) since 2021. Environmental outcomes are not as well specified in some of these plans as previous versions. The New South Wales Natural Resource Commission has reviewed several WSPs since 2021 and has indicated that some plans have not included explicit environmental and public benefit outcomes (for example, the Castlereagh and Border Rivers water sharing plans (NSW NRC 2022a, p. 69, 2022b, p. 39)).

Moreover, draft replacement plans on public exhibition have had objectives that were present in previous versions removed. For example, the draft *Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2024* does not include environmental objectives for maintaining connectivity within and between water sources,⁴ as was specified in the 2020 version of the water sharing plan.⁵

While the draft *Water Sharing Plan for the Castlereagh Unregulated River Water Sources 2024* is no longer publicly available, consultation documents reflect concerns that:

The Plan vision, objectives and performance indicators have been simplified compared to the former water sharing plan. The targeted environmental objectives and performance indicators in the 2020 amended plan should remain in the replacement plan. (NSW DPE 2023k, p. 9)

⁴ Part 2, s. 9. Objectives of Plan.

⁵ *Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012* (current version for 1 July 2020), Part 2, s. 9 Environmental objectives.

In a number of 'summary of changes' fact sheets, it is indicated that more detailed vision, objectives, strategies and performance indicators will be included in the monitoring, evaluation and reporting plans in the background documents (NSW DPE 2022b, 2022j, 2023h, 2023j, 2023i). This has not been specified for the NSW Border Rivers Water Sharing Plan (NSW DPIE 2021c, p. 2).

New South Wales has also had 12 water resource plans (nine for groundwater resources) accredited under the Murray–Darling Basin Plan (the Basin Plan) since 2021 which specify environmental outcomes with respect to identified priority environmental assets and ecosystems. New South Wales has also provided more detail on public benefit outcomes through their regional and metropolitan water strategies (NSW DCCEEW 2024f; NSW DPE 2022d), however, these are not statutory documents and there are no legislative requirements for them to be implemented or for monitoring or assessment of their implementation.

Queensland

The *Water Act 2000* (Qld) requires the Queensland Minister for Water to consider climate change and cultural outcomes in making a water plan. New water plans since 2021 have included specific outcomes for social, economic, cultural and environmental values of water to be achieved by the plan.

The Queensland Department of Environment, Science and Innovation (Qld DESI) has established and updated environmental values (aquatic ecosystems) and water quality objectives to protect human use environmental values (recreation, irrigation) for surface and groundwater for Murray–Darling Basin and South East Queensland catchments (Qld DESI 2021b, 2021c). The *Barron Water Plan* was reviewed and replaced (Butcher 2023b) in 2023 and the *Mary Basin Water Plan* was replaced in 2024 (Qld DRDMW 2024d) to better define environmental objectives to support Great Barrier Reef outcomes and hydrological linkages to ecosystem needs.⁶

Tasmania

Since 2021, one water plan has been reviewed and updated: the *Great Forester River Catchment water management plan* (Tasmanian DPIPWE 2021a). Changes have been made to the objectives to be more specific and measurable and include changed rules around low flow thresholds. The *Draft Amended Mersey River Catchment Management Plan* now identifies water dependent values in the plan itself rather than in supporting material (NRE Tas 2023b, p. 4). Revisions to the Lake Sorell and Crescent water management plans will take a similar approach.

Northern Territory

The *Georgina Wiso water allocation plan* (WAP) specifies environmental outcome objectives in terms of 'understanding characteristics' and 'condition is monitored as far as practicable' in the WAP rather than what environmental outcomes the WAP is aiming to achieve (NT DEPWS 2023b, p. 8). The background report to the Georgina Wiso WAP (NT DEPWS 2023c), as part of the new format introduced in 2022, while providing information about the environmental characteristics and consumptive uses of the catchment, still does not specify the desired environmental or other public benefit outcomes the WAP is aiming to achieve. This is a lower level of detail than previous WAPs for other regions (for example, compared the Katherine Tindall WAP 2019 (NT DENR 2019a, p. 17)).

⁶ Water Plan (Barron) 2023 Subordinate Legislation 2023 No. 67 made under the *Water Act 2000* (Qld) and the Water Plan (Mary Basin) 2024: Subordinate Legislation 2024 No. 47 made under the *Water Act 2000* (Qld).

The Commission notes the context in which the Georgina Wiso WAP was developed in response to a recommendation of the *Scientific Inquiry into Hydraulic Fracturing in the Northern Territory*, and within the plan area there is currently no competition for resources (NT Government, sub. 72 attachment A, p. 7). However, the NWI requires that when a WAP is developed, regardless of the reason for doing so, that environmental and other public benefit outcomes should be clearly specified (NWI paragraph 78).

As noted above, development over the life of a WAP, combined with the uncertainties from climate change, make it important to specify these outcomes in as much detail as possible so they can be monitored and appropriate action taken as circumstances change. The Georgina Wiso implementation plan includes actions that aim to improve the understanding of the characteristics and environmental values of the water resources. These include improving understanding of recharge mechanisms and monitoring flow contributions through basins to rivers (NT DEPWS 2023b, p. 9). However, in the absence of clearly specified environmental and other public benefits in the Georgina Wiso WAP, participants in this inquiry expressed concerns that future licensing decisions may not take these benefits sufficiently into account, risking environmental outcomes (ECNT, sub. 54, p. 8; Sue Jackson and Erin O'Donnell, sub. 57 pp. 12-13).

The Central Land Council also expressed similar concerns about the draft Western Davenport WAP 2023–2033:

[t]he NT Government has substantively weakened the environmental protections from the previous plan:

- The 2018 Plan's environmental objective was to 'meet the environmental water requirements of water dependent ecosystems'. In contrast, the only objective regarding environmental values in the new Draft Plan now reads: 'Balancing the retention and preservation of key environmental values dependent on water with the overall benefits provided by the water resources'.
- The new Draft Plan now contains no specific protections for ecosystem health or groundwater dependent ecosystems. (sub. 44, p. 15)

Further, several submissions said that WAPs do not provide a secure basis for protection of environmental outcomes and other public benefits because they are not binding on decision makers (section 4.3, CLC, sub. 44, pp. 11–12; ECNT, sub. 54, p. 2; EDO, sub. 50, p. 12; NLC, sub. 38, p. 3). For example, in criticising the non-binding nature of WAPs, the Central Land Council said:

[w]ater allocation plans are the only process for identifying and providing for water requirements to sustain environmental and cultural assets in the NT ... The weakness of water plans ... means these key functions as per the NWI are not being carried out sufficiently (nor are they required to be) *before* extraction can occur. This puts environmental outcomes and cultural values at significant risk. (sub. 44, p. 13)

The Commission's assessment of water planning and the provision of water for environmental and other public benefits in the Northern Territory is provided in sections 4.2 and 4.3.

Other jurisdictions

Other jurisdictions have seen minor changes since 2021. The Victorian Government has updated the *Environmental Watering Management Plan Guidelines* in 2022 (Victorian DELWP 2022b, pp. 1–2) providing more guidance to specifying other public benefit outcomes where environmental watering may contribute to shared benefits. The Victorian Environmental Water Holder (VEWH) has improved specification of complementary outcomes by identifying cultural and recreational values (e.g. Aboriginal cultural values and uses, recreational activities such as water sports, bird-watching, angling and camping) in the 2020-21

seasonal watering plan with the expectation that the approach would be refined in the future (VEWH 2020, p. 26, 2023b, p. 15).

The WA Government has updated one water management plan, the *Gnangara groundwater allocation plan* (WA DWER 2022b) which saw improved specification of environmental outcomes.

South Australia amended the *Water Allocation Plan for the Far North Wells Prescribed Wells Area* (SA ALLB 2021) in 2021 to incorporate new information on groundwater connections that were not considered in previous plans.

The Australian Capital Territory (ACT) is currently reviewing its Water Strategy and Environmental Flow Guidelines and developing its Long-Term Watering Plan, all of which will inform how environmental outcomes are specified in water plans (ACT Government, personal communication).

7.2 Management and institutional arrangements

Summary of actions under the NWI

Parties to the NWI agreed to appoint environmental managers with the necessary authority and resources to achieve identified environmental and other public benefit outcomes.⁷ Governments were to develop effective and efficient management and institutional arrangements, including:⁸

- i. environmental water managers that are accountable for the management of environmental water provisions and the achievement of environmental and other public benefit outcomes
- ii. joint arrangements for any shared resources
- iii. common arrangements for interconnected surface water and groundwater systems
- iv. independent audit, review and public reporting on outcomes and the adequacy of management arrangements
- v. enabling environmental water managers to trade water on the temporary market
- vi. special requirements to sustain high conservation value environmental assets.

Previous findings (2021)

In 2021, the Commission found that all jurisdictions had appointed environmental water managers, and the managers generally reported their actions for environmental water management transparently. Joint arrangements in shared water systems such as the Great Artesian Basin and the Lake Eyre Basin had been established, and arrangements for integrating connected surface water and groundwater systems were largely achieved. It also noted that environmental water holders were able to trade their entitlements where appropriate to achieve environmental benefits, and that planning had identified high ecological value sites that require special arrangements.

However, the Commission noted some concerns about the accountability of the environmental water managers. While managers generally reported on activities and environmental flow volumes released, there were gaps in review and reporting on achievement of environmental outcomes. The Commission also had some concerns around institutional arrangements, including the potential for political interference and the efficacy of some environmental water trades. The Commission recommended that governments should make

⁷ NWI paragraph 78 ii).

⁸ NWI paragraph 79.

provisions for the regular and transparent independent auditing of environmental water outcomes and the management arrangements in place to support them, given a lack of any consistent basis for such review.

Assessment

7.2.1 Accountability for environmental water

Accountability of environmental water managers remains limited

Monitoring and public reporting on environmental and other public benefit outcomes associated with the management of water, as set out in water plans, is inconsistent in terms of the content and regularity of reporting. In some cases, it is also limited in scope to the use of held environmental water entitlements only, as is the case in the Murray–Darling Basin in annual reports produced by the Commonwealth Environmental Water Holder (CEWH), VEWH, and South Australia (CEWH 2023a; SA DEW 2022c; VEWH 2022).

This inconsistent reporting on outcomes across environmental water defined by rules (sometimes referred to as planned environmental water) compared to environmental held water entitlements (box 7.1), prevents, amongst other things, governments and environmental managers from being fully accountable to the communities they serve. For example, in New South Wales where environmental outcome reporting has been focused on environmental entitlements and environmental water allocations, the interim findings from the Connectivity Expert Panel stated:

[t]here is strong evidence that flows necessary to maintain the health of the rivers and critical ecosystem functions are not being met during non-dry times, when there is water available to meet these needs

and

[t]here is a lack of appropriate governance at the whole of Northern Basin system, inter-valley scale. This gap has led to a lack of an overall approach to managing connectivity and a lack of accountability for achieving connectivity objectives. (Dula et al. 2024, p. 21)

The Northern Land Council criticised this lack of accountability for planned environmental water:

it is paramount that the NWI provides a similar level of prescription to the decision-making and reporting of planned environmental water as it does to held environmental water. This is particularly important in instances where there is no environmental water holder and the only provision of environmental water is as planned water. (NLC, sub. 38 attachment, p. 24)

Furthermore, several inquiry participants said that the lack of outcomes reporting is a result of inadequate or insufficient monitoring with clear and appropriate indicators (ACT OCSE, sub. 3, pp. 2-3; ASSC, sub. 25, pp. 7, 15; Lachlan Valley Water Inc., sub. 21, p. 11) This is partly a result of a fragmented national monitoring and reporting landscape.

Box 7.1 – How is environmental water allocated and managed?

Environmental water provisions in water plans ensure that sufficient water is allocated and managed to ensure the ongoing environmental protection of rivers, waterways, floodplains, wetlands and the ecosystems they support. They provide for the needs of both surface water and groundwater-dependent ecosystems.

Planned environmental water

In most jurisdictions, environmental outcomes are achieved through planned environmental water. Water plans generally set allocation limits for consumptive users to ensure sufficient water is ‘left behind’ to meet environmental outcomes (PC 2021b, p. 100).

The allocation limits on consumptive users are enforced by water managers using rules, including cease to pump rules, flow sharing arrangements^a, passing flow releases from water storages^b and groundwater access rules, all of which are designed to ensure environmental flows remain at sufficient levels to achieve environmental benefits.

Held environmental water

In the Murray–Darling Basin and some other parts of Victoria, planned environmental water is supplemented with specific entitlements for the environment. These entitlements are managed by government environmental water managers, and may be physically held in dams or other water storages. In these cases, environmental water holders and managers must make decisions on where and when to use and release water to achieve environmental outcomes. As an allocation, held environmental water can be traded and carried over to keep for use in subsequent years (PC 2021b, pp. 100–101).

Responsibility for environmental water

Jurisdictions have established entities with responsibility for defining and enforcing planned environmental water provisions. The Commonwealth, New South Wales, Victoria and South Australia also have bodies responsible for actively managing held water entitlements. These bodies determine when and how environmental water is released and traded.

As the Commission found in 2021, the management of held environmental water, including decisions on how to use and trade it, should be made at arm’s length from ministers and departments with policy responsibility for water allocation and planning, to avoid potential conflicts of interest or political interference (PC 2021b, pp. 117–118).

The below table outlines which government entities are responsible for environmental water. Where ‘not applicable’ is indicated, it is because the jurisdiction does not have held environmental water to manage.

Responsibility for environmental water

Jurisdiction	Planned environmental water	Held environmental water
Australian Government	Murray–Darling Basin Authority	Commonwealth Environmental Water Holder ^c Murray–Darling Basin Authority (The Living Murray)
New South Wales	Department of Climate Change, Energy, Environment and Water – Water Group ^d	Department of Climate Change, Energy, Environment and Water – Environment and Heritage Group

Box 7.1 – How is environmental water allocated and managed?

Victoria	Department of Energy, Environment and Climate Action ^e	Victorian Environmental Water Holder ^f
South Australia	Department for Environment and Water	Department for Environment and Water
Queensland	Department of Regional Development, Manufacturing and Water	Not applicable
Western Australia	Department of Water and Environmental Regulation	Not applicable
Tasmania	Department of Natural Resources and Environment ^g	Not applicable
Northern Territory	Department of Environment, Parks and Water Security	Not applicable
Australian Capital Territory	Environment, Planning and Sustainable Development Directorate	Not applicable

a. Arrangements whereby water in a connected system is shared between jurisdictions, so that each may only take a percentage of the flow from each dam for the consumptive pool. **b.** Water that is released from storages (such as reservoirs) to operate river and water distribution systems. **c.** Operates as a statutory office holder within a division of the Australian Government Department of Climate Change, Energy, the Environment and Water. **d.** On 1 January 2024 the former NSW Department for Planning and Environment was split into the Department for Climate Change, Energy, Environment and Water; and the Department of Planning, Housing and Infrastructure. **e.** On 1 January 2023 the former Victorian Department for Environment, Land, Water and Planning was renamed to the Department of Energy, Environment and Climate Action after planning functions were transferred to the Department of Transport and Planning. **f.** Some entitlements held by the Victorian Environmental Water Holder include rules based environmental water. **g.** The Department was renamed in December 2021, formerly it was known as the Department of Primary Industries, Parks, Water and Environment.

Source: Updated from PC (2021a, p. 134).

The New South Wales Department of Climate Change, Energy, Environment and Water (NSW DCCEEW) made the following observation in their submission to the Commission's interim report:

The department also observes that many of the issues raised by the Productivity Commission related to monitoring outcomes stem from funding issues (short-term funding cycles, inadequate funding and high uncertainty). (sub. 77 attachment, p. 7)

Without well resourced, scientifically sound monitoring of outcomes, there is no good basis for allocation of environmental water, nor an ability to assess the costs and benefits of environmental water against other uses. Further, it inhibits adaptive management. Without timely information about how management actions are working to meet the environment and other public benefit outcomes set out in water plans, opportunities to iterate will be missed.

Participants in the inquiry support a more consistent approach to environmental water outcomes.

The VFF [Victorian Farmers Federation] notes and strongly supports the advice that the focus should shift from megalitres of environmental water to environmental outcomes. The MDBA [Murray–Darling Basin Authority] has made some useful progress on reporting on the pleasing environmental outcomes of the Living Murray Initiative. This progress needs to be built on as a

priority to develop cost effective environmental monitoring methods and funding arrangements. (VFF, sub. 89, p. 6)

The Inspector-General notes that the current legislative frameworks do not support accountability for environmental water outcomes from a national perspective, which could be managed by relevant governments through the NWI. The need for improved accountability means there is value in progressing this through the NWI instead of or in advance of legislative reform. (IGWC, sub. 80, p. 8)

As more water is allocated for environmental use, the renewed NWI should contain an outcome that addresses the monitoring and evaluation of environmental water programs ... This should distinguish between the environmental outcomes achieved as a result of the use of water entitlements held by Commonwealth and State governments, and outcomes achieved as a result of planned environmental water that was already available due to state based water sharing plans. (NSWIC, sub. 88, p. 10)

An extension to the Commission's 2021 NWI renewal advice on review processes for outcomes (8.4) is presented in section 7.4 below. Well-defined environmental outcome indicators should be established to ensure assessment is robust, and where relevant and appropriate, include reference to Indigenous Cultural Knowledges. Any use of Indigenous Knowledges should be respectful of Indigenous Cultural Intellectual Property rights and follow established protocols (NSW Aboriginal Land Council, sub. 60, p. 6; chapter 10 of this report).

Independent review and auditing are absent in many jurisdictions

Independent review⁹ and auditing of environmental and other public benefit outcomes supporting management arrangements is also ad-hoc and inconsistent across jurisdictions.

Most jurisdictions undertake regular State of the Environment (SoE) reporting through a body separate to the agency responsible for water management (although with differing timeframes), and in some cases (such as the Australian Capital Territory and Victoria) the agency is an independent statutory body. While these reports focus on the condition of waterways and water resources at a high level and not on outcomes set in water plans, they provide an external assessment of some elements of environmental water management.

For example, the Australia SoE 2021 report found compliance with water plans was problematic (DAWE 2021) and the Victorian SoE 2023 report found environmental entitlements of the VEWH are not adequate to deliver the scientifically recommended flows needed for environmental outcomes (CSEV 2023, p. 57).

Beyond SoE reporting, only New South Wales has completed an external review of their environmental water management program since the Commission's last assessment (ARTD Consultants 2021). The Commission also notes that as part of the Restoring our Rivers Bill in 2023, the Australian Government agreed to task the Inspector-General of Water Compliance (IGWC) to undertake an independent audit of the water allocated to the CEWH (Plibersek and Hanson-Young 2023b), although no further information on this audit has been published.

An extension to the Commission's 2021 NWI renewal advice on independent managers and auditing (8.10) is presented in section 7.4 below.

⁹ That is, a review which is undertaken by a body external to the agency responsible for a particular water management role, preferably statutorily independent. For example, in table 7.2 where there are different agencies that are responsible for planned environmental water and held environmental water in some jurisdictions.

Australian Government



In response to an external review undertaken in 2020 (Butcher et al. 2020), the CEWH has implemented a number of changes to strengthen the evaluation of outcomes from environmental watering, including the establishment of an independent advisory group (DCCEEW 2023c). Outcomes from environmental watering continue to be monitored and evaluated through the Science Program, with evaluation reports independently and peer reviewed (CEWH 2024). The Flow-MER program has been updated following an external review, with the latest version commencing in 2024. Outcomes of environmental watering in the River Murray are monitored through The Living Murray program (MDBA 2024) with regular report cards published by the Murray–Darling Basin Authority (MDBA 2023a).

The IGWC role was established in 2021 and is responsible for, among other things, monitoring and overseeing relevant Australian Government, and Basin state government agencies' performance in the management of Murray–Darling Basin water resources (IGWC 2023c, p. 1). This includes responsibility for water resource plan compliance and ensuring environmental and other public benefit outcomes are consistent with the intentions set out in water resource plans to give effect to the Basin Plan (IGWC 2023c, p. 8). The IGWC reviewed elements of the CEWH's performance in 2022 as part of its broader review of River Murray operations, and found that the CEWH's monitoring, evaluation and reporting of environmental water use meets adaptive management and reporting obligations under the Basin Plan (IGWC 2022b, p. 16).

New South Wales



Since 2021, the New South Wales Natural Resources Commission has reviewed 25 WSPs and amendments have been made to several to improve environmental and other public benefit outcomes.¹⁰

Annual reporting on environmental watering is undertaken by NSW DCCEEW's Biodiversity, Conservation and Science Group under the Water for the Environment Monitoring, Evaluating and Reporting Program, which also measures progress towards meeting long-term water plans and Basin Plan objectives (the next five-yearly evaluation is due in 2024) (NSW DCCEEW 2024h).¹¹ However, these reports have tended to focus on outcomes from licensed environmental water and environmental water allowances. In contrast, outcomes from water allocated to the environment through environmental flow rules does not appear to have dedicated reporting. Annual evaluation and review reports on active management in the unregulated water sources of the Barwon-Darling, Gwydir and Macquarie-Bogan (NSW DPE 2022a, 2023a) have a focus on improving the rules and procedures and not on monitoring environmental outcomes.

The Commission notes that the NSW Government is developing a Water Sharing Plan Evaluation Framework and Program:

Draft methods to evaluate intended social, economic and environmental outcomes of water sharing plans (WSP) have been developed which includes identifying performance indicators to measure progress towards achieving public benefit outcomes ... (NSW DCCEEW, sub. 77 attachment, p. 7)

¹⁰ The Natural Resources Commission is required under s.43A and s.44 of the *Water Management Act 2000* (NSW) to undertake a review of how provisions have contributed to environmental, social and economic outcomes within the last five years of each WSP and to audit water management plans within the first five years to determine if provisions are being given effect to (NSW NRC 2024).

¹¹ Annual reporting is required under Matter 9.3 and five-yearly evaluation under Matter 8 of Schedule 12 of the Basin Plan.

The NSW Government has also implemented a WSP Social Benchmarking Survey (2022/23 and 2023/24) to collect information on a range of performance indicators to inform the evaluation of WSP objective achievement for WSPs due for replacement in 2026–28 (NSW DCCEEW, sub. 77 attachment, p. 7).

An external review of environmental water program outcomes between 2014–2019 was commissioned and published (ARTD Consultants 2021). The review found that environmental watering was making a positive difference to the health of New South Wales waterways within the Murray–Darling Basin and recommended, as the Commission did in 2021, that enhanced monitoring and reporting of environmental outcomes and better engagement with First Nations interest and incorporation of Indigenous Knowledges is necessary (recommendations 6, 11 and 12 (ARTD Consultants 2021, pp. 45, 62)).

The NSW Environmental Protection Authority (NSW EPA) prepares a SoE report every three years. The 2024 assessment on the state of New South Wales' water resources provides information on the volumes of environmental water released from storages of different regulated river valleys in inland New South Wales between 2017-18 and 2019-20 through specific environmental allowances or licensed environmental water (NSW EPA 2024). There is no information on water made available to the environment through 'non-discretionary fixed rules in water sharing plans, such as prescribed end-of-system flows or transparent and translucent releases' (NSW EPA 2024).¹²

Concerns were raised in the Commissions 2021 assessment about the independence of environmental water decisions from Ministerial direction and the NSW Government has said that it is reviewing governance of environmental water holdings to ensure an appropriate level of independence (NSW Government, pers. comm.).

Following a review by the Chief Scientist and Engineer into fish deaths in the Lower Darling-Baarka in March 2023, the NSW Government established an independent Connectivity Expert Panel 'to provide recommendations on changes needed to New South Wales water sharing plans to improve downstream outcomes' (NSW DPE 2023f, p. 4). The panel has released an interim report making a number of recommendations to improve water connectivity between WSPs in the northern Murray–Darling Basin (Dula et al. 2024) with the final report expected in June 2024 (chapter 4).

Victoria

No significant changes have been made in Victoria since 2021. The Victorian Government released its SoE Report in 2023 which had an independent commissioner and reviewed environmental outcomes delivered by the VEWH. With respect to inland waters, the report found:

there is currently a gap in the monitoring of environmental watering outcomes at a statewide scale that needs addressing to improve future reporting as required by Action 3.6 of Victoria's water plan, Water for Victoria. (CSEV 2023, p. 57)

Victoria continues to assess benefits of water for the environment through its Victorian Environmental Flows Monitoring and Assessment Program and Wetland Monitoring and Assessment Program (ARI 2023a, 2023b) and the VEWH publishes outcomes of its environmental watering program in the annual 'reflections' reports (VEWH 2022, 2023a).

¹² The NSW DCCEEW website describes a transparent flow as occurring in a regulated river system when inflows are passed through a regulating structure – usually a dam – to enable a near-natural flow pulse into the river system and a translucent flow being similar but with only a portion of the inflow volume being passed through. Transparent and translucent flows do not involve the use of licensed environmental water, but are instead a fixed rule that designates water to be made available for an environmental purpose under certain conditions, triggering when a release is made (NSW DCCEEW 2023).

Queensland

Queensland has limited accountability in place for environmental water management. Since 2021 monitoring evaluation and reporting strategies have been included as part of the Draft Water Plan (Mary Basin) 2023 and the Water Plan (Barron) 2023.^{13,14} These monitoring evaluation and reporting strategies set out how the achievement of the outcomes of a water plan will be evaluated, however, these strategies are currently not publicly available. Ministerial performance assessment reports of water plans are required under the *Water Act 2000* (Qld)¹⁵ and the *Water Regulation 2016* (Qld)¹⁶ every five years and are a 'health check' of a water plan (Qld DRDMW 2018). However, a water plan that is being reviewed to determine whether it can be extended, amended or needs a full review and replacement (which can take several years) (Qld DRDMW 2018) is excluded from having a Ministerial performance assessment undertaken, so not all water plans are assessed every five years. Ministerial performance assessments are completed by the same agency responsible for water management.

The Environmental Flows Assessment Program (EFAP) 'provides the science to inform an assessment of how effective rules and strategies within Queensland Water Plans support ecological outcomes', however, they are not undertaken in all catchments and only three studies appear to have been published under the EFAP since 2021 (Qld DESI 2021a).¹⁷ The Local Government Association of Queensland stated:

To date, reporting of EVs [environmental values] and WQOs [water quality objectives] across Queensland's aquatic environments is not conducted in a consistent manner (both spatially and temporally), and thus restricts the ability for stakeholders to identify, monitor and remediate those aquatic environments that are not sustaining identified EVs. (sub. 66, p. 14)

Qld DESI is responsible for preparing Queensland's SoE report at least every four years¹⁸ and the various water quality and aquatic ecosystem monitoring programs that inform reporting of the condition of freshwater, estuarine and marine wetland ecosystems (Qld DESI 2013). Queensland SoE reports do not report against environmental outcomes defined in water plans. The last published Queensland SoE report was published in 2020 (Qld DES 2021) and preparation of the 2024 report is underway (Queensland Government, pers. comm.).

Western Australia

No significant changes have been made in Western Australia since 2021. There is no regular statewide review and auditing, independent or otherwise, of environmental outcomes and the adequacy of management arrangements (the last SoE Report was published by the Western Australian Environmental Protection Agency, which is independent, in 2007). The WA Government does publish annual environmental compliance reports for two water plans – Jandakot and Gngangara – which include information about whether environmental water levels in groundwater systems were met and environmental outcomes achieved (WA

¹³ Part 4 section 20 (1).

¹⁴ Part 4 section 22.

¹⁵ Section 49.

¹⁶ Section 22.

¹⁷ Search of the EFAP on the Queensland DESI, DRDMW and Department of Resources library services website (Qld DESI 2024b) found the following reports by Harding and Prior (2023), Pollard (2023) and Qld DRDMW (2023). In the last summary report of the EFAP program published on the resources website, there were 15 projects listed in the 2011-12 report (Qld DNRM 2012).

¹⁸ Section 547 (1) of the *Environmental Protection Act 1994* (Qld).

DWER 2021a, 2022a, 2023c, 2024a), however no outcomes are reported for other water allocation plans in Western Australia which number over 25.

South Australia

No significant changes have been made in South Australia since 2021. The South Australian Department of Environment and Water (SA DEW) continues to publish annual River Murray Water for the Environment reports (SA DEW 2022c) and undertakes a range of environmental monitoring programs in the Murray–Darling Basin (SA DEW 2024b). There is less reporting on outcomes from environmental water management outside of the Murray–Darling Basin, with the South Australian Environmental Protection Agency (SA EPA) producing annual aquatic ecosystem condition reports for surface water and groundwater quality monitoring and reporting (SA DEW 2024a; SA EPA 2024).

The SA EPA SoE reports draw on these monitoring programs, with the latest report finding that ‘the ecosystem condition of inland waters in catchments that are significantly modified has not improved over the last 20 years of monitoring’ (SA EPA 2023). SA DEW coordinated annual Trend and Condition report cards report on the condition of water resources with respect to specific indicators but do not assess them against environmental outcomes specified in water plans (SA DEW 2023b).

Tasmania

Where the Department of Natural Resources and Environment Tasmania (NRE Tas) is reporting on water, it is generally focused on the quantity of river flows, groundwater and lake levels and water quality (e.g. the River Health Monitoring Program and Environmental Flow Assessments) with no detail on whether minimum flow, levels or quality requirements are sufficient to achieve environmental outcomes or protect and/or enhance ecosystem values.

Impact assessments to support reviews of water plans undertaken every ten years by NRE Tas have a focus on impacts of proposed amendments to the plan, including to environmental water flows and are publicly available (for example the recently prepared impact assessment for the Mersey River (NRE Tas 2023a)). The *Draft Amended Mersey River Catchment Water Management Plan impact assessments*, for each of seven identified issues, provides a summary of positive and negative impacts of possible options under economic, environmental, social and administrative headings and includes a summary of the related objectives from the Plan (NRE Tas 2023a).

Annual River Reports are produced by NRE Tas for six rivers, with a focus on flow and conditions, however, indicators of river health are limited and the reports do not include an assessment of how water plan rules are contributing to environmental outcomes specified in those plans (NRE Tas 2023c). However, NRE Tas is developing new monitoring approaches through its river health advisory project and state wide monitoring program under its *Rural Water Use Strategy Implementation Plan* (NRE Tas 2022a).

The Tasmanian Planning Commission has re-initiated SoE reporting with the next report to be submitted to the Minister for Planning by 30 June 2024 (the previous one was released in 2009) and is being prepared by independent experts (Ferguson 2022; Tasmanian PC 2024). The Tasmanian Government has also engaged a consultant to review the Tasmanian water accountability framework, with findings expected to be released in late 2023 (NRE Tas 2023f).¹⁹

¹⁹ As of 20 May 2024, there were no updates on the public release of the review or government response on the water accountability framework review webpage (NRE Tas 2023f).

Northern Territory

In the Northern Territory, WAPs are reviewed and published every five years and these reviews are undertaken by the Department of Environment, Parks and Water Security that is also responsible for water policy and management – they are not independent. Since 2021, the Alice Springs WAP (2016–2026) has been reviewed. While there was some reporting on whether outcomes from water allocations for the environment were met, there were several gaps.²⁰ A number of actions were recommended to achieve ‘best practice in terms of identifying, managing and monitoring ecosystem values’ that would be needed in developing the new plan (NT DEPWS 2021a, pp. 60–61).

The Northern Territory has also changed the format of WAPs, with new plans requiring annual reporting on progress against implementation actions. Since being introduced in 2022, this new format has been applied to the Georgina Wiso WAP. The first annual report on implementation actions is yet to be published.

While the Northern Territory has no regular independent environmental reporting (ECNT, sub. 54, p. 11), in 2023 the NT Government commissioned an external review of all aspects of water planning in the Northern Territory (Badu Advisory 2023). Findings from the review stated that progressive assessment of the attainment of environmental objectives specified in WAPs should be incorporated in the future (Badu Advisory 2023, p. 13).

Australian Capital Territory

The ACT has made no significant changes in reporting of environmental water manager activities or independent auditing since 2021. The ACT SoE report is undertaken by the Office of the Commissioner for Sustainability and the Environment every five years. The 2023 SoE was published in March 2024 and reported on a number of indicators and identified data and management gaps for water in the ACT (ACT OCSE 2023, pp. 188–189). The report highlighted that environmental flow requirements were met over the reporting period despite significantly reduced rainfall and river flows in 2019 and early 2020, however, also noted that where annual river flows were lowest in 2019, these extremely low flows impacted on aquatic ecosystem health as well as the amenity of the ACTs waterways (p. 185).

The ACT continues to release annual Catchment Health Indicator Program reports (Upper Murrumbidgee Waterwatch 2022) and annual reporting against the ACT water strategy (ACT EPSDD 2023a). The ACT water strategy is currently undergoing its ten-year review that is intended to result in a refreshed Strategy that reaffirms the water management priorities for the ACT and responds to the outcomes of the ACT 2021 Water Governance Review (ACT Government, pers. comm.).

7.2.2 Management of connected systems

Joint arrangements for shared resources are in place

The NWI requires that jurisdictions establish effective and efficient management and institutional arrangements to ensure the achievement of environmental and other public benefit outcomes where resources are shared by jurisdictions. Joint arrangements aim to coordinate the provision of environmental water across jurisdictions and provide a consistent decision framework for identifying and determining priorities for rivers, wetlands and

²⁰In the Technical Review of the Alice Springs WAP, only River Red Gum corridors were assessed for terrestrial groundwater dependent ecosystem health outcomes, with the explanation that other terrestrial groundwater dependent ecosystems are not well defined. The health and occurrence of stygofauna and spring-fed wetlands were similarly not assessed due to lack of knowledge and well-defined baseline for comparison respectively (NT DEPWS 2021a, pp. 36–38).

groundwater dependent ecosystems. This largely applies to the Murray–Darling Basin, the Great Artesian Basin (GAB) and the Lake Eyre Basin and, as was reported by the Commission in 2021 (2021a, p. 123), the requirement that joint arrangements are in place has been achieved.

A number of updates in joint arrangements for shared resources has occurred since 2021.

Murray-Darling Basin

The Commission’s 2023 assessment into the implementation of the Basin Plan found that some progress has been made in implementation since 2018 but the Basin Plan will not be fully implemented within the original timeframe or budget. The Commission made a number of recommendations to mitigate risks to full implementation (PC 2023a, pp. 27–40). Basin governments (excluding Victoria) signed an agreement in August 2023 committing to deliver the Basin Plan in full over a longer time period (DCCEEW 2023a) and amendments were made to the Basin Plan and *Water Act 2007* (Cth) in November 2023 through the *Water Amendment (Restoring our Rivers) Act 2023* (Cth). These amendments provide necessary timeframe extensions, allow for new supply measures and voluntary water purchases, stronger reporting requirements as well as greater emphasis on climate change and First Nations water interests (PC 2023a, p. 2). The Victorian Minister for Water has since released a statement announcing that the Commonwealth has agreed to fund key Victorian environmental water projects under the Basin Plan without signing any agreement and that Victoria continues to oppose buybacks (Shing 2024).

Great Artesian Basin

The GAB is jointly managed under the *Great Artesian Basin Strategic Management Plan (2019–2034)* (Australian Government et al. 2019). Since 2021, the GAB Stakeholder Advisory Committee has been established, holding its first meeting in September 2022. Key outcomes from the March 2023 meeting included endorsing the terms of reference for an external reviewer to undertake a five-year, basin-wide condition report to be completed in early 2024 (GABSAC 2023). The Australian and GAB governments undertook a review of the effectiveness of government programs in the GAB in 2023 (GABSAC 2023). The five-year rolling GAB Strategic Management Plan Implementation Plan and the GAB programs review are in the final stages of approval by GAB governments and are expected to be available on the Department of Climate Change, Energy, the Environment and Water website in June 2024 (DCCEEW, pers. comm., 6 May 2024).

Lake Eyre Basin

The *Lake Eyre Basin Strategic Plan* was released in March 2024 (DCCEEW 2024f). A recommendation from the second ten-yearly review into the Lake Eyre Basin Intergovernmental Agreement (2000),²¹ the strategic plan sets out threats and challenges in the basin, goals and objectives, monitoring and evaluation and governance arrangements. The five goals are:

- collaborative governance for holistic management of the basin’s river systems and related natural resources in partnership with community, scientists and industry
- protection and restoration of the ecological values of the basin’s river systems and related natural resources
- sustainable management of the basin’s river systems and related natural resources

²¹ Management of the Lake Eyre Basin is the responsibility of the Australian Government and Lake Eyre Basin state and territory governments (South Australia, Queensland, the Northern Territory, and New South Wales (observer role only)) and was enshrined in the Lake Eyre Basin Intergovernmental Agreement 2000 (the agreement). The agreement was initially established between the Australian, Queensland, and South Australian governments in 2000, with the Northern Territory joining in 2004 (DCCEEW 2024f, p. 8).

- Aboriginal culture, knowledge and continuous connection to Country are always recognised, appreciated, and supported
- an informed, engaged, and economically resilient community. (DCCEEW 2024e, p. 9)

Five-year implementation plans will set out priority activities and be informed by an evidence and risk-based understanding of issues and pressures of regional and cross-jurisdictional concern (DCCEEW 2024e, p. 23). The monitoring and evaluation framework is underpinned by three components:

- whole-of-basin threat assessments (drawing on risk assessment process undertaken in 2021)
- surveillance monitoring (annual monitoring program Lake Eyre Basin Rivers Assessment (LEBRA))
- local monitoring and research (targeted studies).(DCCEEW 2024e, p. 24)

The outcomes of the evaluation will directly inform the 2026 State of the Basin Condition Assessment Report (DCCEEW 2024f, p. 49). The Lake Eyre Basin Intergovernmental Agreement, the *Lake Eyre Basin Intergovernmental Agreement Act 2001* (Cth) and the governance structure are to be revised early in the life of the strategic plan to ensure governance arrangements support 'contemporary Lake Eyre Basin intergovernmental management' and 'is consistent with broader national water reform objectives, such as the NWI' (DCCEEW 2024f, p. 50).

Border Groundwaters

The Border Groundwaters Agreement Review Committee completed a comprehensive review of the South Australian-Victorian Border Groundwaters Agreement in 2021 and 'identified the need to consider emerging challenges such as the sustainability of groundwater depended ecosystems, climate change and forest land use' (SA DEW and Victorian DELWP 2022, p. 6). The review of the South Australian-Victorian Border Groundwaters Agreement has not yet been published (last five year management review published was the 1996–2000 review), although reviews of management prescriptions for Province 1 and Province 2 completed in 2023 have been (SA DEW 2024e).

Management arrangements for connected systems are being refined

The NWI requires common arrangements for significantly inter-connected groundwater and surface water systems.²² In 2021 the Commission had found that all jurisdictions had recognised the need for these common arrangements and were increasingly recognising connectivity between groundwater and surface water in water planning (PC 2021a, p. 136). Jurisdictions continue to invest in improving information on groundwater resources and how they interact with surface water systems; this is discussed further in section 4.7.

New South Wales



Since 2021, New South Wales has had 12 WRPs accredited and submitted eight for assessment to the Murray–Darling Basin Authority (although four of these latter have since been withdrawn) which must include rules to ensure environmental watering requirements can be met where groundwater has a significant hydrological connection to surface water.²³

²² NWI paragraph 79 i) c).

²³ Basin Plan s. 10.19.

Other jurisdictions

Other jurisdictions have updated their water plans to reflect connectivity between groundwater and surface water connections where they are present as they have been reviewed (NRE Tas 2023b; NT DEPWS 2023c; Qld DRDMW 2023c; SA DEW 2022a; Tasmanian DPIPWE 2021 a; WA DWER 2022b).

7.2.3 Trading of environmental water

States are trading environmental water allocations and entitlements

The NWI requires provision for environmental water managers to trade water allocations at times the water is not required to contribute towards environmental and other public benefit outcomes.²⁴ Trades can be either administrative water transfers (across river systems and/or between environmental water holders for environmental purposes with no financial considerations) or trade in environmental water allocations with consumptive users (commercial trades including selling and buying).

The Commission found in 2021 that this outcome was achieved (PC 2021a, pp. 124, 141–142). All environmental water holders are able to trade. There have been no significant changes to such arrangements since 2021.²⁵

Since 2021, a small number of commercial trades have taken place by state environmental water holders (section 7.5 Annex). The CEWH has not commercially traded (bought or sold) any environmental water allocations since the Commission's last assessment. A tender for the sale of up to 8 GL of annual water allocations in the Goulburn catchment in Victoria was announced in January 2023 but no bids were received above the minimum sell price of \$21/ML (CEWH 2023b).²⁶

²⁴ NWI paragraph 79 i) e).

²⁵ The CEWH operates under the framework set out in the *Water Act 2007* (Cth) and the *Basin Plan 2012* (Cth) while other environmental water holders operate under the legislative frameworks set out in their own jurisdictions, including differences in how water entitlements are defined.

²⁶ Consecutive years of above average rainfall has seen lower prices in water allocation markets (BOM 2023a, p. 5).

The Commission reiterates its view from 2021 that over time it is desirable for the CEWH and other environmental water holders to fully exploit trade in allocation to maximise benefits for the environment (PC 2021a, p. 145). In a submission to the Commission's Murray–Darling Basin Plan implementation review, the CEWH note it is:

... investigating options to streamline its trading process and improve its responsiveness to the market conditions ... to increase the CEWH's capacity to engage more frequently in the water market to support the capacity of the Commonwealth's environmental water holdings to maximise environmental outcomes across the Basin. (CEWH 2023c, p. 9)

The Environmental water trade – making every drop count report by the Australian Bureau of Agricultural and Resource Economics and Sciences identified what it considers as two potential barriers that could be limiting the CEWH from trading as 1) the interpretation of the 'good neighbour' principle and 2) legislation that restricts environmental water trade (Rose et al. 2024, p. 20). With respect to the first potential barrier the report outlines that the CEWH's approach to managing environmental water is guided by the 'good neighbour' principle and to 'do no harm' which has meant passing up on trade opportunities 'that would have generated environmental benefits because the likely impacts on water allocation prices have been interpreted as "harmful"' (Rose et al. 2024, p. 20).

Lack of full understanding amongst stakeholders about how environmental water is managed, used and traded by the CEWH may be contributing to perceptions of sub-optimal market participation. The Australian Competition and Consumer Commission (ACCC) has found that there are negative perceptions by some other water users in how environmental water is managed:

the use of trade mechanisms and other arrangements by environmental water holders to deliver water are generally not well understood by water users, this contributes to perceptions that environmental water holders receive special treatment and that environmental watering is negatively affecting other water users, such as through increased conveyance losses or receiving priority delivery. (sub. 11, p. 6).

Some inquiry participants considered that the CEWH is too restricted in the environmental water it trades and should consider new approaches to ensure delivery of environmental outcomes and balanced trading objectives (Cobram Estate Olives Ltd., sub. 20, p. 2; NFF, sub. 32 attachment, p. 32). The Southern Riverina Irrigators suggested 'in wet flood years, environmental water must be made available to irrigators through the water market via an open and transparent process' (SRI, sub. 87, p. 5).

The Commission notes that governments are implementing water market reform recommendations (DCCEEW 2023f) and the additional functions of the ACCC, IGWC and the Bureau of Meteorology under the *Water Amendment (Restoring our Rivers) Act 2023* (Cth) aim to enhance the transparency of water markets. If implemented as intended, these reforms should assist stakeholders to better understand how the CEWH operates, as well as address concerns about environmental water holders' participation in water markets. Chapter 5 provides a more detailed assessment of water markets and trading.

Since 2021, the Victorian Government has finalised changes to trade and operating rules for the Goulburn to Murray region to deliver water 'in a smarter, more sustainable way that respects the environmental, cultural and community values' (Neville 2022) (chapter 5). The review into trading rules was undertaken by the Victorian Department of Environment, Land, Water and Planning and found that delivering 'water from the Goulburn inter-valley trade account during summer and autumn to support water requirements of the Murray system caused significant environmental damage to the lower Goulburn River' (Victorian Government 2022). The Victorian Farmers Federation cites this as an example of where increased flows 'have negatively impacted the environment' and why 'a greater focus on environmental outcomes is necessary' (sub. 89, p. 6).

The Commission's renewal advice from 2021 with respect to objectives and priority setting for held water (8.5), transparent trade strategies (8.6), innovative market approaches (8.7), and capacity to vary entitlement portfolios (8.8), remains relevant.

7.2.4 Special requirements for high conservation value assets are in place

The NWI requires special arrangements (where warranted) to sustain high conservation value rivers, reaches and groundwater areas.²⁷

Special requirements have been put in place to sustain a number of high conservation value assets. For example, most states and territories have special arrangements in place for Ramsar wetlands of international importance in their jurisdictions and wetlands listed on the Directory of Important Wetlands in Australia (ACT EPSDD 2024; NRE Tas 2019; NSW DCCEE 2018; NT Government 2016a; Qld DESI 2024a; SA DEW nd; Victorian DEECA 2024b; WA DBCA 2024). The CEWH is required to manage environmental water holdings to protect assets covered by international agreements, such as wetlands of international importance listed under the Ramsar Convention (most of the sites to which The Living Murray program delivers held environmental water are Ramsar listed sites).

The Commission therefore found in 2021 that this objective of the NWI had been achieved.

A significant development since 2021 has been the reforms introduced from the review of the *Environmental Protection and Biodiversity Conservation Act 1999* (Cth). For high conservation value assets in particular, the introduction of Regional Plans will provide a tool to deliver net positive outcomes for Matters of National Environmental Significance in regional plan areas where there is conflict between development priorities and environmental and heritage values (DCCEE 2024c). They aim to provide clear guidance on areas for protection, which areas are appropriate for development and which need caution and consider cumulative impacts and manage threats to biodiversity at a regional scale (DCCEE 2022c). Regional Plans will build on existing information provided through state-level planning instruments such as catchment and water management plans, will be underpinned by protective National Environmental Standards and will have ongoing monitoring, evaluation and review (DCCEE 2022c).

Some states already have some 'regional planning' in place that identifies locally important environmental values in addition to those of significant value at the state and national level. For example, the Queensland State Planning Policy (Qld DILGP 2017, pp. 70, 39) provides for 'natural values and/or areas identified by a local government in a planning instrument as [Matters of Local Environmental Significance] MLES' to be 'integrated in planning and development outcomes where relevant'. The Local Government Association of Queensland noted:

Since the 2020 renewal advice, amendments to Queensland's princip[al] planning legislation (now the *Planning Act 2016* (Qld)) ha[ve] resulted in the ability for local governments to identify and protect Matters of Local Environmental Significance (MLES) ... through their local planning instruments. (sub. 66, p. 14)

All environmental values that are recognised through statutory planning instruments should be accounted for in defining environmental outcomes to be achieved through water plans where relevant. The Commission has updated its renewal advice 8.1 from 2021 (section 7.4) to reflect all levels of government can have a role in contributing to identifying environmental values.

²⁷ NWI paragraph 79 i) f).

The Commission's renewal advice from 2021 for integrated management (8.2), waterway oversight (8.3), the management of environmental water entitlements (8.5-8.9), the system managers role (8.11) and commitment to adaptive management (8.12) remains relevant.

7.3 Water recovery for the environment

Summary of actions under the NWI

Parties agreed under the NWI to, where it is necessary to recover water to achieve modified environmental and public benefit outcomes,²⁸ adopt the following principles for determining the most effective and efficient mix of water recovery measures:²⁹

- a) consideration of all available options for water recovery, including:³⁰
 - Investment in more efficient water infrastructure
 - Purchase of water on the market, by tender or other market-based mechanisms
 - Investment in more efficient water management practices, including measurement
 - Investment in behavioural change to reduce urban water consumption.
- b) assessment of the socio-economic costs and benefits of the most prospective options, including on downstream users, and the implications for wider natural resource management outcomes³¹
- c) selection of measures primarily on the basis of cost-effectiveness, and with a view to managing socio-economic impacts.³²

Previous findings (2021)

In 2021 the Commission did not assess commitments to select water recovery options based primarily on the basis of cost-effectiveness under the NWI as, at the time, water recovery was mostly being undertaken through the Murray-Darling Basin Plan (PC 2021a, p. 124) and would be assessed separately (PC 2018, 2023b).

Assessment of the processes in place to assess whether water recovery is necessary is in chapter 4, section 4.2 (water planning).

Assessment

Outside the Murray–Darling Basin (water recovery in the Murray–Darling Basin is not considered in detail in this report – see *Murray–Darling Basin Plan Implementation Review 2023* (PC 2023a)), some limited examples of environmental water recovery have been identified since the 2021 assessment. However, from

²⁸ The use of modified before environmental outcomes here reflects that the majority of our aquatic ecosystems are impacted by human activity. Actions to achieve modified environmental outcomes recognise that a return to a pristine state is unlikely but improvements to ecosystem functioning relative to measured baseline data are possible. In the Australia SoE 2021 report it states that 'in much of southern Australia, the greatest threat to freshwater ecosystems and biodiversity is the modification of water processes that has occurred as a result of changes to river and stream flow, surface water and groundwater extraction (primarily for agriculture), and land use change' (Cresswell et al. 2021).

²⁹ NWI paragraph 79 ii).

³⁰ NWI paragraph 79 ii) a).

³¹ NWI paragraph 79 ii) b).

³² NWI paragraph 79 ii) c).

publicly available information it is not always clear what options have been considered before final decisions have been made and the costs and benefits of them.

Victoria

The recently updated *Central and Gippsland Region Sustainable Water Strategy* (CGRSWS) has identified the need to recover 99.5 GL/y of surface water for the environment over the next ten years (Victorian DELWP 2022a, p. 11).³³ The strategy sets out 14 potential options for recovering this water and meeting increased water demand into the future (Victorian DELWP 2022a, pp. 38–39). The CGRSWS is showing commitment to the broad principles of the NWI by identifying the minimum amount of water required to be recovered to meet the specified environmental and other public benefit outcomes over the defined period of the strategy and assessing the viability of all available options at a high level. The Victorian Government assessed two options – purified recycled water and purchasing water entitlements from farmers – as unviable (despite being options explicitly listed to consider under the NWI) due to lack of social licence and socio-economic impacts respectively.

On purified recycled water: the Victorian Government’s position that purified recycled water does not have social license is based on ‘extensive public consultation’ (Victorian Government, pers. comm.) partly due to concerns about emerging contaminants. On this, the Commission notes that the CGRSWS commits to improving understanding of emerging contaminants (Policy 3-5 and Action 3-11) which, could increase the acceptability of purified recycled water in the Central and Gippsland region (Victorian Government, pers. comm.). The Commission supports continued work to increase community acceptance and notes that public education campaigns in Australia and overseas focusing on the strict health and safety standards, climate resilience and environmental benefits (including demonstration plants in Perth, Western Australia and Quakers Hill, NSW) associated with purified recycled water have significantly increased – into the majority – its public acceptance (WSAA 2021).

On purchasing water entitlements from farmers, unlike the previous strategy it replaced, the CGRSWS:

does not support the purchase of water entitlements from farmers to meet water recovery targets identified for the environment, or any other user groups, including Traditional Owners. (Victorian DELWP 2022a, p. 197)

The Victorian Government has a long standing opposition to buying water entitlements in the Murray–Darling Basin due the harm it considers they can do to regional economies and communities (Foley 2024) and appears to have extended this opposition to the Central and Gippsland region of Victoria.

The Commission notes the findings of a recent meta-analysis by Wheeler et al. (2023) into the impacts of water recovery on economic outcomes in the Murray–Darling Basin, that suggests the reality is significantly more complex. This includes that not all farmers who sold water entitlements left farming or suffered changes in production and that healthy rural communities depend on many other factors than water for production (Wheeler et al. 2023).³⁴ Further, while purchasing water entitlements does reduce the consumptive pool,

³³ The CGRSWS also commits to ‘prioritise opportunities to return water entitlements to Traditional Owners in the region, as water becomes available, without compromising the needs of other water users, including farmers’ (Victorian DELWP 2022a, p. 156).

³⁴ Wheeler et al. (2023) also identified studies that found significant socio-economic impacts from water buybacks had a number of methodological commonalities such as assuming a unit elastic response of production to water extractions, ignoring positive impacts within the local economy from buybacks, overstating negative buyback impacts whilst irrigation infrastructure subsidies were understated.

they are voluntary and compared to other options to reduce overallocation, have been the most cost-effective way for governments to obtain water for the environment (PC 2023b, p. 15).

Instead of ruling out options, to ensure the best outcome for water users in the Central and Gippsland region, and the Victorian public, the Victorian Government should instead fully analyse the potential socio-economic costs and benefits of all options in the CGRSWS (including consideration of any adjustment assistance that may be required – section 11.2) as they have for the Murray–Darling Basin (Frontier Economics and TC&A 2017, 2022).

In terms of assessment of prospective options, the Victorian Government has indicated that where water recovery for environmental and other public benefits is dependent on new urban water supply infrastructure, quadruple-bottom-line assessments (consideration of economic, environmental, social and cultural costs and benefits) will be used in both regionally significant projects (managed through the Water Grid Plan) and locally important projects (managed by water corporations through urban water strategies and IWM [Integrated Water Management] forums) (Victorian DELWP 2022a, pp. 241–243) (section 9.2). As this process is ongoing for the CGRSWS, there is not currently enough evidence for the Commission to determine whether Victoria's assessment of options and selection of the most cost-effective measures meets the NWI requirements, but notes at this stage that the Victorian Government appears to be mostly (with the above reservations) following the procedure set out under NWI paragraph 79 ii).

Western Australia

The revised *Gnangara groundwater allocation plan*, finalised in 2022, aims to reduce annual groundwater abstraction by 54 GL/y (WA DWER 2022b, p. x). It will use a combination of reduced water access for domestic bores, reductions to licensed water entitlements across industry (some exclusions), and a reduction to the amount of water that the Water Corporation can access for the Integrated Water Supply Scheme. A number of programs will be funded by the WA Government to support the transition to using less water for affected industries and the community.

While this reduction of groundwater abstraction to meet environmental and other public benefit outcomes includes a range of options, the cost effectiveness of each option (or options not used) is not clear. Options considered or cost-benefit analysis of the options are not publicly available and further specific information was not provided by the WA Government for the purposes of this inquiry. The WA Government considered that 'The option chosen represented the most effective way of reducing groundwater and took into consideration licensees' ability to adjust to the groundwater reductions' (WA Government, pers. comm.).

The programs supporting the transition to less water are consistent with the NWI.

South Australia

In South Australia, over allocation in groundwater allocation plans in the South-East region is being addressed through stepped reductions to both irrigation (every two years from 2016 to 2022) and commercial forest (at the time of clear fell) water entitlement holders. The SA Government is reducing water allocations in management areas where allocations exceed 90% of annual average recharge and pose a high risk to groundwater users and/or groundwater dependent ecosystems. A risk assessment was undertaken in 2018 and some areas of reduction were put on hold due to change in risk (SA Government. pers. comm., 19 March 2024).

Irrigators were provided time to adjust to reduced allocations and commercial foresters were given the flexibility in which compartments were replanted/not replanted within a management area despite the order of clear fell,³⁵ as long as the reduction was met (SA Government. pers. comm., 19 March 2024).

The Commission notes that the over allocation was not leading to unsustainable levels of extraction in most cases. In other words, water entitlement holders were not using their full allocation. The five-year review of the water allocation plan in 2008 found water table levels had steadily declined under drought conditions and leaving entitlement allocations as they were would 'make future management responses more difficult and ineffective' if water table levels continued to decline (Barnett and Williamson 2020, pp. 359–360). Barnett and Williamson (2020, pp. 361–362) also noted that for 75% of the irrigators, the changes in allocation did not change their usage and that as a result of extensive community consultation, revisions to the water allocation plan in 2012 to implement the reduced allocations were supported by irrigators.

Stepped reductions appear a reasonable approach in the circumstances to proactively manage allocations within sustainable levels, with forecasts in the region for increased drying conditions (chapter 3) and given that the majority of irrigators actual water extractions were not impacted by the reduction in allocations. As no alternative sources of water had to be found for irrigators to maintain existing production, no cost-effectiveness analyses of options has been required.

Overall assessment

While a couple of examples of recovering water for the environment and other public benefits outside of the Murray–Darling Basin have come to light since 2021, a full assessment on progress against this part of the NWI is not possible due to a lack of information on the cost-effectiveness of potential options for that recovery. On the basis of the limited evidence available, the Commission considers that this NWI outcome is partially achieved at this stage as jurisdictions are broadly following NWI-consistent processes, in particular Victoria in identifying a comprehensive range of options early on in the CGRSWS. However, the NWI requires that all available options for water recovery be considered with a socio-economic assessment of the costs and benefits of the most prospective options be undertaken. These assessments should be publicly available to demonstrate that the most cost-effective option has been chosen.

7.4 Findings and renewal advice

The NWI renewal advice in chapter 8 of the Commission's National Water Reform 2021 inquiry report remains relevant. The Commission extends some of that advice below.

³⁵ Essentially this means that rather than at a specific point in time of having water allocation reduced (like irrigators who can more easily adjust), foresters had more flexibility in timing to have their water allocation reduced to when they cut their trees down (plantation rotations can be anywhere from 10 to 35 years) and then make decisions around replanting to meet the reduced allocation within a given management area.

Well-defined environmental and other public benefit outcomes



Finding 7.1

Environmental and other public benefit outcomes are inconsistently specified

There remains a lack of specificity about environmental outcomes defined in water plans, their level of detail and indicators.

Other public benefit outcomes continue to be undefined or defined only at a high level. While the achievement of environmental outcomes can also contribute to other public benefit outcomes, such as recreational opportunities, amenity benefits and public health, the Commission has found no clear long-term performance indicators specified linking these outcomes.

NWI renewal advice 8.1: Best-practice environmental objectives and outcomes

UPDATED IN 2024

Environmental objectives and outcomes agreed in water plans should be guided by criteria on the identification of key environmental assets (including dependent downstream estuaries and near-shore marine environments) and the values communities place on those assets.

- Waterways or water-dependent ecosystems should be considered high environmental priority if they have one, or more, of the following characteristics:
 - formally recognised significance (under Australian or state government legislation, or local planning instruments where enabled by legislation)
 - the presence of highly threatened or rare species and ecological communities (under Australian or state government legislation)
 - high naturalness values (for example, aquatic invertebrate communities or riparian vegetation)
 - vital habitat (for example, drought refuges or important bird habitats and key sites for connectivity).
- Environmental objectives and agreed environmental outcomes should then:
 - be set through a collaborative, stakeholder and community process that considers the relative community value of outcomes
 - be based on good scientific, objective and on-the-ground knowledge
 - clearly identify any risks and potential environmental trade-offs under different climate scenarios (including average and dry years)
 - be transparent, logical and easily understood by stakeholders
 - be specific and defined well, enabling clear long-term performance indicators to be set and monitored.

Environmental water managers with accountability



Finding 7.2

Reporting on environmental outcomes is overall inadequate, particularly for planned environmental water

Jurisdictions generally report on how much environmental water was delivered, and there is reasonable reporting of outcomes by some environmental water holders. However, there is very little reporting on:

- what both held and planned environmental water achieved in terms of outcomes
- the counterfactual – that is, what would have happened if the water had not been delivered, and
- whether the environmental water allocations are sufficient to achieve environmental outcomes specified in water plans.

In many jurisdictions it remains unclear how reporting arrangements for environmental water subsequently feed back into the water planning process and support adaptive management.

NWI renewal advice 8.4: Review processes for outcomes

UPDATED IN 2024

Jurisdictions should commit to a long-term, consistent national approach to monitoring environmental outcomes delivered from both planned and held environmental water. Clear processes should be established for reviewing progress on environmental outcomes, understanding their feasibility given climate induced changes in water availability and other factors (such as sea level rise and increased temperatures), ascertaining whether environmental water flows and allocations are sufficient to meet environmental objectives and determining if and when management objectives should be revisited within planning review processes.

To support this, there should be adequate resourcing of long-term monitoring programs that report against well-defined environmental outcomes indicators. These indicators should be determined by the best possible environmental science, including Indigenous Cultural Knowledges.

Independent audit of environmental outcomes



Finding 7.3

Independent review of environmental outcomes is absent in many jurisdictions

There is no consistent basis for independent audit of whether environmental and public benefit outcomes from environmental water have been achieved, the adequacy of water provision for these objectives, or the performance of environmental water managers. While most jurisdictions have built-in reviews of their water management plans, these are not always undertaken in a timely manner or by an independent body.

NWI renewal advice 8.10: Independent managers and auditing

UPDATED IN 2024

Where governments own significant held environmental water that can be actively managed, they should ensure that decisions on the use of this water are made by independent bodies at arm's length from the agencies directly responsible for water allocation and planning.

Jurisdictions should commit to independent auditing, on at least a five-yearly basis, of the achievement of environmental outcomes resulting from both planned and held environmental water, including the adequacy and use of environmental water to achieve outcomes.

Where jurisdictions have independent environment commissioners or agencies with regular state-of-the-environment reporting, such as Victoria and the Australian Capital Territory, such auditing is ideally placed within the scope of their activities.

7.5 Annex

This annex records commercial trades in environmental water made since 2021.³⁶

The Commission notes that the number of trades and the volume of water traded are not directly comparable between jurisdictions. Each jurisdiction's environmental water holder is subject to their own trading framework, which differs in terms of legislation, administration, hydrological constraints and objectives.

Australian Government

The CEWH did not make any commercial trades in environmental water between 2021 and 2023.

New South Wales

NSW DCCEEW (and its predecessor) has sold environmental water allocations each year and purchased water in 2021-22.

- The Outcomes 2021-22 (NSW DCCEEW 2024g) reports a total net volume of 11,085 ML of surface water across all catchments was sold plus an additional 4000 ML of event based Murrumbidgee supplementary water was sold. 6,575 ML was purchased upstream of the Barmah Choke.
- The Outcomes 2022-23 (NSW DCCEEW 2024h) reports a total volume of 14,439 ML of surface water sold across all catchments and an additional 2000 ML of event based Murrumbidgee supplementary water with a small amount of groundwater allocation sold in the Murrumbidgee catchment.
- In 2023-24 (as of 1 May 2024), the environmental water trades register recorded 40 commercial trades³⁷ (no purchases), with a total volume of 14,150 ML of surface water sold across all catchments + 2,000 ML of Murrumbidgee supplementary water for \$3,224,021 (NSW DPIE 2024a).

³⁶ Commercial trading is defined here as trading environmental water allocations with consumptive users. This is distinct from administrative trading which enables water to be moved across river systems and/or between environmental water holders for environmental purposes (PC 2021b, p. 141).

³⁷ Search criteria was for all WSPs, all water sources, all water management zones, all SDL resource units, all licence categories, NSW DPE (Environment, Energy and Science) environmental holder group for the water year 2023/2024 on 1 May 2024, filtering for all trades that had a positive paid/ML amount.

Victoria

Over the period 2019-20 to 2023-24, the VEWH made the following commercial trades:

- Three purchases of unused licences in the Maribyrnong system, for a total value of \$71,811.
- Two allocation purchases, in the Broken and Moorabool systems, respectively, for a total value of \$316,011.
- Four allocation sales, two in zone 7 (Vic Murray below Barmah), one in zone 6 (Vic Murray above Barmah), and one in zone 1a (Greater Goulburn) for a total value of \$1,320,327 (Victorian Government, pers. comm.).

South Australia

SA DEW did not make any commercial trades in environmental water between 2021 and 2023 (SA Government, pers. comm.).

8. Water resource accounting







This chapter considers progress in achieving the following outcomes and objectives under element 5 of the National Water Initiative (NWI) – water resource accounting:

... to ensure that adequate measurement, monitoring and reporting systems are in place in all jurisdictions, to support public and investor confidence in the amount of water being traded, extracted for consumptive use, and recovered and managed for environmental and other public benefit outcomes.¹

The NWI outlined six action areas against these outcomes²: benchmarking of accounting systems (NWI paragraph 81); consolidated water accounts (NWI paragraphs 82–83); environmental water accounting (NWI paragraphs 84–85); information (NWI paragraph 86); metering and measuring (NWI paragraphs 87–88); and Reporting (89).









A summary of the Productivity Commission’s assessment framework (appendix B) – which does not necessarily map perfectly against the action items – and progress against it, is in table 8.1. The notes to the table indicate which assessment items relate to which NWI actions.

Table 8.1 – Assessment summary: water resource accounting

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2020
Water accounts^c (section 8.1)			
Practical, credible and reliable information	Largely achieved 	Largely achieved 	Water accounting is generally providing practical, credible and reliable information. Improvements have been made in accessibility of this information. However, in many jurisdictions, information is not comprehensive, limiting its usefulness.
Avoid unnecessary duplication of effort	Largely achieved 	Largely achieved 	Jurisdictions collect information with minimal duplication of effort.
Environmental water accounting^d (section 8.2)			
Held environmental water is fully and publicly accounted for	Largely achieved 	Largely achieved 	All jurisdictions with held environmental water publicly report their holdings annually.

¹ NWI paragraph 80.

² NWI paragraphs 81–89.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2020
Public reporting on use of held environmental water	Largely achieved 	Largely achieved 	Jurisdictions report and account for the provision of held environmental water.
Public reporting on planned environmental water	Partially achieved 	Partially achieved 	Jurisdictions generally undertake public reporting on planned environmental water through rules-based arrangements agreed upon in water plans, but there is scope to improve how information is publicly reported. There is great variation between jurisdictions regarding the amount and types of information available, the frequency of reporting, and how navigable and accessible reported information is.
Water metering and measurement^e (section 8.3)			
Develop and implement metering actions Non-Urban Metering Framework implemented	Partially achieved 	Partially achieved 	While jurisdictions continue to roll out non-urban water metering, most are not on track to meet the requirements for AS4747 meter installation on all new and replacement meters. Many jurisdictions do not report on progress and those that do, have low adoption of AS4747 meters.
Compliance and enforcement^f (section 8.4)			
National Compliance Framework implemented	Partially achieved 	Largely achieved 	Jurisdictions have refined their compliance approaches to more closely match the standard set by the National Compliance Framework. There has generally been an increase in compliance activities across most jurisdictions.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraphs 82, 86, 89 ii) and iv) **d.** NWI paragraphs 84–85, 89 iii) **e.** NWI paragraphs 87–88, 89 i) **f.** NWI paragraph 89 i). Note the actions in paragraphs 81 and 83 were date-limited and judged completed by the National Water Commission (NWC 2014), so have not been assessed.

8.1 Water accounts

Summary of actions under the NWI

Parties to the NWI agreed to develop and implement 'robust' water accounting, which ultimately could be reconciled annually and aggregated to produce a national water balance based on all managed water

resource systems. This includes a commitment to develop accounting standards and standardised reporting to enable ready comparison of water use, compliance against entitlements and trading information.³

Previous findings (2021)

Recognising that water accounts are a necessary but not sufficient step in enabling good water management, this assessment also focuses on the outcomes and outputs associated with achieving action items. These are that national water accounting produces i) practical, credible, and reliable information for planners, managers and users, and ii) avoids unnecessary duplication of effort (PC 2021b, p. 145).

In its 2021 assessment, the Commission found that both of these outcomes had been largely achieved, noting that:

water accounts provide key benefits to users (including better investment decisions, risk management and operation decision making), and inform policy decisions in relation to water services and infrastructure investment (ANAO 2014, p. 24; BOM 2016, p. 26) ... Initiatives to reduce reporting burdens and avoid any duplication of effort have progressed. (PC 2021a, pp. 150–151)

The Commission did find that there was still scope for improvement to address information gaps, inconsistencies across jurisdictions, and to meet the demand for more information at the system level⁴ to further improve confidence in water system management and provide better data for planning and adaptation to climate change and extreme weather events.

Assessment (2024)

All jurisdictions supply water account data, but some could provide more comprehensive information

The NWI commits jurisdictions to create robust and useful water accounts. The level of detail of any water account is an important element and means to making them more useful. Participants in this inquiry supported the need for detailed reporting. For example, the Water Justice Hub argued that effective NWI implementation be underpinned by ‘comprehensive, robust, rigorous and transparent water accounting’ (sub. 40, p. 3). Likewise, Hughenden Irrigation Project Corporation stated: ‘water accounting in and of itself is not the primary requirement, as it is merely a tool to good management’ (sub. 1, p. 6).

Jurisdictions differ in the comprehensiveness of their published water accounts. All jurisdictions supply a basic minimal level of information to the Australian Bureau of Statistics (ABS) and the Bureau of Meteorology (BOM), who publish aggregated water account data (ABS 2023d; BOM 2022). These accounts give only a high-level overview of water volumes without any catchment or river-level detail, and no additional analysis or interpretation is supplied. The ABS and BOM accounts are described further in box 8.1. The Northern Territory, Western Australia, Queensland and the Australian Capital Territory publicly report only this high-level information supplied to the ABS and BOM.

New South Wales, Tasmania, South Australia and Victoria have additional self-published comprehensive annual water account reports that are significantly more detailed than the ABS aggregated accounts, and contain catchment level detail including flow heights, historical and current inflows and outflows, physical flow diagrams, summaries of water allocations, among other statistics and analysis (Landscape South Australia Hills

³ NWI paragraphs 81–83.

⁴ Waterways connected physically and in management, for example managed flow releases and transfers between reservoirs occur within the Goulburn Murray water system.

and Fleurieu 2023; NRE Tas 2024a; NSW DCCEEW 2024c; Victorian DEECA 2024c). Water information users would benefit from other jurisdictions progressing towards this higher standard for water accounting.

Box 8.1 – Australian Bureau of Statistics and Bureau of Meteorology national water accounts

The ABS and BOM separately produce national water accounts (known as *Water account, Australia*, and *National water account* respectively) using self-produced data and water account information from jurisdictions. The accounts are largely non-duplicative.

The ABS account provides aggregated water use information, summarising water use and supply for Australia as a whole, as well as at the jurisdiction level. The BOM account reports on the status of, and inputs to, water systems of interest at a more disaggregated scale, including information about, but not limited to the Murray–Darling Basin, Australian capital cities, and for the Ord and Daly northern Australian water systems.

The ABS combines jurisdiction and national level water use and supply statistics with other ABS surveys on economic uses of water. This enables the ABS account to report in more detail on industry water use and on household and industry expenditure on water supply and use. Whereas the BOM report provides more detail on water inflows and outflows within a reporting region. In addition, they provide climate information with metrics on local rainfall, evaporation, soil moisture and streamflow developments within a reporting region.

Source: ABS (2023); BOM (2022).

The limited detail in some jurisdictions' water accounts appears to be hindering achieving higher confidence in water management.

Uncertainty over private water storage, floodplain harvesting and return flows undermines the perceived integrity of holders of water entitlements, increases the likelihood of errors in decision-making, and diminishes trust in decision-making by water governance agencies, especially by the owners of water entitlements. (R Quentin Grafton and John Williams, sub. 40, p. 4)

Even New South Wales, Victoria, South Australia and Tasmania – who provide more detailed reporting – have scope for improvement, with a participant stating that some water accounting data is:

patchy and in some locations, particularly in the Northern Murray-Darling Basin, is subject to large uncertainties. Importantly, data on who, what, how and when, of water use (and return flows) is not publicly available at an individual water diverter level. (R Quentin Grafton and John Williams, sub. 40, p. 2)

Additionally, although Victoria had a consistent track record of timely publication of their annual water accounts going back to 2003, they delayed publishing their most recent 2021-22 annual water account until early 2024. This delay appears partly due to the move to a new digital platform (Victorian DEECA 2024c).

Some water account publications have been delayed

Victoria's delay points to a broader issue of timeliness of annual national aggregated water accounts. The IGWC stated that the lag time in aggregating water accounts is primarily due to the requirement to collate

information from jurisdictions to provide a national picture, with recognition that a refresh of the approach to developing the National Water Account is required (IGWC, personal communication, 21 March 2024). Additionally, the South Australian Department for Environment and Water stated that it has not yet had a formal request for water accounting data for the 2022-23 period from the BOM, with the department citing the requirement of a formal request to enable provision of the data (SA DEW, pers. comm.). The latest national aggregated account available from the BOM is for the 2021-22 period making the information almost two years old at the time of this report.

More concerning, the Murray–Darling Basin aggregated account has not been updated since the 2019-20 period⁵ (BOM 2022). Although some Basin state governments have self-published accounts since 2020, the lack of an aggregated Murray–Darling Basin account since then undermines the value in having a centralised source of updated information, as commented on by WaterNSW:

It is important that this process is not fragmented among different agencies within any one jurisdiction and that the critical mass of skills and expertise is not also fragmented. There are advantages in there being a single source of truth of data [and] making data and insights available to the right end-users in a timely manner. (sub. 55, p. 6)

Many new online tools have been released improving access to water information

Progress has been made by jurisdictions in making water accounting information available online, which improves accessibility for water users and government for water activity planning. South Australia and New South Wales have improved and implemented a variety of dashboards and interactive tools. New South Wales and Queensland have used the same private company to develop their software, creating consistency with their dashboards. Similar consistency exists across dashboards created by South Australia, Western Australia, Tasmania and the Northern Territory. The development of online dashboards has largely been funded by Australian Government grants.

New South Wales has also developed a water account for the unregulated Barwon Darling water system with its first publication for the 2021-2022 water year (NSW DPE 2022c, p. 1).

8.2 Environmental water accounting

Summary of actions under the NWI

Parties to the NWI agreed to develop principles for environmental water accounting and establish and implement an environmental water register with annual reporting arrangements.⁶ Key requirements for meeting the objectives of the NWI include that:

- held environmental water is fully and publicly accounted for, as applies for other entitlement holders,
- there is regular public reporting on how held environmental water is being used (to promote accountability), and
- there is regular public reporting on planned environmental water (to ensure that water is allocated as agreed in water plans). This objective on environmental water outcome reporting is assessed in chapter 7.

⁵ As of 14 May 2024.

⁶ NWI paragraphs 84–85.

Previous findings (2021)

In its 2021 assessment, the Commission found that jurisdictions have largely achieved their NWI commitments for environmental water accounting. That said, there was scope for improvement. For example, while held environmental water was fully accounted for, data collected and reported on both held and planned environmental water could be more comprehensive and consistent between jurisdictions. The Commission also recommended that governments should make provisions for regular and transparent auditing of environmental water holdings.

Assessment (2024)

There has been some limited change since 2021, when the Commission recommended making accounts more comprehensive and reliable (PC 2021a, p. 137). To this end, New South Wales and Queensland have implemented changes to their environmental accounting practices surrounding the return flows from environmental water delivery. Return flows are the water that flows back into a river channel or into a subsequent river system after having been delivered to a location for environmental purposes. If this return flow is not properly accounted for as environmental water, once it reaches the next water system it may be added to the consumptive pool, instead of remaining in the environmental pool, as is the intent. New South Wales has added loss accounting methods which are intended to safeguard some environmental water delivery return flows from consumptive use in some parts of the Murray–Darling Basin in New South Wales until they cross the South Australia border (NSW DPE 2022h, p. 46). Similarly, Queensland and New South Wales have initiated accounting practices for held environmental water crossing their borders, which when combined with proper compliance methods can ensure protection against other uses even in cross-jurisdictional scenarios (NSW DPE 2024).

Given that held environmental water traverses interconnected river systems and jurisdictions, the adoption of cross-jurisdictional accounting standards is a goal that other states and territories should strive for to achieve comprehensive and consistent environmental water accounting.

There is potential scope for improvement in New South Wales and Queensland in the accounting for and protection of environmental water, with the National Parks Association of NSW stating:

there is also a perverse management situation regarding flows down the Darling. The river environment operates as a system, but our administrative system has divided it into two different units where: i) environmental water once it reaches Menindee can become part of the consumptive pool; ii) there appears to be a lack of community transparency about flow agreements from Queensland to New South Wales. (sub. 33, p. 2)

In 2021, the Commission recommended that governments should make provisions for regular and transparent auditing of environmental water holdings. These recommendations continue to be relevant and were supported by participants in this inquiry.⁷

For example, Gwydir Valley Irrigators Association Inc. stated that environmental and other public benefit outcomes:

... could benefit from better implementation of 79 (d) in the [National Water Initiative] 'periodic independent audit, review and public reporting'. (sub. 39, p. 16)

⁷ WIM Alliance (sub. 4), National Farmers Federation (sub. 32), Northern Land Council (sub. 38), Gwydir Valley Irrigators Inc. (sub. 39), R Quentin Grafton and John Williams (sub. 7), National Irrigators' Council (sub. 51), Environment Centre NT (sub. 54), NSW Irrigators' Council (sub. 16).

Since 2021, there has been no progress by jurisdictions towards implementing independent auditing or the public reporting of the performance of environmental water accounting.

Below are examples of jurisdictions' progress under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

New South Wales



New South Wales has new safeguards in accounting for environmental water ('loss accounting'), which apply in the Murray, Lower Darling and Murrumbidgee regulated rivers. The safeguards are a tool to help protect environmental water return flows released in these areas from consumptive use until they cross the South Australia border. Previously, return flows not properly accounted for could add to the consumptive use pool.

Queensland



Queensland and New South Wales have initiated accounting practices for held environmental water crossing their borders, as protection against other uses even in cross-jurisdictional scenarios.

8.3 Water metering and measurement

Summary of actions under the NWI

Parties agreed that metering should be undertaken on a consistent basis in particular circumstances (such as where water access entitlements are traded and in areas where there are disputes over the sharing of available water).⁸ Supporting the NWI commitment for metering to be 'practical, credible and reliable',⁹ the parties in 2009 agreed to a National Framework for Non-Urban Water Metering (the Non-Urban Metering Framework), with a 10-year implementation period, so that all meters would be compliant with the national standard (AS4747 – box 8.2) by July 2020.

Jurisdictions agreed to develop implementation plans to document priorities and targets for non-urban water metering, to publicly report on the implementation of the Non-Urban Metering Framework every two years from 2012, and that BOM would maintain and publish information from state and territory reports on its website.

⁸ NWI paragraph 87.

⁹ NWI paragraph 88.

Box 8.2 – AS4747 standard meters

AS4747 refers to the Australian Standard 4747 which provides guidelines and technical specifications for non-urban water meters used in Australia.

The implementation of the AS4747 standard is outlined in the Metrological Assessment Framework 2. This framework denotes how non-urban water meters should be rolled out by jurisdictions as well as the appropriate regulations and management to provide a nationally consistent approach to non-urban metering. It is intended to meet the following objectives:

1. water take is accurately and reliably measured
2. meters used are fit-for-purpose
3. data from meters can be easily communicated to relevant authorities
4. resources are targeted to higher risk water users and higher-risk water systems
5. mandatory requirements and resources are targeted to higher risk users.

These meters are specifically designed for measuring water usage in non-urban areas, such as agricultural irrigation, rural properties, and industrial sites.

AS4747 meters have been laboratory tested and have met the Australian pattern approval requirements under the *National Measurement Act 1960* (Cth). Principally, this standard requires $\pm 5\%$ measurement accuracy in field settings.

AS4747 meters are also required to be installed by qualified meter installers. These processes provide assurance that AS4747 compliant meters measurement of water is reliable and accurate.

Source: Standards Australia (2013); IGWC, pers. comm. (2024).

Previous findings (2021)

In its last report, the Commission found that while significant progress had been made to implement metering policies, no jurisdiction had fully achieved the NWI commitment of implementing the Non-Urban Metering Framework (PC 2021b, p. 137). Basin states had pushed out the commitment to fully install AS4747 compliant meters until 2025, and other jurisdictions had indicated even longer timeframes. The Commission also found that during the severe drought that affected much of New South Wales and Queensland between 2017 and 2020 there was evidence of widespread lack of compliance with existing metering requirements and commented that this had the potential to undermine confidence in the water management system and needed to be addressed.

Assessment (2024)

Jurisdictions across Australia are facing difficulties meeting the objectives outlined in the Metrological Assessment Framework 2 (MAF2) and seem unlikely to achieve the 2025 goals for AS4747 meter implementation (for new and replacement meters).

Metering progress

Table 8.2 shows the available data on current metering.

Table 8.2 – Metered water take by jurisdiction^{a,b,c}

Jurisdiction	Total metered	AS4747 metered	Non-AS4747 meter	Unmetered water use
New South Wales^d (2023)	79.0%	23.1%	55.9%	21.0%
Victoria (2023)	98.0%	16.0%	82.0%	2.0%
Queensland (2024)	76.0%	No data	No data	24.0%
South Australia (2023)	93.0%	9.6%	83.4%	7.0%
Western Australia	No data	No data	No data	No data
Tasmania	No data	No data	No data	No data
Northern Territory^e (2024)	77%	No data	No data	23%
Australian Capital Territory (2023)	100%	0%	100%	0.0%

a. Figures are from most recent data indicated by year. **b.** Some figures are best estimates as jurisdictions differ in complete knowledge of water licensee metering. **c.** Figures have been rounded and may not add to 100%. **d.** New South Wales figures are for the Murray-Darling Basin region only. **e.** Northern Territory figures are for extraction points metered not total water take.

Source: IGWC (2024, p. 9); SA DEW (2024, p. 2); Victorian DEECA (2024a), Queensland Government (pers. comm.); Northern Territory Government (pers. comm.).

Only Victoria, South Australia and the Australian Capital Territory comprehensively report on AS4747 metering. New South Wales does not, and the above figures for New South Wales are from the Inspector-General of Water Compliance (IGWC) metering report card, which only covers areas of New South Wales within the Murray-Darling Basin (IGWC 2023b, p. 5). The Northern Territory and Queensland report on metering but not AS4747 metering. Tasmania and Western Australia do not report on metering progress at all. The Commission notes that Tasmania is undertaking a review of its water accountability framework under its *Rural water use strategy* with the aim to enhance metering compliance and reporting in future.

For jurisdictions that do report on AS4747 metering, table 8.3 shows progress since 2019-20.

Table 8.3 – Jurisdictions progress on metering water take 2019–2022

Year	New South Wales ^a – AS4747	New South Wales ^a – All	Victoria – AS4747	Victoria – All	South Australia – AS4747	South Australia – All
2019-20	N/A	N/A	14%	84%	1.4%	92.8%
2020-21	5.5%	78.4%	N/A	N/A	4.8%	93.5%
2021-22	19.4%	81.8%	16%	98%	8.3%	93.7%

a. New South Wales figures are for the Murray-Darling Basin region only.

Source: IGWC (2023a, p. 5, 2023b, p. 5); SA DEW (2022d); Victorian DELWP (2020a, 2022e).

Victoria, New South Wales and South Australia have all recorded increases in AS4747 metering, but AS4747 meters remain the minority.

The limited reporting of AS4747 metering implementation across jurisdictions is problematic. Metering progress reporting is valuable as it can assist in identifying where and what the barriers to full pattern approved metering are. The difference between total metering rates and AS4747 metering rates for example, can indicate specific barriers to the attainment of higher standard AS4747 metering. Catchment or region-based breakdowns of uptake can additionally help at jurisdiction level in identifying specific local uptake issues to which governments can initiate tailored interventions to increase meter adoption. Participants in this inquiry gave support for greater reporting, with Irrigation Australia Ltd stating:

We agree that non-urban water users' compliance with the AS4747 metering standards should be reported. (sub. 58, p. 2)

Likewise, NSW Department of Climate Change, Energy, the Environment and Water stated that:

... the Productivity Commission should consider in tracking the success of implementing the Metrological Assurance Framework (MAF) is the lack of good reporting. To improve this, clear and achievable reporting metrics need to be developed that reflect the desired outcome. (sub. 77, p. 10)

Regulatory barriers to AS4747-consistent metering

Under the MAF2, each jurisdiction has discretion to decide their own grandfathering and exemption arrangements from the AS4747 standard, which has led to a patchwork of compliance arrangements across the country. This patchwork – characterised by a lack of legislative consistency – is undermining implementation of non-urban water metering according to participants in this inquiry. For example, Lachlan Valley Water Inc said:

Consistency of standards across jurisdictions is required to achieve best practice monitoring and compliance, so the NWI should be amended to require consistency among jurisdictions on the degree of accuracy of monitoring required to be achieved. (sub. 21, p. 10)

New South Wales, Victoria and the Australian Capital Territory have determined (from 2024) 'existing meters can be retained provided they are validated as accurate to AS4747 requirements' (DEECA 2020, p. 4; DEW p. 1; IGWC 2023, p. 5), which is $\pm 5\%$ accuracy in field conditions. Additionally, water users in these jurisdictions must actively apply for exemption/grandfathering status for their water meters or install new compliant meters.

South Australia has adopted a more generous blanket grandfathering position:

Meters installed post 1 July 2019 must comply with the national metering standards ... Meters installed prior to 1 July 2019 do not need to comply with the national metering standards as these meters are grandfathered and therefore exempt. This means that these meters are not required to be pattern approved, validated or maintained by certified persons (SA DEW 2019b).

As a result, 'all meters in South Australia are compliant with the State's metering policy' (IGWC 2023b, p. 7) with no reported non-compliance. An inaccurate meter from a water user in South Australia can remain undiscovered, and is only legally required to be tested by the regulator:

- if deemed necessary by the Minister
- to verify that the meter is operating within acceptable accuracy limits if:
 - meter security seals are broken by a person not authorised under this specification;
 - it is reasonably suspected that the meter is not operating within acceptable accuracy limits;

- maintenance activities that affect or will affect the metrology of the meter are undertaken by a person not authorised under this specification
- where otherwise directed by the Minister (SA DEW 2019a, p. 5).

Generous grandfathering arrangements mean that non-compliance reporting has largely been rendered ineffective as an incentive for water users to comply with AS4747 standards. The results of this reduced incentive appear to be contributing to South Australia's relatively low AS4747 uptake. South Australia intends to implement a revised metering framework in July 2024, which includes, among other changes, an increase in inspections of grandfathered meters, particularly aiming to inspect all high-risk water meters within five years of framework implementation (SA Government, pers. comm.).

And without rigorous reporting of non-compliance, regulators are limited in their ability to encourage uptake of compliant metering. The Australian Water Association stated a lack of transparent reporting, coupled with a lack of compliance and enforcement mechanisms were key barriers to implementation:

... efforts to implement real-time monitoring and measuring of water extraction in the Murray-Darling Basin had been sluggish and inconsistent, highlighting the need for transparent monitoring, regulation, compliance, and enforcement mechanisms. (sub. 43, p. 16)

Other barriers to uptake of AS4747 meters

Communication and education

Beyond the classification of meter compliance by regulators, participants in this inquiry also flagged poor communication to and education of water users' metering requirements under MAF2, as a key barrier to meter uptake. Gwydir Valley Irrigators Association Inc. outlined several barriers, stating:

There were issues with availability and suitability of AS4747 meters, issues with availability of and requirements of Duly Qualified People, telemetry issues, as well as poor education and communication of metering requirements and reporting. (sub. 39, p. 16)

Similarly, NSW Irrigators' Council stated a key barrier was:

Poor education and communication of metering report and recording requirements. (sub. 16, p. 27)

They also stated:

The overlapping metering requirements on licence conditions, Water Sharing Plans (WSPs) and the Metering Policy have led to confusion over what and when water users need to comply with. (sub. 88, p. 11)

In recognition of this issue, New South Wales has increased staged and targeted regional metering education programs (NSW DPE 2023g, pp. 9–25).

Costs of meter installation and maintenance

Participants in this inquiry have cited installation costs as another barrier to metering uptake, particularly for smaller users. The National Irrigators' Council stated that the AS4747 meter standard is too narrow and specific to Australia, limiting effective use of existing international meter standards and the increased supply and lower costs that could result from using these standards (sub. 84, p. 7).

Another participant stated that compliant meters for their two large river pumps cost \$32,000 (Andrew Watson, pers. comm., 11 April 2024). They also stated that it is not financially feasible for small water users in their communities, some with relatively small 16 ML entitlements, to purchase a required \$5,000 meter (Andrew Watson, pers. comm., 11 April 2024). To contextualise these costs, a 16 ML high reliability

entitlement in the New South Wales Murray system was valued at approximately \$128,000 in 2021-22¹⁰ (BOM 2023a, p. 62).

NSW Irrigators' Council stated:

metering requirements place undue costs on low risk (smaller) water users. (sub. 16, p. 27)

Cotton Australia was unconvinced that complying with the AS4747 standard offers sufficient benefit for the costs involved:

AS4747 metering may have sounded like a good idea at the time, but it is proving to be very expensive, providing no apparent benefit, and in many cases incapable of sustained operation in the Australian environment. (sub. 91, p. 3)

In water areas that are not overallocated, jurisdictions often have exemptions for smaller water users (less than 100 mm wide water pumps in some instances in New South Wales) (NSW DCCEEW 2024i) or those with smaller water entitlements (less than 10 ML in some Victorian catchment areas) (Victorian DELWP 2020, p. 17).

Qualified meter installers

Under the MAF2, meters must be installed by a Certified Meter Installer (CMI), or equivalent Duly Qualified Person (DQP). Participants in this inquiry have commented that some water users have been unable to secure a DQP to install their meter (NSWIC 2023, p. 22). NSW Irrigators' Council stated that there is a:

limited DQP supply in all New South Wales valleys. (sub. 16, p. 27)

The Commission sought further information in its interim report on barriers to uptake of AS4747 meters (information request 8.1). In response, some participants stated that it is not economical to become a DQP in many instances, with the high travel distances between customers, low pay compared to other similar jobs (NRAR, pers. comm. 24 April 2024; NSWIC, sub. 88, p. 11) and burdensome administrative requirements involved in lodging for compliant meter certifications limiting interest in the occupation (Irrigation Australia, sub. 58, p. 2).

Between 2021 and 2023, DQP numbers increased in New South Wales, South Australia and the Australian Capital Territory. DQP numbers were variable in Queensland in this period, while decreasing in Victoria (IGWC 2023b, p. 3, 2024, p. 3). This has contributed to the Victorian Government implementing a state exemption to account for the 'historic lack of pattern approved meters and the relatively high cost of the available AS4747 compliant meters' (Victorian DELWP 2020, p. 9). Similarly, Queensland has not implemented a timeframe for mandating AS4747 for all new and replacement meters. Queensland states they are ensuring that decisions around implementation timeframes are based on evidence that metering is done when 'clear benefits can be established' and that 'requirements can be successfully implemented on the ground' (Qld DRDMW 2023e, p. 4).

Increasing measurement of harvested overland flows (floodplain harvesting)

To meet NWI commitments for complete accounting of water use, jurisdictions have been required to expand water use measurement to water users who harvest water from overland flows and floodplains. Although overland flows occur in floodplains across Australia, outside New South Wales and Queensland, water from such flows is not significantly taken for irrigation.

¹⁰ \$8,000 was the approximate median value per ML in the NSW Murray water system in 2021-22 as per figure 6.7 in the Australian water markets report 2021-22.

Floodplain harvesting constitutes a significant proportion of water use in some New South Wales and Queensland water systems, with Gwydir Valley Irrigators Association Inc. stating in respect of the Gwydir:

Floodplain harvesting licenses were issued in 2022 and contribute almost a quarter of the water use in the region over the long term. (sub. 39, p. 6)

Since 2021 Queensland and New South Wales have taken steps to increase the measuring of this water, however, it remains a relatively under regulated area of water use and has not yet met NWI goals for complete accounting of water use. Accurately implementing overland flow measurement faces similar challenges to those jurisdictions that have had challenges in implementing metering and measurement of water take generally. The National Parks Association of NSW stated:

Queensland and NSW have a patchy network of metering, are challenged in measuring unmetered take such as floodplain harvesting and lack real-time accurate water accounts. (sub. 33, p. 3)

In 2023, the Queensland Parliament passed legislation to require water users to implement overland flow measurement plans. As of June 2023, only one of Queensland's three Murray–Darling Basin water resource plan areas has implemented floodplain harvesting (IGWC 2024, p. 17). Between June 2021 to June 2023, the floodplain water take that is licenced in Queensland increased from 41% to 46% of 608 GL (based on long-term average baseline diversion limits; (IGWC 2023b, p. 2; 2024, p. 18).

In New South Wales since 2021, four out of five northern inland regions have licensed their floodplain harvesting, up from none in 2020 (IGWC 2024, p. 17) (chapter 4). Measurement and licensing of all floodplain harvesting by 1 July 2022 was a New South Wales Government goal, and has not been met.

The New South Wales Natural Resources Access Regulator (NSW NRAR) has also begun using spatial data on connected river systems and dams to reconcile water flows into dams from runoff and other sources. This reconciliation helps identify and account for the source of dam water, and the degree to which it is composed of floodplain flows, to help monitor compliance with licensing conditions (NRAR, pers. comm. 24 April 2024).

New South Wales

Unlike most other jurisdictions, New South Wales has a stepped-out plan for metering compliance, with different regions delivered in different years, and each rollout being packaged with specific engagement and education for each region. New South Wales has had a greater rate of AS4747 metering implementation compared to South Australia and Victoria (the only other jurisdictions that report on AS4747 metering compliance) over the period 2020 to 2023. But overall, it appears unlikely that New South Wales will have all water take metered by 2025.

New South Wales did not achieve its 2020 commitment that all floodplain harvesting would be licensed and measured by 1 July 2022. Currently four out of five Northern Inland regions have licensed their floodplain harvesting up from none of them in 2020.

Victoria

As of 2022-23, 98% of water take in Victoria is metered, up from 84% in 2019-20 (The remaining 2% is exempt under the MAF2 as Victoria determines the costs of metering would exceed the benefits). Of the total metered water take, 89% is rated 'compliant' ($\pm 5\%$ accurate), and only 16% is measured through AS4747 meters (Victorian DEECA 2024a).

Queensland

Queensland has secured funding of \$3.7 million from the Australian Government to increase uptake of telemetry¹¹ by subsidising up to 950 telemetry devices (Butcher 2023a).

Queensland measures floodplain harvesting in the Murray–Darling Basin region only, using estimates based on storage levels (MDBA 2022, p. 41)

South Australia

There has been a small increase in AS4747 metering from 1.4% to 8.3% over the past three years. South Australia does have the highest official rate of overall meter compliance, but this is because its local rules uniquely designate all previously compliant meters installed prior to 1 July 2019 as compliant under new MAF2 rules with no testing of actual accuracy required.

The Commission notes that South Australia's meter compliance checking rates appear to have declined since 2020, alongside a high rate of reported meter compliance. Combined with lower standards for metering compliance, fewer meter compliance checks will likely contribute to continued slow AS4747 meter uptake.

8.4 Compliance and enforcement

Summary of actions under the NWI

State and territory governments are responsible for administering water compliance and enforcement laws within their jurisdiction. The *National Framework for Compliance and Enforcement Systems for Water Resource Management* (the National Compliance Framework) implemented a 2009 Coalition of Australian Governments' commitment to improve compliance and enforcement of water resources, and represents the nationally agreed standard for ensuring compliance with state-based water laws and regulations.

The National Compliance Framework has six major components:

1. Water laws – each jurisdiction agreed to use 'best endeavours to introduce and pass legislation to adopt consistent offence provisions to minimise unlawful water take'.
2. Risk assessment – assessment of all water resources according to a nationally consistent risk profile requiring minimum levels of compliance monitoring by jurisdictions in line with the level of risk categorisation.
3. Toolbox – development of new and efficient processes and products to improve the efficiency of compliance activities and the skills of compliance officers.
4. Stakeholder education – a structured approach to 'provide information to educate the public and the stakeholders on the importance of compliance and enforcement of water resources management to the environment and other water users'.
5. Monitoring – compliance monitoring rates should be based on the level of risk. The majority of monitoring activity will take place where there is high competition for water resources with more compliance officers in the field to 'carry out annual monitoring events equal to 10% of the total number of water entitlement/licence holders of a water resource, using on ground officers'.

¹¹ Automatic collection and transmission of data from remote sources.

6. Reporting – publication of annual reporting and compliance strategies, plans and statistics by water agencies.¹²

Previous findings (2021)

In its 2021 report, the Commission found that there had been significant strengthening of compliance and enforcement activities in almost all jurisdictions, including several legislative changes to strengthen penalties and offences (PC 2021a, p. 28). However, the Commission considered that most jurisdictions were yet to fully implement the National Compliance Framework.

The Commission also called for a revised National Compliance Framework, as the current iteration lacked implementation of strong independent compliance culture and had insufficient resourcing and capability building. Several jurisdictions had pending reforms, and others did not publish sufficient information about compliance activities making it difficult to determine the effectiveness of their implementation, an issue highlighted by several inquiry participants.

Assessment (2024)

The National Compliance Framework has mostly been implemented

The commitment by jurisdictions to implement the National Compliance Framework is mostly being met. Jurisdictions conform to a similar compliance approach with cross jurisdiction consistency in enforcement activities utilised (National Compliance Framework 1). Likewise, all jurisdictions espouse – and reported compliance statistics support – a compliance pyramid approach whereby the principal method to increase compliance is a focus on education and information being used for lesser inadvertent infringements, with prosecutions and enforcements restricted to serious and deliberate non-compliance (National Compliance Framework 2, 4).

Further, increasing use of new monitoring technology is evident in some jurisdictions, with monitoring activities targeting catchments and water users based on a risk assessment framework (National Compliance Framework 3, 5). Some exceptions to full implementation are present around the comprehensiveness of published annual compliance activities and some jurisdictions are not making progress in increasing the capability and variety of compliance tools they deploy.

There are still improvements to be made by all jurisdictions to fully implement the National Compliance Framework. In 2021, the Commission found that, Western Australia, Tasmania and the Northern Territory were lagging in implementation. Since then, Northern Territory has made progress, while Tasmania is notably behind other jurisdictions.

Compliance and enforcement activities

Reporting of compliance activities is mostly sufficient. To meet best practice, jurisdictions could try to meet the transparent compliance activity statistics standard achieved by New South Wales, the Australian Capital Territory and South Australia, in addition to publishing annual compliance level strategies.

¹² COAG (2012).

Across jurisdictions, compliance activities show diverging trends. Most jurisdictions have increased compliance efforts and enforcement activity:

- Annual meter site visits increased in the Australian Capital Territory from 2020 to 2023 from one to 47 (ACT TEDD 2023, p. 359).
- Annual audits of water management activities (water take, licence conditions compliance) increased in Queensland from 2021-22 to 2022-23 from 916 to 1454 (Qld DRDMW 2022a, p. 19; 2023a, p. 26).
- Annual compliance investigations finalised in New South Wales from 2019-20 to 2022-23 increased from 1,367 to 1,551 (NSW NRAR 2024c).
- Northern Territory began reporting on license inspections in 2020, with a goal of 20% of water licenses per year inspected (NT DEPWS 2023e).

Decreased activity was apparent in the following jurisdictions:

- Between 2020-21 and 2022-23, annual enforcement actions taken in Victoria remained steady despite potential compliance breaches almost doubling in these two years from 1,393 to 2,186 (Victorian DEECA 2023d).
- Between 2020-21 and 2022-23, annual site visits relating to unauthorised water take/use or non-compliant metering declined in South Australia from 2,964 to 1,881 (21% of meters down to 13%) (SA DEW 2021c, p. 2; 2023c, p. 3).

An increase in compliance activity is an important complement to other measurement and metering policies designed to increase uptake.

Compliance rates are generally improving due to increased and more effective monitoring

Alongside increased compliance activity, New South Wales and the Northern Territory have seen a declining non-compliance rate (IGWC, p. 24) (NT DEPWS 2023e), illustrating the importance of compliance activity to achieve effective monitoring under the National Compliance Framework.

The efficient use of technology is also important for increasing compliance. Victoria has the highest use of telemetry to monitor water users water take at 76% (Victorian DEECA 2024a). New South Wales has increased the use of remote sensing with numerous catchments monitored for volumetric changes in dams, with comparisons against metered take at properties used to ensure compliant water take (NSW DPIE 2020a, p. 8). The use of satellite technology has been adopted by NSW NRAR particularly in enforcing water licence rules around floodplain harvesting (NSW NRAR 2024b). Queensland and Western Australia also report use of remote sensing technology in their compliance strategies (Qld DRDMW 2023h, p. 2; WA DWER 2024c).

The Australian Capital Territory, Northern Territory and Tasmania do not report use of any form of remote sensing technology. In the Australian Capital Territory, the small geographic size reduces the net benefit of implementing remote sensing.

The Northern Territory and Tasmania have had contrasting outcomes for jurisdictions that do not utilise telemetry for compliance checks and instead rely on site inspections. The Northern Territory has achieved its 2020 goal of inspecting 20% of meters annually. The Northern Territory has also observed major improvements resulting from a targeted compliance and enforcement priority list for 2021–26 (and a new compliance plan in 2022-23) which combines greater meter checks, with educational and behavioural strategies, such as monthly reminders to submit water meter readings, a new accessible MyMeter online digital app, and auditing of monthly meter reading submissions (NT DEPWS 2023d, p. 2). Alongside this tranche of efforts, audited compliant self-reported meter readings increased from 77% in June 2022 to 94% in March 2023.

In the same period (2020–23), Tasmania has audited only 13% of water licensees. The Northern Territory has accomplished its high inspection rate with only five Full Time Equivalent staff and a significantly larger land mass. Tasmania’s comparatively low inspection rate may indicate under resourcing for this objective, or inefficient inspection practices, supporting the Commission’s finding in 2021 that resourcing for these activities appears to be insufficient (PC 2021b, p. 140).

New South Wales



Compliance rates and investigations into non-compliance have increased. New South Wales publishes full, regional breakdowns of compliance strategies and performance (NSW DCCEE 2024f). A recent prosecution in New South Wales for water theft of 365 ML was predicated on meter read anomalies by Western Murray Irrigation as well as an investigation into pipeline tampering (Bannister 2024; NSW NRAR 2024a).

NSW NRAR has proposed a more accurate valuing of illegally taken water on which to base penalties. The current method used by NRAR relies on average trade values from a highly specific water source. However, most water sources in New South Wales are not actively traded. Consequently, prices tend to instead default to an administrative charge based on utility service costs, which is significantly lower than a true market value of the water. The new method expands its scope geographically, using trades (greater than 20) to establish an accurate market rate within the water source, water sharing plan area, or region (NSW DCCEE 2024d). By linking penalties to the value of stolen water, this approach enhances deterrence, imposing proportionately higher penalties on high-risk water from scarce catchments or heavily irrigated sources compared to where water may be abundant, in low-use areas.

Victoria



Victoria has legislatively expanded its tools for issuing infringements, adding an infringement notice option. The use of warnings letters has increased, as have investigations into non-compliance (Victorian DEECA 2023d). Victoria is the leading user of telemetry to monitor water take.

Queensland



Queensland undertakes a high number of meter audits (6,383 in 2022-23) and other investigations into unauthorised water take (Qld DRDMW 2023a, p. 26). This rate of meter auditing has remained steady since 2020. Queensland has increased its investment in education and social media presence to improve knowledge of water take rules amongst water users.

In 2022, the Queensland Government initiated a telemetry subsidy for water entitlement holders in areas deemed to be high-risk water management areas in the Murray–Darling Basin (Qld DRDMW 2023i). Use of telemetry allows for near real time sending of water meter data to jurisdiction water agencies for both planning and compliance purposes, removing the need for manual meter reads and sending of meter information by water users (Qld DRDMW 2023i). Queensland has also been trialling a WaterIQ app, which assists water users in submitting meter reads and self-reporting faulty meters (Qld DRDMW 2023h, p. 16).

Tasmania



Tasmania has a relatively low rate of compliance activity, visiting 13% of water license holders (or 16% of all water allocations) between 2020–23 (NRE Tas, pers. comm., 22 May 2024) (compared to 20% of licenses annually in the Northern Territory). The Tasmanian Government also does not use telemetry or remote sensing technology.

Northern Territory



The Northern Territory Government started producing an annual compliance report card in 2020 (NT DEPWS 2022b). A new compliance and enforcement priority list (NT DEPWS 2021b) and a compliance plan (NT DEPWS 2023g) were also released. This plan contains development of a MyMeter app platform, auditing of monthly meter read submissions, monthly reminders and meter site visits.

8.5 Finding and recommendation

The Commission's renewal advice from chapter 10 of the *National Water Reform report 2021* remains valid, and the Commission reiterates that advice.

To meet existing objectives of the NWI, a further recommendation is below, with an additional finding.



Finding 8.1

Jurisdictions are not projected to meet their metering installation commitments

Most states or territories are not on track to meet their commitment to have all new and replacement meters AS4747 compliant and have all water entitlements metered by July 2025. This undermines the ability of states to conduct proper measurement of watering limits and increases the risk of unreported water use and overextraction.

The private benefits for water users to upgrade their water meters to AS4747 standard are low and therefore not a sufficient incentive to upgrade.



Recommendation 8.1

Improving the rollout of AS4747 meters

To better allow water users and the public to benefit from the improved AS4747 standard, jurisdictions should take steps to accelerate their rollouts.

Jurisdictions should:

- report annually on non-urban water users' compliance with the AS4747 metering standards
- actively engage with non-urban water users to improve understanding of their metering compliance requirements
- set a higher bar when approving interim standard or grandfathered water meters
- for both interim and grandfathered meters, water users should be required to actively prove their meter is accurate to within $\pm 5\%$ as is the requirement in Victoria, New South Wales and the Australian Capital Territory.





9. Urban water reform

This chapter considers progress in achieving outcomes under element 6 of the National Water Initiative (NWI) – urban water reform.¹

Under this element, all jurisdictions agreed to provide healthy, safe and reliable water supplies, increase water use efficiency and encourage innovation, achieve improved pricing, and facilitate water trading between the urban and rural sectors.^{2,3} The NWI outlined specific actions on demand management, innovation and capacity building.

Past water reforms have delivered significant benefits for urban water users but many of these benefits were achieved in the early 2000s. In 2021, the Productivity Commission found that the lack of detailed actions in the NWI for the urban water sector, coupled with the changing climate and the frequency of extreme weather events have made this element of the NWI largely irrelevant to the sector's future (PC 2021b, p. 161). Nevertheless, a summary of the Commission's assessment framework (appendix B) – which does not map perfectly against the action items – and progress against it is in table 9.1. The notes to the table indicate which assessment items relate to which NWI outcomes.

Table 9.1 – Assessment summary: Urban water reform

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Urban Water Service Quality^c (section 9.1)			
Achieving healthy and safe water supplies: Major cities	Achieved 	Achieved 	Water quality compliance is generally achieved and is supported by appropriate regulatory frameworks and monitoring.
Achieving healthy and safe water supplies: Regional and remote^e	Largely achieved 	Largely achieved 	Some regional and remote areas still do not have access to safe drinking water supply. There is a lack of consistent monitoring and regulation in some communities. Jurisdictions are taking steps to improve regional and remote service quality.

¹ Urban water services are diverse in scale and scope. They are delivered to households and businesses in cities with millions of people through to regional town centres and remote communities that might have fewer than 100 people. Urban water services include the supply of potable (drinking quality) water, wastewater services, stormwater management and water recycling. Urban water systems are complex, and can be capital intensive, characterised by long lived and expensive infrastructure, such as water treatment plants, distribution networks and drainage systems.

² NWI paragraph 90.

³ This chapter does not consider facilitating water trading between the urban and rural sectors (NWI paragraph 90 iv)) nor improved pricing for metropolitan water (NWI paragraph 90 vi)). These aspects of urban water reform are assessed in chapters 5 and 6 respectively.

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Water reuse, end use efficiency, water sensitive urban design and innovation^d (section 9.2)			
Pursuing water reuse, end use efficiency, water sensitive urban design and innovation	Largely achieved 	Largely achieved 	Jurisdictions have made some progress in this area and substantially met their commitments under the current NWI. Although efforts to embed integrated water cycle management as 'business as usual', should continue.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraph 90 i) **d.** NWI paragraph 90 ii), iii) and v). **e.** For the purpose of this chapter, 'regional and remote' are defined in accordance with the Australian Bureau of Statistics (ABS) remoteness (ABS 2023c). Broadly, this encompasses all areas (both urban and rural) outside of the capital cities and nearby major cities. Rural communities (smaller communities outside of cities and towns) are defined as a subset of 'regional and remote' communities in this chapter.

9.1 Urban water service quality

Summary of actions under the NWI

The NWI committed jurisdictions to providing healthy, safe and reliable water supplies,⁴ but did not include any specific actions to address these aspects of water service delivery. In the absence of specific actions, the Commission has considered the following to assess progress towards achieving healthy, safe and reliable water:

- the extent to which state and territory drinking water quality management and reporting frameworks reflect the *Australian Drinking Water Guidelines* (ADWG)
- water service outcomes (including drinking water quality and reliability)
- policy changes and programs designed to improve water service outcomes.

Previous findings (2021)

In 2021, the Commission (2021a, p. 175) found that water services in major cities were achieving the NWI outcome of safe, healthy and reliable water supply. Tasmania and Western Australia made progress in addressing areas of water supply risk in regional and remote areas, but issues persisted in the Northern Territory. Drought had led to significant service quality issues in parts of New South Wales and Queensland, which indicated that more could be done to ensure communities were prepared for drought.

The Commission also found that on balance, NWI outcomes were being achieved in most regional areas but problems with drinking water quality remained in many remote Aboriginal and Torres Strait Islander communities. The Commission highlighted that there was limited, if any, data published by governments on communities that self-supply, or on remote Aboriginal and Torres Strait Islander communities (PC 2021a, p. 175). However, the studies and data that were available showed that water quality problems persisted in many of these communities, with chemical and biological contamination, palatability issues and water security concerns. The absence of a centralised register also made assessing compliance with the ADWG

⁴ NWI paragraph 90 i).

difficult in jurisdictions with many utilities (e.g. where local governments are responsible for urban water services such as Queensland and New South Wales). The Commission also found that New South Wales was not reporting regional and remote water quality outcomes in a timely fashion – remedying this would improve transparency.

Assessment (2024)

Drinking water quality management and reporting frameworks

The ADWG provide the framework within which drinking water quality outcomes can be monitored and managed, consistent with the overall objective of healthy and safe water supplies. The ADWG form part of the *National water quality management strategy* (paragraph seven of the NWI) and are overseen by the National Health and Medical Research Council. Since the Commission's 2021 inquiry, minor updates have been made to the ADWG to reflect current best practice in managing health risks from microorganisms, and radiation protection and measurement (NHMRC 2022).

All jurisdictions have arrangements in place to implement the ADWG, but these regulatory arrangements vary across and within jurisdictions (table 9.2). Implementation of these jurisdiction-based regimes typically require water service providers to establish risk management, monitoring and reporting regimes consistent with those set out in the ADWG, and to report on instances of contamination exceeding the guideline parameters. In 2021, the Commission noted that water quality regulation in regional and remote areas of New South Wales, Western Australia and the Northern Territory were less rigorous than the major cities.

Table 9.2 – State and Territory drinking water quality regulation

	Utility	Legislation	Notes
NSW	WaterNSW	<i>Water NSW Act 2014</i>	The legislation empowers the Independent Pricing and Regulatory Tribunal (IPART) to administer utility operating licences, which specify that drinking water should be managed in accordance with the Framework for Management of Drinking Water Quality in the ADWG. NSW Health maintains a Memorandum of Understanding (MOU) with the water businesses, which facilitates cooperation.
	Sydney Water	<i>Sydney Water Act 1994</i>	
	Hunter Water	<i>Hunter Water Act 1991</i>	
	All NSW drinking water suppliers	<i>Public Health Act 2010</i> <i>Public Health Regulation 2022</i>	The legislation requires drinking water suppliers to develop and adhere to a quality assurance program in accordance with the Framework for Management of Drinking Water Quality in the ADWG. Regional utilities are subject to NSW Health's Drinking Water Monitoring Program.
Vic	All Victorian water businesses	<i>Safe Drinking Water Act 2003</i> <i>Safe Drinking Water Regulations 2015</i>	The legislation requires a range of designated water businesses (water suppliers and water storage managers) and other statutory authorities that supply drinking water to the public to provide safe, high-quality drinking water. The regulatory framework is consistent with the ADWG and includes a risk management framework 'from catchment to tap', a set of standards for key water quality criteria,

Utility	Legislation	Notes	
Qld	All Queensland drinking water service providers	<i>Water Supply (Safety and Reliability) Act 2008</i> <i>Public Health Act 2005</i> <i>Public Health Regulation 2018</i>	information disclosure requirements for water businesses and community consultation processes. The legislation requires each drinking water service provider to register and develop a drinking water quality management plan, and sets standards based on the ADWG parameters stated in the physical and chemical guideline table. Queensland Health provides directions during public health incidents.
WA	All water corporations ^a and regional providers ^b	<i>Water Services Act 2012</i>	The legislation sets out licensing conditions for water service providers. The Economic Regulation Authority issues licences based on compliance with an MOU with WA Health. WA Health audits water quality and management to comply with the ADWG through the MOU. For regional providers, exemptions to licensing may be granted or revoked by the Minister for Water.
SA	All entities who supply drinking water to the public ^c	<i>Safe Drinking Water Act 2011</i> <i>Safe Drinking Water Regulations 2012</i>	The legislation requires all providers to register with SA Health, implement a risk management plan. Providers are subject to audits and inspections to implement the ADWG.
Tas	TasWater	<i>Public Health Act 1997</i>	The legislation requires that the regulated entity (TasWater) must manage water in a manner that does not pose a threat to public health, and it is required to prepare a water quality management plan to promote and maintain the quality of the water. The Director of Public Health issues Tasmanian Drinking Water Quality Guidelines based on the ADWG. The Guidelines apply to TasWater, private drinking water suppliers and water carriers.
NT	Power and Water Corporation and Indigenous Essential Services	<i>Water Supply and Sewerage Services Act 2000</i>	The legislation outlines minimum standards of service that the licensee (Power and Water Corporation) must meet when providing water supply to customers in licenced areas, but there are currently no minimum standards for drinking water outlined in the legislation. Instead, NT Health has an MOU with the Power and Water Corporation and Indigenous Essential Services. The Power and Water Corporation implements internal water quality monitoring in line with the ADWG.
ACT	Icon Water	<i>Public Health Act 1997</i> <i>Public Health (Drinking Water) Code of Practice 2007 (the Code) (No1)</i> <i>Utilities Act 2000</i>	ACT Health issues the Code which provides a framework for reporting and water quality management relating to the supply of drinking water. Icon Water must comply with the Code to be issued,

Utility	Legislation	Notes
		and to continue to comply with, the Drinking Water Utility Licence.
<p>a. Water Corporation, Busselton Water and Aqwest. b. Responsibility for delivery of water and wastewater services for 141 remote Aboriginal communities was transferred from the Department of Community Services to Water Corporation in 2023. c. Includes SA Water, operators of independent town supplies and supplies in rural and remote communities, water carters and providers of drinking water in facilities including hospitals, accommodation premises, child care and aged care centres.</p>		
<p>Source: Icon Water (2023, p. 9); NSW DoH (2022, 2023a, 2023b); NT Government (2022, p. 6); PowerWater (2022, pp. 7–11); Qld DoH (2022b); Qld DRDMW (2022b, p. 172); SA DoH (2024); Tasmanian DoH (2023); Tasmanian DHHS (2015, p. 4); Victorian DoH (2022); WA DoH (2023); WA Government (2024e).</p>		

Below are some examples of jurisdictions' progress, maintenance or backsliding under this policy area. Where a jurisdiction is not shown, it is because the Commission has not identified any significant change since 2021.

New South Wales

Since 2021, the NSW Government has made changes to the regulation of their local water utilities with the release of the *Regulatory and assurance framework for local water utilities* (NSW DPE 2022i). This updated and amended framework aims to improve regulatory settings and should allow for regulators to better identify risks and manage water more effectively and efficiently. The NSW Government has also developed guidance to support water utilities to incorporate health-based targets into drinking water management systems and proposals related to water treatment, sewerage and reuse works (NSW DoH 2023c).

Western Australia

The WA Government has made changes to the provision and regulation of water and wastewater services to remote Aboriginal communities. In 2023, the WA Government transferred responsibility for water and wastewater services for 141 remote Aboriginal communities to the Water Corporation (WA Government 2023b). The WA Government has committed an initial \$200 million from the Remote Communities Fund for upgrades and improvements to power and water infrastructure, and improvements to water quality (Water Corporation 2023). These services were previously provided by the Western Australian Department of Communities and were unlicensed. These changes follow a Western Australian Auditor General's Report (2021, p. 22) which found that there were 44 Aboriginal communities where water was not tested for microbial contamination.

The Water Corporation has commenced a program of service upgrades and is working with the Western Australian Department of Water and Environmental Regulation to ensure it meets its regulatory requirements. The Water Corporation is working towards implementing higher levels of monitoring and reporting on water services so they can better understand requirements and identify potential improvements (Water Corporation nd). The WA Government has indicated that water quality data will be monitored by the Department of Health under the existing Memorandum of Understanding (MOU) between the Department of Health and Water Corporation for Drinking Water (WA Government, personal communication). The Commission understands that the Water Corporation is working towards increased monitoring in the 44 communities without compliance-based monitoring as a priority, with an annual report to be prepared for the 2023-24 period in consultation with the Department of Health (WA Government, pers. comm.).

Northern Territory

In the Northern Territory, drinking water standards are not set in legislation. Instead, a *Memorandum of Understanding (MoU) between the Department of Health, Power and Water Corporation, and Indigenous Essential Services Pty Ltd for drinking water* (NT Government 2022, p. 1) outlines a statement of mutual intention of the parties, but is not legally binding. The MOU outlines:

The Department and the Corporation accept that pursuant to Section 45 of the *Water Supply and Sewerage Services Act 2000* (NT) no minimum standards for Drinking Water quality have been set in licensed areas. Similarly, the Department and IES accept that no minimum standards have been set for areas not subject to the Act. However, the ADWG will be used as the primary reference regarding the quality of Drinking Water and management of Drinking Water quality. (NT Government 2022, p. 6)

The Commission notes that the NT Government plans to introduce safe drinking water legislation by 2024, 'that commits to transparency in drinking water quality which will be monitored against agreed guideline values through plans outlining how water quality will be improved' (NT OWS 2023c, p. 24). Under the new legislation drinking water providers will be required to develop and maintain safe drinking water management plans (NT Government, pers. comm.). The NT Government has also indicated that once the legislation is enacted the Department of Health will be able to regulate the quality of public water supplied to cities, towns, remote communities and some homelands (above a certain population size) (NT Government, pers. comm.).

Water service outcomes

The Commission has undertaken a high-level review of water service quality outcomes which incorporates both drinking water quality outcomes and service reliability for major cities. Drinking water quality outcomes reported by jurisdictions are summarised in table 9.3.

Table 9.3 – Water quality outcomes

Reported compliance

	Reporting entity	Reporting Period	Outcomes
NSW	Sydney Water	2022-23	Full compliance with the ADWG long-term health and aesthetic parameters
	Hunter Water	2022-23	99.94% microbiological compliance. 100% aesthetic and health-related chemical compliance.
	Regional	2022-23	100% microbiological compliance. ^a 100% chemical compliance
Vic	Department of Health	2022-23	98.4% microbiological compliance. 96.0% of providers fully compliant with all water quality standards based on the ADWG.
Qld	Seqwater ^b	2022-23	100% microbiological compliance. Minor aesthetic non-compliance.
WA	Water Corporation	2021-22	100% microbiological and chemical health compliance. 93% compliance with aesthetic guidelines.
	Busselton Water	2022-23	100% microbiological compliance. 100% chemical compliance. 99.9% aesthetic compliance.

	Reporting entity	Reporting Period	Outcomes
	Aqwest	2022-23	100% microbiological compliance. 100% chemical compliance. Minor aesthetic non-compliance.
SA	SA Water	2022-23	99.96% microbiological compliance. 99.98% compliance with ADWG health-related parameters (metropolitan systems). 99.85% compliance with ADWG health-related parameters (regional).
Tas	TasWater	2021-22	100% microbiological compliance. 99.9% chemical compliance.
NT	Power and Water Corporation – major and minor centres	2021-22	100% microbiological compliance in nearly all major and minor town centres. ^c Minor chemical and aesthetic non-compliance.
ACT	Icon Water	2022-23	100% microbiological compliance. 100% chemical compliance.

a. Inverell local water utility recorded a microbiological compliance of 99.91% in 2023-23. **b.** This data does not include information from individual council water providers nor other urban utilities in Queensland. **c.** The town of Katherine, recorded a microbiological compliance of 99.4% in 2023-23.

Source: Aqwest (2023, p. 23); Busselton Water (2023, p. 4); Hunter Water (2023, p. 14); Icon Water (2023, pp. 44–48); NSW DPE (2023c); PowerWater (2022); SA Water (2023); Seqwater (2023a); Sydney Water (2023); Tasmanian Economic Regulator (2022a); Victorian DoH (2024, p. 12); Water Corporation (2022).

Jurisdictions have also provided information to the Commission on water quality incidents since 2021, which are summarised in table 9.4.

Table 9.4 – Water quality incidents

Reported to the Commission between 1 January 2021 and 31 December 2023

Jurisdiction	Boil water notices
NSW	54
Vic	11
Qld	120 ^a
WA	0
SA	0
Tas	4
NT	6
ACT	0

a. During 2022-23, drinking water incidents reported in Queensland led to the issuing of 32 'boil water alerts', six 'do not consume alerts' and three 'do not use' advisories – one of which impacted 27,000 people in south-east Queensland (Qld DoH 2022a, p. 77).

Source: Personal communications with jurisdictions.

Jurisdictions also reported on the use of water restrictions. Water restriction definitions vary by jurisdiction with restrictions often applied in response to persistent drought.

There have been extended water restrictions in parts of Queensland as a consequence of drought and water quality issues over the period 2021–2023. 25 town water schemes in Queensland had water restrictions in place continuously for the past three years, including:

- Rockhampton Regional Council, which had level six water restrictions in place for Mount Morgan (box 9.1) due to low water supply and ongoing water carting (Saunders 2024).
- South Burnett, which had level three water restrictions in place for all of its schemes to manage water quality risks (BOM 2024f).
- Toowoomba City Council, which had level two restrictions for Vale View to manage low water supplies until it is connected to the Toowoomba bulk supply network (Queensland Government, pers. comm.).
- Tablelands Regional Council, which had level two water restrictions in place for Atherton, Bellview Estate, Cassowary Heights, Herberton, High Country Estate, Malanda/Davies, Millaa Millaa, Millstream Estates, Mt Garnet, Ravenshoe, Tinaroo Park, Walkamin and Yungaburra to assist in managing water quality issues (Queensland Government, pers. comm.).

The Queensland Government also indicated that in 2023, nearly 70% of town water supply schemes (183 schemes) had water restrictions in place for at least some of the year.

Box 9.1 – Mount Morgan water restrictions

Mount Morgan is a central Queensland town located 38 km south west of Rockhampton (Mount Morgan Promotions and Development Inc 2024). Mount Morgan’s household, commercial and industrial water and sewerage services are provided by Rockhampton Regional Council through its commercialised business unit, Fitzroy River Water (Rockhampton Regional Council 2024a).

The No.7 Dam has been the sole water supply for the Mount Morgan community since 1999 following the decommissioning of the Fletcher Creek Weir (Qld DNRME 2018, p. 2). The dam was raised by 4.5m to provide a storage capacity of 2830 ML, however its small storage capacity, reliance of summer rain and short drawdown period makes the dam vulnerable to short, extreme dry periods (Qld DNRME 2018, p. 6). Stochastic modelling later undertaken as part of the *Mount Morgan regional water supply security assessment* in 2018 indicated that the storage level of the No. 7 Dam was likely to stay at low levels for an extended period, resulting in prolonged periods of water restrictions (Qld DNRME 2018, p. 12).

On 15 March 2021, the Rockhampton Regional Council introduced level six water restrictions for Mount Morgan when the No.7 Dam fell below 10% capacity due to prolonged drought conditions. The introduction of level six restrictions aimed to restrict demand and keep daily usage under 0.8 ML (Rockhampton Regional Council 2021). This was the third failure or near failure of the water supply scheme in the past 20 years (AECOM 2024).

Water carting from Gracemere commenced in March 2021 to ensure adequate water supply to the 3,000 residents of Mount Morgan. Up to 22 water trucks a day delivered water to the Mount Morgan Treatment Plant, costing the region’s taxpayers an estimated \$70,000 per week (Loram and Semmler 2021). By January 2023, water carting to Mount Morgan had cost the Rockhampton Regional Council \$5.7 million. The council sought financial assistance from the Queensland Government to help cover the costs of the water carting. In January 2023, the Queensland Government announced a Special Assistance Package of up to \$10.8 million to the council to cover ongoing water carting costs until a permanent water supply option was secured (Miles 2023).

Box 9.1 – Mount Morgan water restrictions

The Rockhampton Regional Council engaged global infrastructure firm, AECOM, to undertake a preliminary evaluation of water supply options at a cost to the council of \$300,000 (Bridge 2022). The council received a further \$3.5 million from the Australian Government to fund the delivery of a business case and detailed design by AECOM (Rockhampton Regional Council 2022, p. 11).

In January 2024, the first pipes were laid in the construction of a 28km potable water pipeline from Gracemere to Mount Morgan to provide long-term water security for the town. The \$88.2 million Mount Morgan Pipeline project has been jointly funded by the Australian Government (\$30 million), Queensland Government (\$40.4 million) and the Rockhampton Regional Council (\$17.8 million). This amount includes \$3.5 million previously provided by the Australian Government to fund the business case (National Water Grid 2024). When asked in parliament whether the \$88.2 million was being made on a 'cost recovery basis', the Queensland Water Minister, Glenn Butcher, responded with:

'the project is being delivered by Rockhampton Regional Council and any questions regarding ongoing implications for water utility bills are a matter for Council' (Butcher 2023d).

In April 2024, the Rockhampton Regional Council lifted the level six water restrictions after rainfall in the catchment in early 2024 resulted in the No. 7 Dam reaching full capacity. Water carting, which has been in place since March 2021, has been reduced throughout April as the dam water is reconnected to the Mount Morgan Treatment Plant (Rockhampton Regional Council 2024b). The Mount Morgan Pipeline project is expected to be completed in September 2025.

The Commission notes that short-term stage one and stage two water restrictions were applied for short periods in some regions of Tasmania during 2021 and 2022 to deal with poor source water quality limiting treated water production capacity and planned low storage due to the reconstruction of a primary dam storage (Tasmanian Government, pers. comm.). Victoria and Western Australia indicated that permanent water saving measures remain, but no water restrictions have been in place over the last three years. New South Wales, South Australia, Northern Territory and the Australian Capital Territory also indicated that water restrictions have not been imposed over the past three years.

All jurisdictions – Water service outcomes – major cities

The National Urban Performance Reports in 2022 and 2023 show that there continues to be 100% microbiological compliance for drinking water in major cities of Australia, with no supply issues reported in the capital cities over the past three years (BOM 2023b, p. 70, 2024b, p. 72).⁵ This continued high compliance is indicative of the strong regulatory arrangements and monitoring programs in place to ensure quality drinking water continues to be provided by the major service providers in each jurisdiction.

All jurisdictions – water service outcomes – regional and remote

Problems with service quality continue in some regional areas. Some minor microbiological compliance issues were identified by Coliban Water in regional Victoria in 2022-23 largely due to flooding in the area (BOM 2024b, p. 72). Although microbiological compliance has remained relatively high in other regional areas, boil water alerts have been issued in New South Wales, Queensland and Victoria, some as a result of

⁵ South West Water Corporation in Melbourne reported 99.9% compliance in 2022-23 (BOM 2024b, p. 72).

heavy rainfall and floods impacting water treatment plants (Cassowary Coast Regional Council 2023; Victorian DoH 2024, p. 8; NSW Government pers.comm.).

Persistent water quality issues remain or have worsened for some remote Aboriginal communities. In some remote areas of Australia, people and communities still do not have access to safe drinking water as there are exceedances in the chemical health standards outlined in the ADWG. Some examples include:

- eight chemical health exceedances across eight different communities in the Northern Territory for the 2021-22 reporting period due to naturally occurring chemicals in the water sources (such as uranium, barium, fluoride, and manganese in groundwater) (PowerWater 2022, p. 40).
- three remote communities in Western Australia required bottled water to be provided due to elevated uranium levels and a further two required bottled water due to elevated fluoride levels (WA DoC 2023b).
- 22 remote communities in Western Australia had nitrate levels that exceeded the ADWG value for infants less than three months old that are bottle-fed. To mitigate the risk to these infants, free bottled water was supplied to households and the health clinic in these communities, for use in mixing baby formula for infants under three months of age (WA DoC 2023a).

The presence of chemical contaminants in drinking water in remote and regional areas gives rise to particular public health concerns. For example, compared to urban areas, the prevalence of chronic kidney disease is higher, including amongst First Nations peoples. Elevated levels of uranium and nitrates in drinking water, which have been linked to renal injury (Rajapakse et al. 2019, p. 186) may exacerbate symptoms. For people living in remote communities suffering from kidney failure, poor water quality and unreliable electricity supply has also meant that patients are often unable to receive home haemodialysis but have to travel or relocate to areas where safe water supply is guaranteed (Scholes-Robertson et al. 2022, p. 7).

Even when drinking water is considered safe from microbial or chemical contamination it may not be acceptable for drinking, washing, and other household water uses due to aesthetic issues. Aesthetic parameters are characteristics associated with the acceptability of water to the consumer in terms of appearance (colour), taste and odour. Some examples of aesthetic non-compliance in remote communities of the Northern Territory include:

- 35 out of 72 communities exceeded hardness levels as measured by calcium carbonate (CaCO_3) (PowerWater 2022, p. 42). Hard water may lead to excessive scaling of pipes, taps and fittings, requires more soap to achieve lather and can impact infrastructure and kitchen appliances such as kettles (PowerWater 2022, p. 43).
- five out of 72 communities exceeded the iron threshold of 0.3 mg/L in water (PowerWater 2022, p. 42). High iron concentrations give water a rust-brown appearance and can stain laundry and plumbing fittings (PowerWater 2022, p. 43).
- 19 out of 72 communities had levels of pH below 6.5 which is likely to cause corrosion of pipes and fittings (PowerWater 2022, pp. 42, 46).

Aesthetic non-compliance related to elevated levels of calcium carbonate (CaCO_3) (or hard water) is likely to lead to a deterioration in plumbing hardware and household appliances over time. A study of the cost implications of hard water in remote communities in the Northern Territory found health hardware items such as taps, spouts, shower roses and hot water systems required more frequent replacement and had higher maintenance costs compared to communities without hard water (Browett et al. 2012, p. 11). Poor water quality, in particular as a result of hard water, 'affects the functionality of health hardware (taps, hot water systems, tub, sink, shower head, washing machine etc.) which has an impact on public health, liveability and wellbeing of people and communities' (Vanweydevelde 2022, p. 18).

Although aesthetic non-compliance does not necessarily impact people's health, it has led to a loss of confidence in the water supply by people in some communities (Earle et al. 2023, p. 9). The World Health Organisation agrees that exceeding acceptability standards 'may be of great significance for consumer confidence and may lead consumers to obtain their water from an alternative, less safe source' (WHO 2017, p. 28).

Access to safe drinking water continues to be a challenge for residents in Walgett, New South Wales, creating an ongoing health risk. Data collected by the Dharriwaa Elders Group and University of NSW (UNSW) shows sodium levels in groundwater extracted from the Great Artesian Basin were regularly in excess of 300 mg/L (UNSW 2024). This level of sodium is 15 times higher than medical practitioners recommend for long-term consumption by people with severe hypertension or renal and heart issues (Rosewarne et al. 2021, p. 3). But there are no health guidelines for sodium in the ADWG, only palatability guidelines of less than 180 mg/L (NHMRC 2022, p. 214), something the Dharriwaa Elders Group (sub. 47, p. 8) suggested needed to be rectified.

A survey of Walgett Aboriginal community members undertaken by the UNSW and The George Institute in April 2022 found that:

- 91% of respondents were concerned about water quality at some time during the year
- 42% of participants experienced no usable or drinkable water and 36% going to sleep thirsty in at least one month in the last year
- the burden and cost of access to safe drinking water has been shifted to individuals in the community that experience disproportionately higher levels of disadvantage and chronic disease, with some people reporting spending \$30-\$50 on bottled water each week, which made it difficult to afford a healthy diet (Tonkin et al. 2023, p. 8).

Ongoing water quality issues in some remote communities indicate that current arrangements for providing safe water are not adequate (finding 9.1).

The full extent of water quality issues is hard to determine given a lack of consistency in reporting drinking water quality and the lack of data available for self-supplied communities. The Commission notes that the Power and Water Corporation has improved the detail of water quality data for the 72 remote communities in the Northern Territory serviced by its subsidiary IES (Vanweydeveld 2022, p. 131). However, the Commission understands that there is no drinking water quality data published for 79 outstations. There are also 133 communities in Western Australia (generally with a population less than 50) that are self-managed and do not receive supports from government (Vanweydeveld 2022, p. 198). The South Australian Council of Social Service (SACOSS) notes that:

[As] with other elements of water service provision, the quality and safety of water provided to remote Aboriginal communities is often inadequately monitored, and issues of quality often go unreported. (sub. 23, p. 6)

The Commission acknowledges research outlining the difficulties faced by monitoring regimes in remote communities including the 'distance to laboratories for testing, low staff numbers, and a high turnover of on-ground, skilled water and wastewater management staff' (Hall et al. 2021b).

Changes to the national performance report

The Commission notes that from July 2024 the Bureau of Meteorology (BOM) will start collecting data from water utilities with under 10,000 connections as part of the National Performance Report (BOM 2024c, p. 1). BOM will initially collect information on the water quality risk management guidelines used by each water utility and information about the treatment of wastewater, rather than the more detailed water quality indicators collected from larger providers. Further development is required to centralise the reporting of

drinking water quality indicators, such as percentage of the population where microbiological compliance was achieved, percentage of the population where chemical compliance is met and number of boil water alerts issued (finding 9.2).

Dr Paul Wyrwoll highlights the lack of consistent reporting and the opportunity for improvement under a renewed NWI:

Australia lacks a comprehensive strategy for transparent water quality monitoring and reporting. The new national agreement is an opportunity to develop a National Drinking Water Quality Database to monitor progress on improving household water access and support other government programs, including commitments under Closing the Gap Priority Reform 4 regarding disaggregated data and information sharing. The development of this publicly available database would be enabled by the establishment of consistent standards for annual reporting of drinking water quality monitoring across all jurisdictions, e.g. a defined set of summary statistics to report by ADWG characteristics. Power and Water Corporation (2022) provides an Australia-wide benchmark for better practice in reporting of drinking water quality data. An important component of a national database would be education and information resources that support households and communities to interpret reporting and use the information to define their expectations for improvements. (sub. 27, p. 4)

The Local Government Association of Queensland (LGAQ) note that an increase in mandatory reporting can lead to increased compliance costs and administrative burden. It said:

The scope and extent of mandatory reporting should be fit-for-purpose and not be more onerous than the expected benefit it provides. This is particularly true if the benefit falls more to the receiver of the data with the cost shifted to the reporting organisation. Any move towards increasing the administrative burden of compliance is likely to exacerbate existing skills and capacity shortages being experienced in the water sector. (sub. 66, p. 17)

Policy initiatives commenced since 2021

Since 2021, most jurisdictions have introduced or extended programs or projects to improve drinking water quality. Some new investments focused on regional and remote areas include:

- The Australian Government has committed to invest \$150 million to ensure remote First Nations communities have access to clean drinking water. Yuendumu has been allocated \$11.1million for the installation of pumping equipment to allow operation of two existing bores and the replacement of ageing water service lines and mains (DITRDC nd). While Milingimbi will receive \$6.4 million for new bores and upgrades in three locations (DITRDC nd).
- The Northern Territory Government committed \$28 million to address critical water supply infrastructure needs in remote Aboriginal communities that are experiencing water quality and security stress. Of which, \$6.8 million was used on the Laramba Water Treatment Plant which became operational in April 2023 (NT Government 2023).
- The Queensland Government has invested \$2.6 million for an Urban Water Risk Assessment project (Butcher 2023c) aimed at better understanding drinking water quality, water supply security and water and sewerage service delivery risks across remote and regional Queensland communities, and \$120 million to the Indigenous Councils Critical Infrastructure Program (Queensland Government 2020).

There are difficulties (and costs) associated with maintaining safe and reliable water services to regional and remote communities. A report prepared for the National Water Grid Authority identified the following challenges for water supply maintenance, infrastructure and governance:

- (i) insufficient ongoing and secure operating funding for maintenance and infrastructure upgrades;
- (ii) lack of clear, stable, long-term governance in many areas to oversee maintenance and upgrades; and
- (iii) lack of community involvement, training, and appropriate skills development opportunities in system maintenance. (Doble et al. 2023, p. 13)

Inquiry participants also noted that skilled workers and a continuous revenue stream were essential for infrastructure investments to be maintained in the long-term (chapter 10).

Whilst there are recognised challenges with improving water quality in remote and regional areas, there have been some successful Government initiatives, including the Safe and Healthy Drinking Water in Indigenous Local Government Areas Program (SHDWP), that was funded by Queensland Department of Health (box 9.2). The program demonstrated that improvements in water quality, operator competence and regulatory compliance can be achieved within a relatively short period of time, and it provides a benchmark for effective delivery of public health improvements for Aboriginal and Torres Strait Islander communities (Vanweydevelde 2022, p. 281).

Pilot programs like the SHDWP can provide guidance on processes that enabled success, but it is not a one size fits all solution, and the cost effectiveness can vary. Community-based approaches to design, including consideration of ongoing operation and maintenance, are important to ensure service delivery models generate local development benefits, support service reliability, and manage long-term operating costs. Vanweydevelde (2022, p. 280) highlights that programs must be tailored to the needs and challenges of each community and their water operators.

Box 9.2 – Case Study – Safe and Healthy Drinking Water in Indigenous Local Government Areas Program (SHDWP)

Following repeated microbial drinking water contamination incidents reported by the Torres Strait Islands Regional Council (TSIRC) in Queensland, in 2017, the Queensland Department of Health funded the ‘Safe and Healthy Drinking Water in Indigenous Local Government Areas’ pilot. The pilot program was developed in close consultation with TSIRC engineering staff and the island-based, Indigenous water operators. The initiative was first trialled on Kirriri (Hammond) Island and Warraber Island from January 2017 to June 2017.

An independent assessment of the pilot program found that no *E. coli* detections occurred immediately following implementation. In addition, water operators demonstrated enhanced skills and knowledge resulting in no disinfection or sampling failures at the time of assessment.

The researchers assessing the program identified the following three pillars as underpinning effective delivery of the pilot program:

1. Appropriate infrastructure: investments were made in water treatment infrastructure that was ‘fit for purpose, place and people’.

Box 9.2 – Case Study – Safe and Healthy Drinking Water in Indigenous Local Government Areas Program (SHDWP)

2. Support for staff and culture: the programs were co-designed, embedded cultural competency and developed training that was specifically tailored to water operators working on the Torres Strait Islands.
3. Culturally sensitive and efficient inter-agency government involvement: clear roles for active engagement with relevant government agency were established with regular communication among parties and shared funding.

The reviewers of the pilot program did note costs associated with travel and accommodation, staff time, and water treatment technology, and that ‘sufficient and stable funding for multiple years may be needed to provide the required longer-term sustainability’ (Hall et al. 2021a, p. 87).

The SHDWP has since been adapted and delivered to 23 First Nations communities in Queensland.

Source: Hall et al.

A renewed NWI must commit to ensuring access to a basic level of service

In 2024, the Commission is reiterating its view, made in the 2021, that all Australians should be ensured access to a basic level of service for safe and reliable drinking water (2021b, p. 11).

In 2021 the Commission’s renewal advice (12.4), reiterated in 2024, made clear that:

- a renewed NWI should include a commitment by State and Territory Governments to each develop a definition of, and to ensure access to, a basic level of water services for all Australians.
- at a minimum, this would include safe and reliable drinking water, with a consistent definition of ‘safe’ and a definition of ‘reliable’ based on local circumstances.
- cost-reflective user charges should remain the default arrangements, but that operational subsidies would be required to maintain a basic level of service in some high-cost regional and remote areas.⁶

Submissions to the inquiry support the importance of this renewal advice and highlight the sense of urgency required.⁷ WaterNSW also note that:

[e]stablishing greater clarity around what a “basic” or “minimum” level of service looks like may also help to distinguish between the delivery of ‘core’ water services, and the delivery of services or activities that go above and beyond basic or minimum requirements, and that, therefore, would need to be aligned with customer preferences around willingness to pay or funded via other mechanisms. (sub. 85, p. 4)

In 2021, the Commission (2021d, p. 24) noted that the definition of minimum service reliability would be influenced by local circumstances including the quantity of water available, the frequency of water restrictions, and/or clear arrangements to maintain services during extreme events.

⁶ The arrangements for Community Service Obligations for regional and remote communities are outlined in this report in chapter 6.

⁷ Central Land Council sub. 44, p. 27; Environmental Defenders Office sub. 50, p. 35; South Australian Council of Social Service sub. 23, pp. 5–6; WSAA sub. 81, p. 6).

The Commission (2021d, p. 24) also noted that the definition of 'safe' water should align with existing health guidelines under the ADWG. However, as noted by WaterNSW:

[t]here can be times when water may meet the ADWG, but still not align with community desires or expectations (for example, around taste). A renewed NWI could consider whether there are any other issues that are outside the scope of the ADWG but could be considered for guidance through the NWI itself. (sub. 85, p. 3)

The LGAQ agrees that regulators need to provide clear expectations regarding compliance with ADWG health-based targets.

As reflected in 2023 LGAQ Annual Conference motion 141 which calls on the State Government to clarify expectations for asset improvements in meeting drinking water quality ensuring a consistent interpretation and approach for all Queensland water service providers, setting clear and unambiguous minimum standards for safe drinking water in Queensland is a prerequisite for achieving consistent and sustainable potable water supply in rural and remote communities. (sub. 66, p. 16)

9.2 Water reuse, end use efficiency, water sensitive urban design and innovation

Summary of actions under the NWI

The NWI set out:

- an overarching objective to have policy settings which facilitate water use efficiency and innovation in urban and rural areas⁸
- outcomes to increase water use efficiency, encourage reuse and recycling of wastewater where cost effective and 'encourage innovation in water supply sourcing, treatment, storage and discharge.'⁹

Parties to the NWI agreed to a range of actions to support these aims (box 9.3). Many of these specific actions were implemented in the early years of the NWI, including 'substantial water efficiency gains through pricing reforms, public education, implementation and monitoring, the Water Efficiency Labelling and Standards Scheme, the Smart Water Mark for gardens, and water conservation rules and incentives' (NWC 2014, p. 63).

Subsequent agreements made by COAG set out further actions that would promote similar objectives and outcomes. The 2008 COAG *Work program on water* included actions to establish the National Centre of Excellence in Desalination and the Australian Water Recycling Centre of Excellence (COAG 2008).

⁸ NWI paragraph 23 viii).

⁹ NWI paragraphs 90 ii), iii), and v).

Box 9.3 – Water use efficiency actions

Water efficiency actions and the dates actions were completed by:

- implementing the Water Efficiency Labelling Scheme (2005)
- implementing a Smart Water Mark program for household gardens (2006)
- reviewing the effectiveness of temporary water restrictions and associated public education strategies, and assessing the scope for extending low level restrictions as standard practice (2006)
- implementing management responses to improve water use efficiency measures, where cost-effective (2006)
- developing national health and environmental guidelines for recycled water and stormwater (2005)
- developing national guidelines for evaluating water sensitive urban developments (2006)
- evaluating existing water sensitive developments to identify gaps in knowledge and lessons for future developments (2005)
- reviewing institutional and regulator models for achieving integrated urban water cycle planning and management, followed by preparation of best practice guidelines (2006)
- reviewing incentives to stimulate innovation (2006).

Source: NWI paragraphs 91-92.

COAG also expanded on the NWI urban reform commitments with the development of further principles to guide urban water reform (box 9.4). Key pieces of work were the:

- 2008 *National urban water planning principles* (DCCEE 2019) – designed to help governments and water utilities plan the development of urban water and wastewater services in a sustainable and economically efficient manner.

There is no formal requirement for jurisdictions to comply with the *National urban water and planning principles*. The Commission (2021b, pp. 164–165) found that the following three areas, essential for best practice for utilities, had not been widely adopted:

- adopting an integrated approach to urban water planning
- ensuring all options (including demand management) are on the table
- clarifying roles and responsibilities to enable greater coordination.

In addition, the Commission highlighted the need for guidance to help regional and remote utilities improve their planning practices and better align with regional water resource.

Given that many of the actions under this element of the NWI have been implemented, assessment is instead based on a broad consideration of overall progress towards achieving water use efficiency, integrated water management, supply innovation and water-sensitive urban design.

Box 9.4 – COAG expanded on the 2004 National Water Initiative

In 2008, COAG adopted the *National urban water planning principles* as an approach to best-practice urban water planning. The principles are listed below.

1. Deliver urban water supplies in accordance with agreed levels of service.
2. Base urban water planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
3. Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply/demand balance.
4. Manage water in the urban context on a whole-of-water-cycle basis.
5. Consider the full portfolio of water supply and demand options.
6. Develop and manage urban water supplies within sustainable limits.
7. Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply/demand balance.
8. Periodically review urban water plans.

Source: COAG (2008).

Previous findings (2021)

In 2021, the Commission found that jurisdictions, both collectively and individually, had undertaken significant activities in this area and, therefore, had largely met their NWI commitments. The Commission noted that jurisdictions should continue to pursue initiatives where they are cost-effective.

As part of its renewal advice in 2021, the Commission proposed significant enhancements to this area of the NWI (renewal advice 12.1) designed to embed water use efficiency outcomes of urban water management as part of ‘business as usual’ – particularly, with regard to integrated planning and management of water supply, wastewater and stormwater. The renewal advice also proposed that all supply options should be considered and their relative merits subject to a rigorous, consistent and transparent assessment of benefits and costs (PC 2021b, p. 168).

Finally, the Commission recommended that enhancements to this part of a renewed NWI should be combined with renewed actions to encourage innovation, and to further promote cost-effective implementation of water reuse and efficiency measures, and water-sensitive urban design.

Assessment (2024)

Some jurisdictions have reported further progress towards embedding water use efficiency, integrated water management, supply innovation and water-sensitive urban design. Some examples are listed here.

- The NSW Government released the *NSW Water efficiency framework* in 2022 which provides water utilities, councils and large businesses a best-practice guide to developing and delivering water efficiency in their local context (NSW DPE 2022f, p. 4).
- The Victorian Government has invested in a \$14.1 million Integrated Water Management Grants Program over three years (2021–2024) (box 9.5), which Integrated Water Management Forum member organisations are eligible for (Office of the Premier of Victoria 2021).

- The WA Government published the *Kep Katitjin – Gabi Kaadadjan – Waterwise Perth action plan 2* in October 2022. Since the release of the plan, \$4 million has been granted to nine local governments in the Gnangara Plan area to assist with irrigation system upgrades and implementation of water-sensitive urban design principles in public open spaces (WA DWER 2023a, p. 54).

Box 9.5 – Victoria’s integrated water management program

In 2017 the Victorian Government released the *Integrated Water Management (IWM) Framework for Victoria*. This was the first time a systematic application of collaborative IWM had been designed and promoted at a state-wide scale in Australia.

Key activities of the IWM Framework outlined by the Victorian Government in 2022 include:

- collaborating with Traditional Owners, water corporations, catchment management authorities and local government to establish 15 IWM forums across Victoria, bringing together over 100 organisations to identify, prioritise and oversee the implementation of local and regional collaborative water opportunities
- grant capital funding toward 15 stormwater and recycled water projects that aim to create an additional 1.4 billion litres of stormwater and recycled water for maintaining important green spaces across Victoria, saving around of one billion litres of drinking water every year
- \$22.4 million in funding from the Victorian Government for 106 priority projects across the state including for strategic planning (e.g. investigations, business cases, and detailed design) and for construction
- \$60.3 million in Commonwealth investment for planning and construction of IWM projects in Victoria and a further \$19.7 million in investment from IWM forum member organisations.

Source: Victorian DELWP (2022d).

Despite progress, there are still concerns that water infrastructure planning is not being considered in an integrated way alongside other forms of urban infrastructure, such as roads and rail. In its submission, Sydney Water noted:

[t]here is a risk that current accelerated housing planning intensifies planning silos. A sole focus on transit-oriented development means that growth impacts on water, wastewater, stormwater and waterway health may not be appropriately considered, or other constraints to timely delivery of housing identified. Other vital forms of urban infrastructure such as open space, canopy cover, urban cooling potential and walkability may not be adequately integrated into planning. (sub. 41, p. 14)

WIM Alliance also raised concerns about progress in this area of the NWI.

There is no evidence of any progress on the development of frameworks, tools or processes to ensure that integrated management of water supply, wastewater and stormwater is embedded within urban water planning and management systems. Further the existing regulatory approaches for management of these water streams is not complementary or compatible and perverse outcomes frequently occur (e.g. no formal requirement for stormwater treatment and monitoring of stormwater performance however stringent requirements for wastewater pumping and overflow requirements based on arbitrary flow triggers) (sub. 4, p. 13).

These comments provide further support for the Commission’s 2021 renewal advice 12.1.

9.3 Findings



Finding 9.1

Some regional and remote areas still do not have access to safe drinking water supply

There continue to be drinking water quality issues in some remote areas of Australia caused by exceedances in the chemical health standards outlined in the *Australian Drinking Water Guidelines*. In addition, exceedances of aesthetic parameters such as colour, palatability have led to acceptability issues. This is leading to a loss of confidence in the water supply amongst the community in these areas.



Finding 9.2

There continues to be a lack of consistency and transparency in relation to the publication of drinking water quality data

The detail, consistency and availability of drinking water quality reports continues to vary for regional and remote areas.

There have been improvements to the publication of data across all *Australian Drinking Water Guidelines* standards for the regions and communities serviced by Power and Water Corporation in the Northern Territory. Also, from July 2024 water service providers with under 10,000 connections will now report on the water quality risk management guidelines used as part of the National Performance Report.

Further development is required to centralise the reporting of drinking water quality indicators, such as percentage of the population where microbiological compliance was achieved, percentage of the population where chemical compliance is met, and number of boil water alerts issued.





10. Knowledge and capacity building

This chapter summarises the progress of jurisdictions in implementing the outcomes and actions related to knowledge and capacity building under the National Water Initiative (NWI). The key outcome sought was for knowledge and capacity building to assist in implementation of the entirety of the NWI.¹ Jurisdictions agreed to the following actions:²

1. Identifying the key knowledge and capacity building priorities needed to support ongoing implementation of the NWI.
2. Identifying and implementing proposals to more effectively coordinate the national water knowledge effort.

A summary of the Productivity Commission’s assessment framework (appendix B) – which does not necessarily map perfectly against the action items – and progress against it, is in table 10.1. The notes to the table indicate which assessment items relate to which NWI actions.

Table 10.1 – Assessment summary: Knowledge and capacity building

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Knowledge and capacity building will assist in underpinning implementation of the NWI ^c	Largely achieved 	Largely achieved 	Most jurisdictions are undertaking activities to build knowledge to support water resource management and service delivery. Investment in capacity and capability does not appear to be an area of focus for most jurisdictional governments.
Identify key knowledge and capacity building priorities needed to support ongoing implementation of the NWI ^d	Partially achieved 	Partially achieved 	Most jurisdictions have published knowledge building priorities. Few jurisdictions have identified capacity building priorities.
Identify and implement proposals to better coordinate the national water knowledge effort ^e	Partially achieved 	Partially achieved 	Jurisdictions coordinate research efforts in specific areas, but there is still no national coordination of water knowledge generation. Two research coordination programs for the Murray–Darling Basin have ceased to operate since 2021.

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraph 100. **d.** NWI paragraph 101 i). **e.** NWI paragraph 101 ii).

¹ NWI paragraph 100.

² NWI paragraphs 101 i) and ii).

Previous findings (2021)

In 2021, the Commission found that jurisdictions had largely met their NWI commitments to build knowledge and capacity to support implementation of the NWI. However, the Commission considered that prioritisation and coordination processes required greater attention. The Commission also concluded that jurisdictions needed to dedicate more resources to monitoring the capacity and capability needs of the water sector.

The rest of this chapter describes the knowledge and capacity building activities selected jurisdictions have undertaken since 2021 and provides assessments of their progress against meeting their NWI commitments. Where a jurisdiction is not shown, it is because there has been no significant change since 2021. Annex 10.5 provides further specific information on each jurisdiction's knowledge prioritisation and generation activities and references to the relevant publications.

10.1 Priority setting and coordination of knowledge generation

Assessment

All jurisdictions have identified priorities for water-related research, and many have laid out timelines for accomplishing the associated research projects. However, as identified in 2021, the processes used to identify those priorities are not always made public. The Australian Academy of Technological Sciences and Engineering (ATSE) emphasises that public investment in water knowledge building needs to be 'consistent, predictable and enduring, not sporadic, and ephemeral' (sub. 68, p. 2). Governments could achieve this through coordinated, clear identification of research priorities, supported by robust planning.

Australian Government

As highlighted in 2021, there is no national process or forum for identifying water-related knowledge generation priorities, nor a framework for national coordination. There are some examples of coordination between jurisdictions, such as through sub-committees of the National Water Reform Committee, but only for specific subject areas. Furthermore, the Basin Science Platform and Murray-Darling Basin Authority (MDBA) Knowledge Framework, two of the few inter-jurisdictional coordination and prioritisation programs identified by the Commission in 2021, have since ceased to operate (MDBA, personal communication, 21 March 2024).

Several submissions have called attention to the lack of national-level research coordination (ASSC, sub. 25, p. 4; ATSE, sub. 5, p. 5; WSAA, sub. 15, p. 14), and some have recommended that a reestablished National Water Commission (NWC) take on this coordination and knowledge sharing role, amongst other functions (ACCC, sub. 11, p. 8; ASSC, sub. 25, p. 4). See chapter 1 for further discussion on a reestablished NWC.

In 2023, the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) commissioned a review to 'advise and make recommendations that will enable the Commonwealth to ensure water science and research investments are strategically aligned, and appropriate to water policy' (DCCEEW 2023d, p. 18; PC 2023a). These recommendations may go some way to addressing the lack of national strategic and coordinated knowledge sharing and priority setting (see 1.3 in chapter 1).

10.2 Knowledge generation

Assessment

Jurisdictions have continued to progress research across a variety of topics relating to water resource management and water service provision and are assessed as continuing to largely achieve the outcomes required by the NWI. Topics of research have included:

- the effect of climate change on water resources
- eco-hydrology
- groundwater management
- river health.

As the Commission found in 2021, Australian Government knowledge generation investments have been largely focused on the Murray–Darling Basin.

Section 3.3 of chapter 3 describes some of the modelling work governments have undertaken to understand the effect of climate change on water resources in more depth.

Participants in this inquiry have identified several other areas where additional research could fill in potential knowledge gaps, including:

- research and monitoring to provide evidence of the benefits of environmental water (ACCC, sub. 11, p. 5; Central NSW Joint Organisation, sub. 30, p. 4) (chapter 7 provides more information on jurisdictions' activities to manage water for environmental outcomes)
- further research into alternative water sources (LGAQ, sub. 12, p. 2) (chapter 3 discusses alternative water sources in more detail)
- modelling of the interconnections of Australia's water resource systems, including surface water-groundwater interactions, and assessment and monitoring of soil-landscape systems (ASSC, sub. 25, p. 4; ATSE, sub. 5, p. 4).

First Nations knowledges

Submissions also emphasised the importance of recognising First Nations knowledges and integrating them with water management.³

Jurisdictions are engaging with First Nations communities and groups, and there are several examples of initiatives to incorporate First Nations knowledges into water management.

- The Ngarrindjeri Knowledge Research Project, a collaboration between the South Australian Government and the Ngarrindjeri community, has further developed the Yarlular-Ruwe assessment tool which is used in ecological restorations across Ngarrindjeri Yarlular-Ruwe land (SA DEW 2023a, pp. 22–23). The project also involved the development of the Ngarrindjeri Knowledge Database, which brings together 'Ngarrindjeri resources and knowledge in an accessible and culturally appropriate way to support Ngarrindjeri engagement and input into current and future environmental research/management projects'.
- The Githabul First Nations Water Modelling Project, will 'improve Queensland's ability to integrate First Nations' cultural knowledge, values, and land and water management skills into scientific water modelling and management practices' (Qld DESI 2023).

³ ACT OCSE, sub. 3, p. 3; ATSE, sub. 5, p. 4; Engineers Australia, sub. 34, p. 4; Heather Ferguson and Carl Stephens, sub. 19, p. 2; MDBA, sub. 36, p. 4; Terri Janke, sub. 18, p. 5; Watertrust Australia, sub. 35, p. 2; WSAA, sub. 15, p. 14.

- The Incorporating First Nations Knowledge in Water Modelling Project will ‘create a methodology for collaboration between First Nations knowledge holders and technical specialists for landscape restoration projects focused on Munga Lake and its Condamine and Balonne catchments [in Queensland]’ (Qld DESI 2023).
- Aboriginal Waterways Assessments are tools developed by several First Nations groups and the Murray-Darling Basin Authority, that are used by First Nations groups to assess the health of waterways. In 2020, an Aboriginal Waterways Assessment was conducted by the River Murray and Mallee Aboriginal Corporation on the Chowilla Floodplain in South Australia. The assessment completed by the corporation was used to support additional environmental water supply to the site to ensure the black swan breeding season was not compromised by low water levels, and an additional two gigalitres of water was pumped into the waterway (The Australian Water Partnership 2023).
- The Australian Capital Territory’s Ngunnawal Ngadjung Water Initiative seeks to ‘[s]upport the integration of traditional value and uses in waterway management’ (ACT EPSDD 2023a). Since August 2022, the Australian Capital Territory has also supported three Aboriginal Waterways Assessments with First Nations communities across six sites.
- In Victoria, catchment management authorities engage with local stakeholders, including First Nations communities, to inform annual environmental water priorities during the preparation of their seasonal water proposals. For example, the North Central Catchment Management Authority, the Victorian Environmental Water Holder (VEWH) and the Enhancing Northern Waterways Advisory Group ‘planned winter-spring watering to support waterbirds chicks that hatched over a very successful breeding season due to the natural floods in Gunbower in 2022’ (Victorian Government 2023b, p. 20). The VEWH has also started working with Traditional Owners and the government toward establishing Traditional Owner-led seasonal watering proposals (VEWH 2023b, p. 15).

As governments integrate First Nations knowledges in water management, it is important that they also ensure adequate protection for Indigenous Cultural and Intellectual Property (ICIP) (box 10.1).

Box 10.1 – Indigenous Cultural and Intellectual Property

ICIP ‘refers to Indigenous peoples’ rights to their cultural heritage’, and includes ‘all aspects of cultural practices, traditional knowledge, resources and knowledge systems developed by Indigenous people as part of their Indigenous identity’ (Terri Janke and Company 2022). Protecting ICIP is essential as the misuse or exploitation of ICIP may result in ‘direct and indirect economic, social and cultural harm’ to First Nations peoples (The University of Melbourne 2023). Further, if First Nations communities have concerns that their knowledge may be misused or misappropriated, they may be less likely to participate in water management and share their valuable knowledge.

The Australian Government has committed to introduce new stand-alone legislation to protect ICIP (Australian Government Office for the Arts 2024), and some jurisdictions, including New South Wales and Queensland, have policies or measures in place to protect ICIP (NSW Government, pers. comm.; Queensland Government, pers. comm.).

10.3 Capacity building

Assessment

Most jurisdictions have taken action to build water resource management capacity. Examples of capacity building activities undertaken follow.

- The Australian Government provided \$50 million of funding to establish the One Basin Cooperative Research Centre in 2022, to promote collaboration, delivery capacity to respond to emerging climate and water changes, and train future leaders (One Basin CRC 2024).
- The then NSW Department of Planning, Infrastructure and Environment (NSW DPIE) established the Water Knowledge Division in 2021 to boost the department's generation and management of knowledge through data, science, analytics, and modelling (NSW Government, pers. comm.).
- The WA Government has established a climate change water specialist team, which is responsible for understanding and communicating the latest climate science to internal water planning teams, external agencies, and the community (WA Government, pers. comm.).
- Tasmania's major water managers including the Department of Natural Resources and Environment Tasmania, Tasmanian Irrigation, TasWater, Hydro Tasmania, and Inland Fisheries Service and Environment Protection Authority Tasmania established the Water Managers and Data Custodians Working Group in 2021. The working group was established to 'investigate options for improved coordination and sharing of river health, and water quality data between water entities' and 'guide the design of a new statewide water quality monitoring program for Tasmania' (NRE Tas 2023e, p. 12).

The Interim First Nations Water Working Group also noted the importance of building the capacity of First Nations communities to allow them to participate more effectively in water management (sub. 78, p. 5). This could include providing First Nations communities with training for monitoring water management outcomes, conducting evidenced-based research, measuring community benefits and protecting ICIP. A recent example of an initiative to build First Nations capacity is the development of a new TAFE course in Western Australia, to 'train Aboriginal rangers in groundwater management, empowering remote communities to actively participate in environmental stewardship and land management' (WA Government 2024d). The Australian Government's *Draft Indigenous Ranger Sector Strategy*, released in 2022 and currently being finalised, also includes proposed actions to increase the accessibility and adequacy of training courses available to Indigenous Rangers who are involved in land and water management (NIAA 2022, p. 32). Chapter 2 discusses representation and involvement of First Nations communities in water management in more detail.

Some jurisdictions are also supporting capacity and capability building in water service provision. Given the importance of the sector to the community and its wellbeing, governments have a responsibility to monitor and ensure appropriate systems are in place to maintain capability. In Victoria, the July 2023 *Water for Victoria Action Status Report* states that '[w]ater corporations and [catchment management authorities] are continuing to work with delivery partners to identify skills gaps and develop programs to improve skills and capacity in the sector, including traineeships, apprenticeships and Director development programs' (Victorian Government 2023a, p. 19). Similarly, Water Corporation in Western Australia invests in entry-level programs to build and support its workforce, including through trade-based apprenticeships, partnerships with TAFE to deliver water industry qualifications under the National Water Package and a dedicated training centre for centralised coordination and delivery of water operations training across the state (WA Government, pers. comms.).

Challenges with maintaining adequate capacity in utilities appears to be greatest in small-scale utilities and in regional and remote areas of the country. Reflecting this, New South Wales and Queensland have undertaken the most action in this area.

New South Wales



While water utilities are responsible for the capacity of their workforce, the NSW Government recognises that ‘competent operators are vital to provide essential water and sewerage services in regional New South Wales and to managing drinking water quality’, and that there is a ‘critical shortage of formally trained water operators in NSW’ (NSW DPIE 2023c). The NSW DPIE’s Town Water Risk Reduction Program identified and is now implementing long term solutions to water and sewerage service challenges and risk in regional towns, including skills shortages (NSW DPIE 2023d). This includes the actions laid out in the *Water operations skills and training action plan* that the NSW DPIE and Training Services NSW are undertaking, including (NSW DPE 2022k, pp. 7–8):

- considering the establishment of a minimum training requirement for New South Wales water operators
- providing fee-free training subsidies for water industry operations
- supporting the conversion of the Certificate III Water Industry Operations to a trade qualification
- increasing marketing to attract new trainees and school leavers to the water industry
- providing incentives to current operators and employers to become water operator trainers.

The NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) also provides competency-based training in the operation of water and wastewater systems in a range of locations across regional New South Wales where TAFE NSW and other training providers are less likely to provide training. This training does not result in formal qualification, but does provide the skills necessary to perform job functions in local water utilities (NSW DPIE 2024b).

Queensland



In 2022, the Queensland Government committed to funding the Queensland Water Regional Alliance Program (QWRAP) on an ongoing basis (as opposed to the previous funding as a limited life program) (qldwater 2022, p. 10). QWRAP is an industry-led initiative to investigate regional collaboration on water and sewerage services in regional Queensland. One of QWRAP’s programs is the Queensland Water Skills Partnership, which seeks to ‘address critical skills needs facing the urban water industry in Queensland’ (qldwater 2024). Through QWRAP, projects are being undertaken to understand skills gaps by region.

The Queensland Department of Regional Development, Manufacturing and Water (Qld DRDRW) started the Urban Water Risk Assessment (UWRA) project in 2023 to ‘evaluate risks to water quality, water security and water and sewerage service delivery for all providers (mostly local governments) outside of South-East Queensland’, including operator competency (Qld DRDMW 2023j). Stage 1 of the program was completed in January 2024, and involved a high-level desktop scan of existing information. Stage 2 is due in June 2024, and will look to identify, develop and implement solutions to the complex workforce challenges faced by the sector, leveraging and complementing existing state government jobs and skills initiatives where appropriate (Qld Government, pers. comm.).

Australian Capital Territory



The ACT Government established the Office of Water in 2022-23, responsible for, amongst other things, delivering ‘initiatives to improve access to and understanding of water information’ for evidence-based policy and planning, and for the public (ACT EPSDD 2023b; ACT Government 2021a, p. 1).

In 2023, the ACT Environment, Planning and Sustainable Development Directorate (ACT EPSDD) partnered with DCCEEW to trial the Town and City Water Security Framework. The framework includes a diagnostic tool that

was used to assess the internal ACT Government capacity and capability to support water security planning. This assessment identified skills gaps in hydrological modelling, water quality modelling, and analysing the implications of climate change on water resource management (in particular, ecological and water chemistry thresholds). To address these identified skills gaps, the ACT EPSDD is building internal capability through recruitment, consolidating technical and water information management into a single team to foster knowledge sharing and partnering with universities and industry experts (ACT Government, pers. comm.).

Water utility capacity

The delivery of safe and reliable water services requires utilities to maintain skilled workforces (see chapter 9 for further discussion on safe, reliable urban water). The water industry has expressed concerns relating to utility workforces since at least 2009 (DEWHA 2009, p. 4). Participants in this inquiry again raised issues relating to the adequacy of utility workforces, predominantly in regional New South Wales and Queensland. The two main related issues raised were difficulties with attracting and retaining staff, and water operator skills and training gaps. The Water Services Association of Australia (WSAA) recommended that a renewed NWI include an objective that '[w]ater service providers have the appropriate skills and capabilities to ensure safe and reliable water and sewerage services for Australian communities' (sub. 81, p. 11).

Difficulties with attracting and retaining water utility staff

Several submissions raised concerns about difficulties with attracting and retaining staff at water utilities (AWA, sub. 43, p. 9; qldwater, sub. 29, pp. 2–4; WIM Alliance, sub. 4, p. 2). In 2022, the Queensland Water Directorate reported 'high vacancy rates, especially for water treatment plant operator positions' across Queensland's urban water industry, and that 'vacancies are protracted with 45% of water operator positions being vacant for greater than 13 months' (sub. 29, p. 3). The 2022 *NSW water operations workforce and training analysis* report also raised 'staffing and turnover pressures' within New South Wales water utilities (NSW DPE 2022g, p. 5). Jobs and Skills Australia's analysis found no water operator shortages in any jurisdiction in 2023, the most recent year the analysis has been conducted for (Jobs and Skills Australia 2024). However, WSAA contends the shortage has not been identified due to undercounting of water industry workers in census data stemming from the lack of water-specific occupational codes recognised by the Australian Bureau of Statistics (sub. 81, p. 11).

Competition for workers from larger industries was noted as one of the barriers to staffing for the water industry (qldwater, sub. 29, pp. 2–3) and the NSW Government highlighted that the 'average water operator salary is significantly less than the average salary of other stationary plant operators around Australia' (NSW DPE 2022g, p. 5). To try to resolve these issues, the Queensland Water Directorate has recommended that measures be taken to enhance 'the perceived value of water services as a career option', and to improve remuneration for water service workers, such as through a dedicated award (sub. 29, p. 2).

Some submissions also highlighted the importance of other staff within utilities including in engineering, planning, project management, finance, procurement and information technology roles (LGAQ, sub. 66, p. 17; WSAA, sub. 81, p. 11) and also roles to support and operate a more diverse utility asset base including desalination plants and purified recycled water plants (Sydney Water, sub. 41, p. 15).

Responsibility for attracting and retaining a qualified workforce to adequately deliver water services primarily rests with water utilities. Utilities may need to increase wages to attract and retain employees and support further training and development of their staff, but this entails increased costs and the potential need to increase water prices accordingly. To support the industry, WSAA and the Australia Water Association (AWA) have collaborated to build a website that will further develop water operator career pathways and promote opportunities to schools and universities (AWA and WSAA 2024).

Water Operator Skills Training

Submissions also raised concerns about water operator skill levels (qldwater, sub. 29, p. 2, WSAA, sub. 81, p. 11), suggesting that the water operator workforce lacks formal training which increases the risk of water safety incidents (NSW DPE 2022b, p. 9, WSAA, sub. 81, p. 11). There is also concern that an absence of minimum training requirements leads to a lack of demand for formal training and consequently reduced supply from Registered Training Organisations (RTOs) (NSW DPE 2022k, p. 9).

Very similar concerns around training and skills have been raised going back as far as 2008, for example through the National Audit of Water Skills (DEWHA 2009, p. 1). Governments have in the past worked with industry, and each other, aiming to ensure that the training system is suitable for meeting the needs of water utilities. The Coalition of Australian Governments' *Water for the Future*, a national water skills strategy designed to 'encourage and work with industry to build demand for and uptake of state and national training programs', was a response to the National Audit of Water Skills (DEWHA 2009, p. 1). Until 2022, water industry bodies such as WSAA and the Water Industry Operators Association were involved in the Australian training framework as members of the Water Industry Reference Committee, providing advice to the process of development and approval of the national water training package. More recently, BuildSkills Australia⁴ has responsibility for the national water training package and is preparing a Built Environment Workforce Plan to guide the national response to skills shortages in the water sector (as well as the construction and property sectors) (BuildSkills Australia 2024).

As discussed above and separate to BuildSkills Australia, several jurisdictions' governments, including New South Wales and Queensland, are also undertaking initiatives to address water operator skills gaps.

10.4 Overall assessment

Overall, the Australian, state and territory governments have largely met their NWI commitments to build knowledge and capacity to support implementation of the NWI. However, the Commission considers that governments should:

- give greater consideration to implementing prioritisation and coordination processes, including at the national level
- integrate First Nations knowledges in water management, and enhance protection for ICIP
- continue to work with the water sector, including water utilities, to monitor and identify actions to address capacity and capability needs.

10.5 Annex

This annex documents key examples of each jurisdiction's actions since 2021 on their commitments under NWI paragraphs 100 and 101 related to knowledge prioritisation and building. The Commission notes that other organisations and sectors (including water utilities, industry associations, research institutions, and environment and community organisations) have also invested in knowledge and capacity building.

Chapter 5 of this report describes developments in monitoring and reviews of environmental watering activities, and chapter 6 summarises developments in water resource accounting and monitoring. These

⁴ BuildSkills Australia was established in 2023 as the Jobs and Skills Council for the built environment sector and is tasked with addressing skills and workforce needs through collaboration between industry and training providers.

activities are also important sources of knowledge. Programs noted in the 2021 report have not been repeated here.

Australian Government

The Australian Government continues to fund research projects and programs, conducted by the MDBA, CSIRO and other agencies. Most of the work is focused on the Murray–Darling Basin.

Priority setting

In the Murray–Darling Basin, the Murray–Darling Water and Environment Research Program (MDWERP) is focused on four key themes – climate change adaptation, upgraded hydrology, environmental outcomes associated with water management, and social, economic and cultural outcomes to reflect new knowledge required for the Basin Plan review (Hart and Butcher 2023, p. 26). However, an independent evaluation of MDWERP found that the program’s key research questions were established without consultation of First Nations peoples, and therefore was not reflective of their needs or priorities (Hart and Butcher 2023, p. 26).

New knowledge generation

The Australian Government continues to fund research in the Murray–Darling Basin.

- CSIRO and MDBA collaborated on the Ecosystem Functions Research Program to address ‘key ecosystem functions knowledge gaps at basin-scale to inform improved management and delivery of water for the environment in the Murray–Darling Basin’ (CSIRO 2024b). This program was finalised in January 2024.
- DCCEEW, the Commonwealth Environmental Water Holder and the MDBA are collaborating with a research consortium to deliver MDWERP, an initiative to generate new knowledge to support the Basin Plan review in 2026 (MDBA 2024b). Several peer-reviewed papers have been produced through MDWERP.
- The MDBA’s Sustainable Rivers Audit is measuring the health of rivers in the Basin. It will deliver a report that provides ‘the most current assessment of the trends and condition of Murray–Darling Basin’s First Nations’ Cultural, social, environmental, and economic values’ (MDBA 2024c). It is expected to be published in 2025.
- The MDBA’s Sustainable Yields study will provide a Basin-wide water resource assessment based on the latest hydrological and climate change science’ (MDBA 2024c). The final report for this project will be published in 2025.
- The MDBA’s Basin Condition Monitoring Program is enhancing monitoring and reporting of conditions in the Murray–Darling Basin. Developed through a participatory design process, 15 projects have been established to better understand the condition of the Murray–Darling Basin for the five themes of economic, social, environmental, cultural and hydrological condition (MDBA 2024a). This program was approved in 2022 and will run through to December 2025.
- The MDBA’s Murray–Darling Basin Climate Vulnerability Assessment and Adaptation Planning Project will conduct research on the impact of climate change on a sample of the Murray–Darling Basin’s 16 Ramsar wetlands (DCCEEW, pers. comm.).
- DCCEEW and the Australian Bureau of Agricultural and Resource Economics are collaborating to deliver the Integrated River Modelling Uplift Program to upgrade Murray–Darling Basin modelling capacity. The program will do this by ‘eliminating a lot of manual interventions’ currently required to provide a whole-of-Basin view, and by ‘integrating the independent river models’, improving the way the separate models ‘talk’ to each other (MDBA 2023). The models are expected to be integrated by July 2024.

CSIRO has continued to conduct research on a range of water-related topics, for example:

- The Water Supply for Remote Australian Communities report was published in 2023. It provides a framework for ‘reviewing alternative and emerging water treatment technologies to support safe and

reliable water supplies in remote communities (including First Nations communities), and to guide the prioritisation of investment in water infrastructure' (CSIRO 2023b).

- CSIRO is conducting the Southern Gulf Water Resource Assessment, which aims to provide a comprehensive and integrated evaluation of the feasibility, economic viability and sustainability of water and agricultural development in the Southern Gulf catchments in the Gulf of Carpentaria (CSIRO 2022b). It is expected to be completed by June 2024.
- Several desktop appraisals identify potential new opportunities for groundwater-based irrigation, the use of low-cost desalination in irrigated agriculture, and Managed Aquifer Recharge to support irrigated agriculture (CSIRO 2022a). These appraisals were conducted in 2021.

DCCEEW refreshed the National Hydrological Modelling Strategy in 2022, which aims to improve Australia's hydrological modelling systems (DCCEEW 2022a). These modelling systems are used to support water policy, planning and management across Australia.

New South Wales

Priority setting

The NSW Department of Climate Change, Energy, the Environment and Water's (NSW DCCEEW) 2021 *NSW Water Strategy* sets out the state's water priorities, including research on the impact of climate change on New South Wales's water resources (NSW DPIE 2021b).

NSW DCCEEW established the new Water Knowledge Division in 2021. Its key knowledge work is focused on (NSW DPIE 2021d, p. 6):

- research into groundwater management, water quality and river management
- modelling of surface water, groundwater, source models, floodplain harvesting
- hydrometrics.

New knowledge generation

The NSW Government has:

- improved the climate data it uses for strategic water planning (NSW DPIE 2023a)
- invested in developing new technology to assess water quality over large areas via satellite. This new technology may provide early warnings of potential extreme events like fish kills (NSW DPIE 2022d)
- built 79 additional groundwater bores in coal basins around New South Wales, which will allow water levels, pressure and salinity of the bores to be monitored (NSW DPIE 2023b).

Victoria

Priority setting

Victoria identified understanding and applying climate science to water management as a priority in 2016 (Victorian DELWP 2016, p. 28). Further research themes were identified under the Applied Aquatic Ecology Research Hub, which were discussed in the Commission's 2021 report. Research priorities do not appear to have been updated since 2017.

New knowledge generation

The Victorian Water and Climate Initiative (VicWaCI) is a research program focused on better understanding the effect of climate change on the state's water resources. VicWaCI published the findings from its first

phase of research in 2020. This included guidance on the then-best available hydroclimate projections, which were projections from 2016 (Victorian DELWP 2021, p. 72). Phase 2 of the program is currently underway, which involves researching new methods for developing the next generation of hydroclimate projections, and further research on the drivers of rainfall change (Victorian DEECA 2022).

The Arthur Rylah Institute for Environmental Research (ARI) is the biodiversity research organisation for the Victorian Government. Amongst other things, ARI produces research relating to water-based flora and fauna, including:

- the Wetland Monitoring and Assessment Program for environmental water, which investigates the response of vegetation, frogs, birds and fish to environmental water (ARI 2023b). The program's Stage 3 final report was published in 2021 and Stage 4 is ongoing.
- the 'Reintroduction strategies for Southern Pygmy Perch to Gunbower Island wetlands using a metapopulation model' project, which developed a 'metapopulation model to assess strategies for the reintroduction of Southern Pygmy Perch to Gunbower Island' in Victoria (Todd et al. 2023, p. ix). The report for the project was published in December 2023.
- the 'Turtle and Frog Condition Monitoring in Barmah-Millewa Forest' project, which 'monitors changes in turtle and frog population health over time and investigates how environmental factors may influence populations' at the Barmah-Millewa Forest, along the Murray River (Howard et al. 2023, p. 4). A technical report for the 2022-23 survey season was published in 2023.

Queensland

Priority setting

As identified in the Commission's 2021 report, Queensland's 2020–2030 Water Planning Science Plan (WPSP) establishes the state's science priorities. These priorities are organised into 'themes', including (Qld DRDMW 2020, p. 18):

- ecological asset requirements and threats
- landscape ecohydrology
- groundwater dependent ecosystems
- catchment threats
- hydrology
- cultural values
- social economic values
- assessment and evaluation.

The *Queensland Water Strategy* states that one of Queensland's areas of focus will be 'using climate science and modelling to understand climate change effects on our water resources and to tailor our response' (Qld DRDMW 2023f, p. 17).

Science needs for newly made water plans are articulated in each plan area's Monitoring, Evaluation and Reporting Strategy (Qld DRDMW 2020, p. 8).

New knowledge generation

The Queensland Government is producing updated water availability projections that take into account climate change, by inputting downscaled climate projection data into its hydrological models (Qld DRDMW 2023g, pp. 12–13). 15 of Queensland's 23 water plans will expire and be evaluated within five years of this work, during which the updated climate science can be incorporated (Qld DRDMW 2023g, p. 22).

The 9th Annual Water Planning Science Forum was held in 2023 to present the ecological, cultural and socioeconomic science work being undertaken to support water planning (Qld DRDMW 2023a, p. 34).

The Queensland Government has continued to conduct research in line with the priority areas identified in its *Water Planning Science Plan*. Examples of these projects include:

- a study to 'collect critical biological information, to better evaluate the species' response to current and future threats' (Burndred and Sternberg 2022, p. 3). The Cooper Creek catfish is endangered species which little is known about.
- a study to 'develop calibrated waterhole persistence models in a range of waterhole types throughout the Queensland portion of the [Lake Eyre Basin]' (Cockayne 2021, p. 1). These waterholes provide critical aquatic refugia and essential water supply during dry periods.
- a monitoring program to verify the success of water storage operating rules to protect the nests of endangered Australian freshwater turtle species (Espinoza et al. 2022, p. 972).
- a study to 'develop new modelling capability to identify risks to fish occupying waterhole refuges and to support appropriate management responses' (Zhai et al. 2022, p. 3).

The Queensland Government invested almost \$700,000 into seven water modelling projects in 2023 (Qld DESI 2023). These projects aim to:

- incorporate First Nations knowledges into water modelling
- ensure water modelling outputs are used by decision makers to improve climate resilience
- enhance the way investment in, and management of riparian zones are prioritised to ensure investments are evidence-based and provide maximum benefits
- improve estimates of the effectiveness of nutrient offsetting
- build on earlier initiatives that assessed issues with stream bank modelling in Great Barrier Reef catchments and provide frameworks to support better water modelling decisions for these catchments
- develop water models (from climate, hydrological, water quality, and decision support models) to assess climate change impacts on drinking water security.

Western Australia

Priority setting

The WA Government has committed to developing a 'prioritised and targeted research program to address key climate change challenges for the Western Australian water sector' (WA DWER 2023b, p. 12).

New knowledge generation

The WA Government published the *Guidelines to Future Climate Projections in Water Management for Western Australia* in 2023. And, in its 2023 Climate Adaptation Strategy, the WA Government says it will '[c]ollaborate with the Bureau of Meteorology and CSIRO to understand and communicate the impact of climate change on Western Australia's water resources' by 2025 (WA DWER 2023b, p. 11).

The WA Government has continued to conduct groundwater studies (WA Government 2024b). For example, the WA Department of Water and Environmental Regulation published a report improving certainty of how much groundwater can be abstracted from Perth's deep aquifers without impacting their long-term sustainability (WA DWER 2021b).

The Healthy Rivers program continues to collect and interpret data on rivers and their catchments through standardised assessments (WA DWER 2024b). This knowledge is used to support development of

strategies to best protect the environment from known stressors, including climate change and localised land-use pressures.

South Australia

Priority setting

South Australia's 2022 *Climate Change Science and Knowledge Plan* states that its priorities include:

- studies into climate change risks to water supply, considering regional water demands, and the vulnerability of regional water resources to climate change
- new studies into how water infrastructure and resource management can be used to overcome the impacts of climate change.

New knowledge generation

The SA Department for Environment and Water (SA DEW) released its *Guide to Climate Projections for Risk Assessment and Planning in South Australia* in 2022. This guide provides new projections for annual rainfall, droughts, and evapotranspiration across South Australia. The Guide will be updated in 2024, with new data from the NARClIM 2.0 project. SA DEW also plans to map statewide climate change risks to water supply, and analyse the climate change vulnerability of South Australia's water supplies (SA DEW 2022b, p. 24).

The Goyder Institute for Water Research – a research alliance between SA DEW, CSIRO, and South Australian universities, established in 2010 – continues to produce research to inform water policy and decision making. Its research program works across four areas: water for people, water for the environment, water for industry and climate adaptation (Goyder Institute for Water Research 2024c). Examples of the institute's recent work include:

- an ongoing study into the effects of flooding on the Coorong ecosystem, including whether nutrient conditions in the sediment have changed, effects on macroinvertebrate distribution and diversity and impact on food web and key biota (Goyder Institute for Water Research 2024a)
- a project to model the impact of a reduction in groundwater extraction from the Great Artesian Basin aquifers on spring pressure levels and spring flow rates from spring tails. This project started in December 2023 (Goyder Institute for Water Research 2023).
- a project to develop a decision support framework to help prioritise investment in urban stormwater management interventions, to reduce input of fine sediment to Adelaide's coastal waters. This is important because excess fine sediment is a main cause of loss of sea grass in the area. The results of this project were published in 2021 (Goyder Institute for Water Research 2024b).

SA DEW also invested in the Healthy Coorong Healthy Basin Science Trials and Investigations, a series of research projects to fill knowledge gaps and inform management actions to improve the long-term health of the Coorong wetland. The research program covered nutrient dynamics, aquatic flora and fauna, incorporation of Ngarrindjeri knowledge and climate adaptation (SA DEW 2024c). A summary of the key findings from this research was published in 2023 (SA DEW 2023a).

Through the Ngarrindjeri Knowledge Research Project, the SA Government has worked together with the Ngarrindjeri Community to further develop the Yarluwar-Ruwe assessment tool, which is used in ecological restorations across Ngarrindjeri Yarluwar-Ruwe land (SA DEW 2023a, pp. 22–23). The project also developed the Ngarrindjeri Knowledge Database, which brings together 'Ngarrindjeri resources and knowledge in an accessible and culturally appropriate way to support Ngarrindjeri engagement and input into current and future environmental research/management projects' (SA DEW 2023a, p. 23).

Tasmania

Priority setting

The Department of Natural Resources and Environment Tasmania (NRE Tas) published its *Rural Water Use Strategy Implementation Plan* (RWUSIP) in 2022, which identifies its research priorities (NRE Tas 2022a, p. 5). These priorities include research to enable responses to emerging trends such as:

- increasing productive value and competition for water
- increased investment in irrigated agriculture
- increasingly complex water management requirements
- climate change.

New knowledge generation

Tasmania has progressed a number of the research projects that it identified as priorities in the RWUSIP (NRE Tas 2022a, pp. 5–6).

- The Catchment Yield Science Update Project, which is exploring using contemporary predictions of climate change to update hydrological estimates of catchment yield in test catchments. Phase 1 of the project has been completed, and involved determining the preferred pathway for using contemporary climate projections to update the hydrological estimates of catchment yields that underpin the state's water allocation process (NRE Tas 2023d, p. 16). Phase 2 (which is currently subject to funding approval) will implement the preferred pathway identified in Phase 1, to produce new Tasmania-wide catchment yield estimates (Tasmanian Government, pers. comm.).
- The Groundwater Management Project, which is developing a desktop groundwater risk assessment tool, and undertaking targeted case-study groundwater research to improve information on groundwater use and interactions between surface water and groundwater (NRE Tas 2024b). Phase 1 of the project is complete and has delivered the Tasmanian Groundwater Risk Assessment Tool and Management Framework. The tool has been applied to 32 groundwater assessment units across Tasmania. Phase 2 of the project will involve 'targeted field-based studies, investigations, and activities to provide confidence in preliminary risk outcomes and support the implementation of the Management Framework'.
- The Hydrological Monitoring Network Review Project, which is undertaking a desktop review of NRE's hydrological monitoring network, which is crucial for managing Tasmania's water resources (NRE Tas 2024c).

Renewables, Climate and Future Industries Tasmania (RECFIT) is conducting a statewide climate change risk assessment, with contribution from NRE Tas. This risk assessment covers water topics such as seasonal distribution and intensity of rainfall (Tasmanian RECFIT 2024).

Northern Territory

Priority setting

The NT Government has designed its water research program to '[align] with ... Northern Territory Government priorities as laid out in its Territory water plan and strategic plan' (NT Government 2024b). These priorities include building knowledge on water resources, water quality monitoring, and conducting eco-hydrology studies (NT OWS 2023a, p. 36).

The NT Government is undertaking a territory-wide climate risk assessment, which will identify key climate risks to water security and identify knowledge gaps. This assessment is expected to be delivered in 2024 (NT OWS 2023a, p. 35).

New knowledge generation

Examples of research the NT Government is conducting or has conducted to support water management include (NT Government 2024b):

- the Upper King River managed aquifer recharge investigations - an ongoing project to investigate whether a site in the Upper King River in the Katherine region of the Northern Territory could be suitable for managed aquifer recharge
- the Western Davenport salinity study - a study completed in 2021 to examine salt levels in the Western Davenport Basin, and the effect it might have in the area
- Western Davenport hydrostratigraphy - an ongoing project to better understand the underground water layers in Western Davenport, their capacity, connections, and how water moves in and out of the aquifer
- updating existing water resource models - an ongoing two-phase project. Phase 1 is expected to be completed in 2025 and involves improving the existing models with new monitoring data, high-tech aerial surveys, and drilling and sampling programs for the Flora River, Ooloo Dolostone, Daly Roper River and Western Davenport
- the Light Detection And Ranging (LIDAR) project - using LIDAR to better understand how much water is needed by the ecosystem during the wet season and how much surface water can be collected without affecting the environment.

Australian Capital Territory

Priority setting

The ACT EPSDD's Science Plan 2020–2025 sets out the gaps in knowledge that it is prioritising research into, including water quality dynamics (nutrient movements in urban ponds, wetlands and lakes), projected scenarios for water flows and impacts on water bodies in the Australian Capital Territory, and the interactions between land management practices (such as total grazing pressure), soil processes and water management (ACT EPSDD 2020, p. 18).

The refresh of the ACT Water Strategy, which is expected to be completed by mid-2025, and the review of the ACT Environmental Flow Guidelines, which is expected to be completed by June 2024, are expected to reaffirm the knowledge building priorities in the ACT EPSDD Science Plan and identify any new knowledge gaps (ACT Government, pers. comm.).

New knowledge generation

The Water Resource Vulnerability Assessment Project has been initiated by the ACT Office of Water to build knowledge on the risks (nature, timing and extent) to the Australian Capital Territory's future water security posed by climate change. Phase 1 of the project involves developing new climate, water quality, hydrological and hydro-ecological modelling and data analysis capability. This phase is expected to be completed in 2024. Phase 2 will involve upgrading the vulnerability assessment model (ACT Government, pers. comm.).

The Healthy Waterway Program, first established in 2014, has received ongoing investment from the ACT Government since 2021. In 2022-23, the program delivered (ACT EPSDD 2023a):

- investigations into fertiliser used by households and businesses, which will be used to design ongoing education campaigns
- research into the sources of pollution in the Lake Tuggeranong catchment
- continued development of modelling and reporting tools for Lake Burley Griffin and Lake Tuggeranong to better manage water quality.

The Asset Evaluation and Land-use Monitoring Program is an ongoing program to understand the pollutant load generation by landuse types across the Australian Capital Territory, and performance of Water Sensitive Design infrastructure (ACT EPSDD 2022, pp. 39–40).

The ACT Government also continues to conduct several monitoring programs to track the populations and breeding behaviours of various fish species (ACT EPSDD 2022, pp. 42–43).

11. Community partnerships and adjustment

This chapter outlines the progress across two community related areas included in element 8 of the National Water Initiative (NWI) – community partnerships and assistance with structural adjustment. Community partnerships include the processes of community consultation and engagement, along with the provision of information to stakeholders on a range of water planning matters.¹ Assistance with structural adjustment relates to government programs and measures aimed at helping communities adjust to the effects of water reform.²





A summary of the Productivity Commission’s assessment framework (appendix B) – which does not necessarily map perfectly against the action items – and progress against it, is in table 11.1. The notes to the table indicate which assessment items relate to which NWI actions.

Governments’ engagement with First Nations peoples and communities, including with respect to their commitments under the *National Agreement on Closing the Gap* to partnerships for shared decision-making, is also addressed in chapter 2.

¹ NWI paragraph 93.

² NWI paragraph 94.

Table 11.1 – Assessment summary: Community partnerships and adjustment

NWI commitment	2021 assessment ^a and progress indicator ^b	2024 assessment and progress indicator	Comments – progress since 2021
Community partnerships (section 11.1)^c			
Engage water users and other stakeholders by: <ul style="list-style-type: none"> • providing opportunities to communities to express their views in a range of processes • providing information to support decision making through these processes • taking steps to respond to stakeholder concerns, and document outcomes from these processes. 	Largely achieved 	Largely achieved 	<p>Jurisdictions have provided opportunities to communities to express their views in a range of processes. Some jurisdictions have implemented changes to their engagement processes, including publishing ‘what we heard’ reports.</p> <p>The evidence received by the Commission indicates that most jurisdictions are, for most processes, providing information to stakeholders. However, engagement on water-related matters has not been sufficiently responsive to stakeholder concerns and may not be informing decision making.</p>
Community adjustment assistance (section 11.2)^d			
Address adjustment issues raised by the implementation of the NWI	Largely achieved 	Largely achieved 	<p>The Australian Government recommenced open tender water purchases (known as water buybacks) to address overallocation and increase water for the environment. This addresses the primary area of concern raised in 2021, but further actions are now required to ensure development, and monitoring and evaluation of the proposed adjustment measures are effective.</p>

a. Achieved: All requirements met (green shading). **Largely achieved:** Requirements generally met, with some exceptions (yellow shading). **Partially achieved:** Only some requirements met (red shading). **b.** Progress indicators reflect an overall assessment of whether, on the whole, reforms have moved closer to consistency with the NWI in the three years since 2021. An arrow pointing upward indicates progress, a flat line indicates no change, and a downward arrow indicates poorer performance or backsliding. **c.** NWI paragraphs 93 and 95-96 **d.** NWI paragraph 97.

11.1 Community partnerships

Summary of actions under the NWI

The outcome related to community partnerships is:³

to engage water users and other stakeholders in achieving the objectives of this Agreement by:

- improving certainty and building confidence in reform processes;

³ NWI paragraph 93.

- transparency in decision making; and
- ensuring sound information is available to all sectors at key decision points.

The NWI identified two actions to achieve this outcome: to ensure open and timely consultation with all stakeholders, and to provide accurate and timely information to relevant stakeholders.⁴

Previous findings (2021)

In 2021, the Commission found that community consultation and engagement processes undertaken by Australian governments on water management matters largely achieved the relevant NWI requirements. They provided various opportunities to communities and stakeholders to express their views on a range of processes. However, concerns were noted in submissions and meetings about the adequacy and effectiveness of some consultation and engagement processes undertaken since 2017, particularly within the Murray–Darling Basin.

Similarly, the Commission observed participants' reservations in submissions, and other inquiries and reviews about the adequacy and effectiveness of some information provision efforts undertaken since 2017, again with a particular focus within the Murray–Darling Basin. The Commission found there was insufficient feedback from jurisdictions on their information provision efforts to make a fully informed assessment of whether these efforts met the requirements of paragraph 96 of the NWI. The Commission was also unable to fully assess whether jurisdictions had taken steps to respond to stakeholder concerns and document outcomes of engagement processes.

The Commission noted that all jurisdictions had sought to improve the scale and quality of their consultation and engagement with communities and First Nations peoples.

Finally, the Commission concluded that all Australian governments should further build their capacity and capability to:

- undertake effective, thorough and well-informed community consultation and engagement
- provide water information that is publicly available, accessible, credible and well communicated.

Assessment (2024)

To assess the development of community partnerships by jurisdictions, the Commission has used the same framing for effective stakeholder engagement that was used for the assessment in 2021 (box 11.1).

As was the case in 2021, most processes associated with the development of water plans, policies and programs across the jurisdictions have provided stakeholders an opportunity to express their views through some form of public participation.

All jurisdictions have in some way, at some time, published a response or summary of engagement processes as a means of keeping stakeholders informed about the impact of engagement on decision making. The approach to this response process varies significantly between jurisdictions. For example, New South Wales and Victoria appear to systematically publish 'what we heard' or 'closing the loop' reports on their websites, while other jurisdictions appear to have more of a project specific approach to publishing summaries or responses to engagement processes. However, these reports do not always document how 'what was heard' was then used to inform decisions.

⁴ NWI paragraphs 95-96.

Box 11.1 – Effective stakeholder and community engagement

For stakeholder engagement mechanisms to be effective, they should be:

- representative – all relevant stakeholders and communities have an opportunity to express their views
- informative – all relevant stakeholders and communities have an opportunity to obtain information that enables them to increase their level of knowledge on issues that are being considered
- responsive – the information and views gathered through the engagement process are taken seriously by decision makers and are used to inform decisions.

Source: Hart and Doolan (2017) and Manwaring (2010) in PC (2017).

A number of states have made changes to First Nations engagement practices. For example, New South Wales has established a dedicated engagement team and a number of Regional Aboriginal Water Committees under its Aboriginal Water Program. The Queensland Government is investing in development of a First Nations Water Strategy to lead to stronger engagement with First Nations communities and more culturally inclusive water planning (Qld DRDMW 2023b). And in South Australia, a First Nations Voice to Parliament has been established providing First Nations peoples the opportunity to provide advice (on any matters, not just water related) to the Parliament and government decision makers (SA AGD 2024).

The urban utility sector has continued to demonstrate good practice community engagement. Engagement is one of the five elements of the PREMO incentive mechanism adopted by Victorian water businesses. Implementing engagement activities in accordance with the framework led to direct benefits to water businesses, improved communication between utility staff and customers and enhanced understanding of customers (Farrier Swier Consulting 2019, pp. 21–23).

Overall, governments are continuing to engage the public at least in some way in most decision-making processes, and some are making improvements to engagement processes. There are also increasing efforts to report back to stakeholders summaries of views shared in engagement activities, and in some cases, how these views have been taken into consideration in decisions made. While some participants in this inquiry have noted improvements in engagement activities by the Australian and NSW governments in the past three years, many remained unsatisfied with engagement efforts (box 11.2). There is also a need for improved coordination of engagement efforts, especially in the Murray–Darling Basin where there are many simultaneous processes by different governments and agencies.

Box 11.2 – Participants' views on engagement processes

Arid Lands Environment Centre

Community engagement processes in the Northern Territory are atrocious. ... Currently, community engagement falls well below the International Association for Public Participation code of ethics. (sub. 53, pp. 35, 36)

Australian Water Association

Community engagement in planning and decision-making has improved, but there is still a need to increase transparency and water literacy to protect and extend gains. (sub. 43, p. 7)

Berrigan Shire Council

Communities, including ours, have continuously complained they have been over consulted, under-represented and completely unheard, in all consultation efforts. Further they have claimed loudly that the consultation provided is tokenistic. Online surveys and webinars, in areas where connectivity is at best questionable and invite only meetings where attendees have to travel, at times hundreds of kilometres, demonstrate how poorly those in Canberra and Sydney understand the people of our communities and the barriers they face. The form and lack of commitment to meaningful consultation also demonstrate the sheer unwillingness of those in power to actually communicate with those their decisions will affect. (sub. 2, p. 6)

Environment Centre NT (ECNT)

The NT Government did not involve the community in the Badu Advisory review, despite the clear public interest and a strong level of community engagement in water decisions in the Northern Territory. It is unclear to ECNT what, if any, stakeholder input was sought as part of the review. (sub. 54, p. 5)

Interim First Nations Water Working Group

Cultural authority and governance systems are continually undermined by simplistic engagement geared towards satisfying minimum procedural requirements for token and minimalist forms of recognition, rather than genuine inclusion of First Nations' enduring rights, connections to and responsibilities for Country. (sub. 48, p. 5)

Melissa Ball

The NT *Water Act* is inadequate in terms of ensuring meaningful community consultation because it does not require that water advisory committees are formed nor that they are comprised of local community representatives and Traditional Owners. (sub. 13, p. 1)

NSW Irrigators

The scope, framework, modelling and timeframes that will be used for this coastal sustainable extraction research remains unclear, demonstrating a lack of effective community partnership and engagement, preventing water users from understanding any risk or potential change to the consumptive pool. (sub. 16, p. 15)

Terri Janke and Company Pty Ltd

These standards of 'having regard to' and 'consult' do not meet the thresholds for Free, Prior and Informed Consent (FPIC), an inherent right of First Nations people, that is also protected under the [United Nations Declaration on the Rights of Indigenous Peoples]. While these standards may be met in practice, this relies on the goodwill of governments and public servants. (sub. 18, p. 7)

Watertrust

Watertrust's extensive consultations across Australia have identified that reform processes with limited effective stakeholder and First Nations' involvement have contributed to a growing

Box 11.2 – Participants’ views on engagement processes

mistrust of governments, increased mistrust among stakeholders, undermined reforms’ legitimacy and constrained policy implementation. ... Reform processes would greatly benefit from governments increasing the genuine involvement of stakeholders in decision-making across the policy cycle to work through the inevitable conflicts that arise. (sub. 35, pp. 1, 2)

Below are some examples of jurisdictions’ progress, maintenance or backsliding under this area. Where a jurisdiction is not shown, it is because there has been no significant change since 2021.

Australian Government

Most stakeholder engagement work conducted by the Australian Government on issues related to water is focused on the Murray–Darling Basin. The Australian Government said it has worked to streamline and improve its engagement processes in the Murray–Darling Basin. An example of improved coordination includes nine rounds of ‘listening tours’ conducted by the Murray–Darling Basin Authority (MDBA) which involved a range of senior MDBA officials as well as representatives from the Department of Climate Change, Energy, the Environment and Water (DCCEEW), the Commonwealth Environmental Water Holder (CEWH) and state water agencies visiting communities together. This approach allowed communities to engage with multiple decision makers without the time and effort associated with attending separate events (PC 2023a, p. 244).

The Commission has received mixed feedback on recent Australian Government engagement processes. Through its inquiry into implementation of the Murray–Darling Basin Plan, the Commission heard that conversations are characterised as ‘one-way’ (people are being consulted but it is not clear they are being listened to) and are not therefore, influencing key decisions, and that little feedback was provided on the outcomes of engagement processes (PC 2023a, p. 242). However, some positive comments were made by participants in this inquiry.

There has been an improvement in community engagement processes at the state and federal levels. The Murray–Darling Basin Authority and Commonwealth Environmental Water Holder have stepped up the level of engagement with communities and organisations representing environmental interests. This has helped to improve general understanding of the complexities of water management. (IRN, sub. 64, p. 4)

MDBA has markedly stepped up its engagement with Lifeblood Alliance ... [a]s a result we have a better understanding of MDBA decision making processes. (Lifeblood Alliance, sub. 67, p. 4)

The Australian Government provides information to local communities through Regional Engagement Officers (REOs) and Local Engagement Officers (LEOs) working for the MDBA and the CEWH respectively. These officers provide an opportunity for two-way information sharing between Australian Government agencies and local communities in the Murray–Darling Basin. In its inquiry into the Murray–Darling Basin Plan implementation, the Commission found that LEOs had contributed to successful engagement with local communities and the building of partnerships with irrigation infrastructure operators. These partnerships and collaborations have been instrumental to the CEWH’s credibility with communities and its success in facilitating the delivery of environmental outcomes. The CEWH’s LEO model provides a good template for effective local engagement (PC 2023a, p. 245). In 2022, DCCEEW provided additional funding for the MDBA’s REO network. The funding was to support REOs’ capability and allow DCCEEW to draw on their insights and expertise, as well as the MDBA. REOs provide the opportunity for regional communities to

receive and share information (Australian Government, personal communication). There are opportunities for improving the effectiveness of REOs' engagement with local communities, such as through clarifying their purpose (PC 2023a, p. 245).

The Australian Government also supports the Basin jurisdictions to improve community engagement, along with other objectives of the Murray–Darling Basin Plan, through the Federation Funding Agreement for Implementing Water Reform in the Murray–Darling Basin (Commonwealth of Australia 2022).

Most recently, the Australian Government has been undertaking public engagement associated with the new National Water Agreement, to replace the NWI (chapter 1). There is dissatisfaction with this process, with some participants concerned about the overlap with the Commission's work, consultation fatigue and the intention for the government to conduct only one round of public consultation based on a discussion paper lacking in key details.⁵ For example, the Australian Dairy Industry Council is of the view that '[t]he process DCCEEW is currently running will most definitely remove any remaining community and jurisdictional trust' (sub. 94, p. 5).

New South Wales



The NSW Department of Climate Change Energy, the Environment and Water (NSW DCCEEW) has instituted changes to improve the provision of information and increase transparency and inclusion. This includes hosting a monthly webinar to provide updates on all consultation processes. NSW DCCEEW publishes a monthly newsletter and maintains a 'have your say' website to keep interested stakeholders informed about the activities of the department (NSW DCCEEW 2024a). New reference groups were established to provide diverse perspectives on water management policies and programs (NSW DCCEEW, sub. 77, attachment 1, p. 2). NSW DCCEEW is also taking steps to improve coordination of engagement across the department to address concerns of over engagement.

These efforts to improve community engagement have led to positive feedback from participants to this inquiry for some activities.

The NSW Government's approach to engagement for the Metering Reform has been a largely positive experience. (NSWIC, sub. 88, p. 12)

But not all.

[T]he sustainable extraction in coastal catchments project ... has significantly lacked stakeholder engagement. The NSW Government's decision to reverse coastal harvestable rights from 30% back to 10% was made suddenly, was communicated by email, and did not reflect the views of affected stakeholders ... and decision-making continues to be hidden behind closed doors. ... There is an evident lack of effective community partnership and engagement, preventing water users from understanding any risk or potential change to the consumptive pool. (NSWIC, sub. 88, p. 12)

The NSW Water Stakeholder and Community Engagement Policy (which incorporates the IAP2 principles – see below: Best practice for community engagement) was updated in 2023 and is undergoing a full review in 2024 to ensure it reflects recommendations from external audits (NSW Government, pers. comms.).

In 2020, NSW DCCEEW established the Aboriginal Water Program and created a dedicated engagement team, which is responsible for ensuring First Nations communities are informed about new water initiatives or policy changes and, where appropriate, can have a say on water matters (NSW DCCEEW 2024j). In 2023

⁵ ADIC, sub. 94, p. 8; AMEC, sub. 92, p. 3; MIL, sub. 90, p. 2; NIC, sub. 84, p. 1; RGA, sub. 86, p. 6.

the Aboriginal Water Program established 12 Regional Aboriginal Water Committees to give greater recognition to Aboriginal water rights and interests (NSW DCCEEW 2024e).

However, these efforts to provide dedicated engagement processes for First Nations communities has not been supported by all. For example, the Dharriwaa Elders Group (DEG) observed:

We continue to see government creating more positions in departments as the means to achieve greater engagement with Aboriginal communities as if the lack of these positions is the cause of government failure to achieve improved outcomes in water management. However, this does nothing to address the structural and systemic changes that are needed to make or improve government accountability to communities. DEG now has an extra layer of government relations to navigate and educate to progress DEG's water priorities. (sub. 47, p. 3)

Northern Territory



The Commission recognises that the engagement task in the Northern Territory is challenging due to the remoteness of many communities, which, for example, makes face-to-face meetings difficult to conduct. Lack of such opportunities, particularly for First Nations communities, has been a source of concern and frustration amongst participants in this inquiry (ALEC, sub. 53; ECNT, sub. 54; EDO, sub. 50).

The Commission has assessed the Northern Territory performance in the area of community engagement in the past three years as being poorer than the previous period for following reasons.

- Unlike the three-year period assessed in 2021, not all water allocation plans (WAPs) have been developed (or are under development) with a water advisory committee (WAC) in place. The Georgina Wiso WAP, which was declared in 2023, did not make use of an established, dedicated WAC.
- The operation of WACs in the past three years has left committee members unsatisfied.
 - Four members of the Mataranka WAC resigned in 2023, three of which were representatives of Traditional Owners. The Northern Land Council have said the Traditional Owner resignations were due to 'their views ... not being taken into consideration in the preparation of the plan' (NLC, sub. 38, p. 4).
 - The minutes to the Western Davenport and Ti Tree WAC show the committee members did not endorse the gazetted plan, and were not satisfied with the community consultation undertaken or the extent that community feedback was reflected in the gazetted draft plan.

[T]he Committee (6 of 6 members) remain concerned that the Draft Plan does not adequately reflect widely shared and clearly expressed community values. ... The Plan presented to [the minister] for gazettal reflects few substantive alterations to the Draft Plan put out for public consultation. The Consultation Summary captures clear disagreement between Government and members of the community. Where community voices are unable to influence the planning process it is unlikely that community members will believe engagement with Government during consultation processes has value. (NT DEPWS 2024, p. 4)

The Commission's finding is supported by feedback received by participants in this inquiry who consider that aspects of engagement by the NT Government on water-related matters has worsened in the past three years (CLC, sub. 44, p. 22; NLC, sub. 38, p. 4).

The public consultation process on the draft Georgina Wiso WAP 2023–2031 comprised of accepting written submissions and survey responses. Meetings were also held with the Beetaloo Regional Reference Group, Northern Land Council, selected industry groups and government agencies to provide information in support of the public consultation process. The consultation summary for the plan recognised there was limited community participation in the development of the plan and that submissions received were critical of the

consultation process. The NT Government noted in the consultation summary that while a WAC did not advise the plan, the plan was based on various studies and assessments, there is no competition for the water resources and the plan commits to engagement with Aboriginal people to support and monitor its implementation over eight years (NT DEPWS 2023a).

Participants in this inquiry reiterated that community consultation for the plan, largely restricted to an online survey and written submissions, was not considered to be appropriate or inclusive for remote First Nations communities that would be affected by the plan (ALEC, sub. 53, p. 35; NLC, sub. 38, p. 3). No on country engagement was conducted in the development of the water plan (NT Government, pers. comm.). Chapters 2 and 4 discuss the Georgina Wiso plan further.

The Commission recognises efforts of and plans by the NT Government to improve community engagement, particularly with First Nations peoples. Implementation of these planned actions, and their outcomes, will inform assessments in future period(s).

- The Territory Water Plan includes an action to establish an Aboriginal Water Advisory Council to advise the NT Government on strategic water issues (NT OWS 2023a, 2023b). This action is a specific response to feedback received on the draft Territory Water Plan.
- The department is also intending to strengthen the voice of First Nations peoples in water management through increasing representation on WACs to up to 50%, or by establishing dedicated Aboriginal Reference Groups (ARGs) to provide input to development and implementation of WAPs (NT Government, pers. comm.).
- The department has undertaken a process to seek permission for submissions to be published and accessible to the public for the next draft WAP released for public comment (NT Government, pers. comm.).

The Territory Water Plan includes an action to establish ARGs in the future to ensure that Aboriginal cultural values and knowledge are understood, key groundwater dependent sites are defined, and specific cultural protections are developed for future inclusion in the plan (NT OWS 2023a). In its submission to this inquiry, the NT Government indicated that these groups are under development in some regions (sub. 72, p. 2). The NT Government has further advised the Commission that it will tailor the approach for First Nations representation in the development of WAPs based on consultation with the relevant First Nation groups. Where preferred, ARGs will be established. Alternatively, First Nations peoples will be prioritised in the membership of WACs (NT Government, pers. comms.).

If implemented effectively, the advisory council and proposed increased representation of First Nations peoples on WACs or use of ARGs could lead to an improvement in engagement and participation by First Nations peoples and communities in water planning. And publishing submissions to the water planning process will improve information provision and accountability.

Best practice for community engagement

Effective and successful community engagement leads to the community having confidence and trust in decision makers and the decisions they enact. Decisions made with involvement of the community have been shown to be more effective and more widely accepted (PSU AESE 2024). To foster confidence and trust in the decision makers themselves, and the decisions taken, requires that decision makers act in good faith – and are seen to act in good faith – throughout the engagement process. The NSW Irrigators' Council noted the impact poor engagement has had on trust.

Water user trust in government decision-making for water management has been eroded due to several factors including poor engagement and non-genuine consultation with stakeholders, unclear decision-making processes and a lack of evidence supporting reforms. (sub. 88, p. 15)

A widely accepted international best practice for community engagement has been developed by the International Association for Public Participation (IAP2). The IAP2 participation spectrum is a means of selecting the level of participation that best defines the public's role in an engagement program and is a valuable tool for shaping effective engagement processes (International Association for Public Participation 2019). A number of jurisdictions indicated that they use the IAP2 spectrum to help plan their engagement processes. As summarised in box 11.2, many participants feel they are not engaged meaningfully, participation is not influencing key decisions, and at times they lack relevant information to feel informed. The IAP2 spectrum ranges from the provision of information (the minimum level of participation) through to collaboration and empowerment where the public are more involved in decision making and their advice is incorporated to the maximum extent possible (International Association for Public Participation 2019).

Based on feedback the Commission has heard through this, and previous, inquiries, governments should be ensuring that, where appropriate, best practice engagement processes in line with the IAP2 definitions of collaboration and empowerment are adopted. This would include the provision of information, listening to concerns and feedback, reflecting concerns in alternative options and also incorporating advice to the maximum extent possible, or placing decision-making in the hands of the public.

11.2 Community adjustment assistance

Summary of actions under the NWI

Assistance with structural adjustment relates to government programs and measures 'to address adjustment issues raised by the implementation of the NWI.'⁶ The actions agreed to achieve this outcome were:⁷

The Parties agree to address significant adjustment issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the reforms proposed in this Agreement.

i) States and Territories will consult with affected water users, communities and associated industry on possible appropriate responses to address these impacts, taking into account factors including:

- a) possible trade-offs between higher reliability and lower absolute amounts of water;
- b) the fact that water users have benefited from using the resource in the past;
- c) the scale of the changes sought and the speed with which they are to be implemented (including consideration of previous changes in water availability); and
- d) the risk assignment framework referred to in paragraphs 46 to 51.

ii) The Commonwealth Government commits itself to discussing with signatories to this Agreement assistance to affected regions on a case-by-case basis (including set up costs), noting that it reserves the right to initiate projects on its own behalf.

Previous findings (2021)

In 2021, the Commission found some positive developments in community adjustment assistance, namely the commitment to monitor and evaluate the Murray–Darling Basin Economic Development Program. But

⁶ NWI paragraph 94.

⁷ NWI paragraph 97.

decisions inconsistent with the NWI were also identified, in particular the Australian Government decision to halt the use of water buybacks to recover water for the environment.

Overall, the Commission concluded that the NWI provided limited guidance on appropriate adjustment actions and, therefore, jurisdictions had largely achieved the NWI requirements. Monitoring and evaluation of adjustment assistance measures was identified by the Commission as a key ongoing priority for jurisdictions.

Assessment (2024)

The Australian Government has recommenced open tender water purchases (known as voluntary water buybacks) to address overallocation and increase water for the environment (Plibersek 2023b). Compared to subsidies for on-farm water efficiency improvements, voluntary buybacks increase the overall efficiency of government expenditure to reduce overallocation. Reintroduction of buybacks addresses the primary area of concern raised in 2021, which noted that '[r]uling out buybacks is inconsistent with NWI commitments for water recovery measures' (PC 2021a, p. 207). With this in mind, the Commission notes state government reservations about voluntary water buybacks. The Victorian Government has voiced its strong opposition to buybacks (Shing 2024) and in February 2024 the NSW Government released its *NSW Alternatives to Buybacks Plan: Delivering on our commitments to implement the Basin Plan in full* that proposes an approach to recovering water for the environment while minimising impacts of 'broad scale water buybacks by the Australian Government' (NSW DCCEEW 2024b, p. 4).

Other than voluntary buybacks, there has been little change in adjustment programs in the past three years. Western Australia is currently undergoing a water recovery process for the Gngangara Mound and is providing individuals, businesses, local governments, schools and communities support to adjust to reduced water allocations (WA Government 2024f).

As outlined in the NWI renewal advice (13.1) provided in 2021, any adjustment assistance that is provided should consider:

- community needs, understood through effective community partnerships and engagement
- generally available measures targeting the welfare and skills of individuals, and regional development planning and initiatives
- in rare circumstances where it is appropriate to take additional steps to address adjustment issues, the assistance option that:
 - delivers the largest benefits relative to costs
 - is likely to build adaptive capacity and secure employment
 - targets the most vulnerable individuals
 - includes a commitment to public monitoring and evaluation of effectiveness.

In early 2024 the Australian Government consulted on a draft framework for delivering the 450 GL of additional environmental water under the *Water Amendment (Restoring our Rivers) Act 2023* (Cth). The draft framework includes the Sustainable Communities Program, an adjustment assistance program for Basin communities impacted by voluntary water purchases (DCCEEW 2024h).

It is not clear from the draft framework the extent of community involvement in program development or if monitoring and evaluation is an intended part of the program. The Commission would encourage governments to consider the NWI renewal advice (13.1) provided in 2021 when designing the program, in particular, that it include 'public monitoring and evaluation of the effectiveness of any assistance'. The government should also consider increasing the level of involvement of affected community members in the development of the program to build a sense of ownership and trust in the program (PC 2023a, p. 95).

As noted above, monitoring and evaluation of adjustment programs is important. However, the Australian Government has not published evaluation reports for its Murray–Darling Basin Economic Development Program which commenced in 2020. This is despite the monitoring, evaluation, reporting and improvement framework identifying specific timelines for reporting in 2022 and 2023 (DCCEEW 2021, p. 7).

Overall, however, the specific requirements of the NWI with respect to community adjustment assistance have been largely met by all jurisdictions.

11.3 Renewal advice

NWI renewal advice in chapters 13 and 15 of the Commission’s National Water Reform 2021 inquiry report remains relevant. The Commission extends some of that advice below.

NWI renewal advice 13.1: Helping communities deal with adjustment pressures

UPDATED IN 2024

Inclusion of guiding principles in a renewed National Water Initiative would clarify how governments can respond to any significant community adjustment pressures resulting from policy-induced reductions in water availability.

- The socioeconomic impacts of any major potential policy change be assessed to identify possible community needs. Effective community partnerships and engagement are critical to understanding the wider context.
- Generally-available measures targeting the welfare and skills of individuals, and regional development planning and initiatives to leverage community capabilities and competitive advantages are usually the most appropriate responses to adjustment pressures.
- In rare circumstances, it may be appropriate to take additional steps to address adjustment issues if policy changes that are beneficial to the wider community impose increased risk of permanent disadvantage for groups of individuals. Where generally-available measures will be inadequate, more support could improve the efficiency of the adjustment process by addressing impediments to change.
- Where further support is warranted:
 - assistance programs should be integrated with regional development strategies and frameworks
 - options for further support need to be considered on a case-by-case basis and consider all factors affecting a community (not just changing water availability) and the chosen option should be the one that delivers the largest benefits relative to costs
 - measures that are likely to build adaptive capacity and secure employment or business opportunities should be the focus, and targeted to the most vulnerable individuals (those at risk of permanent disadvantage)
 - industry assistance and subsidies should be avoided
 - a commitment should be made to public monitoring and evaluation of the effectiveness of any assistance.

NWI renewal advice 15.1: Community engagement framework

UPDATED IN 2024

Australian governments should recommit to best practice, cost-effective engagement with their communities on all water matters. To achieve this, a renewed National Water Initiative should develop a community engagement framework focused on:

- continuously improving and sustaining government engagement effort across all aspects of water resource management and water service provision
- coordinating engagement actions between all levels of government, particularly in multi-jurisdictional activities
- ensuring that engagement effort and its resourcing are fit-for-purpose taking into account the scale of proposed change or reform, its sensitivities and its impacts
- ensuring that governments are clear about the purpose of their engagement, the role of communities in decision making, and transparently report on how communities' views have informed decisions
- improving the effectiveness of community engagement through enhancing:
 - water information accessibility and comprehensibility
 - community water literacy.

This framework should adopt the characteristics of inclusiveness, timeliness, partnership, respect, access to information, transparency, responsiveness and continuous improvement as a best-practice foundation for effective community engagement and information provision practice in water resource management and water service provision.

Appendices

A. Public engagement

This appendix outlines the engagement process undertaken for this inquiry and lists the organisations and individuals who participated in this inquiry.

Inquiry terms of reference

The terms of reference for the inquiry were received on 22 December 2023. The inquiry was advertised in The Australian and Australian Financial Review newspapers on 11 January 2024. The call for submissions was released on 5 January 2024 to assist people wanting to make a written submission to the inquiry. The call was also promoted through the Commission's social media accounts.

Consultations

The Commission received 96 submissions (table A.1), six brief comments and conducted over 49 consultations with representatives from Australian, state and territory government water agencies, water regulators, water sector peak bodies, academic institutions, industry associations, and First Nations peoples and organisations (table A.2).

In accordance with section 89 of the *Water Act 2007* (Cth), the Commission established a Stakeholder Working Group for this inquiry which met three times during the inquiry. The working group is an important avenue for engagement. It provides a forum to exchange information and views on issues relevant to this inquiry (table A.3).

The Commission would like to thank everyone who has participated in this inquiry.

Documents produced by the inquiry

The following documents were prepared by the Commission on this inquiry:

- Call for submissions – released 5 January 2024.
- Interim report – released 4 April 2024.
- Final report – delivered to the Australian Government on 28 May 2024 (to be publicly released within 25 parliamentary sitting days).

Table A.1 – Submissions

Participants	Submission no.
Acid Sulfate Soils Centre	25
Alistair Watson	17
Arid Lands Environment Centre	53
Association of Mining and Exploration Companies	92
Aurecon	28
Australian Academy of Technological Sciences and Engineering	5, 68
Australian Competition and Consumer Commission	11, 82
Australian Dairy Industry Council	94
Australian Healthcare and Hospitals Association	61
Australian Water Association	43
Berrigan Shire Council	2
Business Council for Sustainable Development Australia	7
Central Land Council	44
Central NSW Joint Organisation	30
Cobram Estate Olives Limited	20
Colin Boyce MP	26, 69
Committee on Aboriginal and Torres Strait Islander Water Interests	95
Cotton Australia Limited	91
CSIRO	42
Darryl Day	76
Dental Health Services Victoria	56
Desert Knowledge Australia and the Goyder Institute for Water Research	24
Dharriwaa Elders Group	47
Dr Paul Wyrwoll	27
Engineers Australia	34
Environment Centre NT	54
Environmental Defenders Office	50, 73
Gwydir Valley Irrigators Association Inc.	39
Heather Ferguson and Carl Stephens	19
Hughenden Irrigation Project Corporation	1
Indigenous Land and Sea Corporation	52, 79
Inland Rivers Network	64
Inspector-General of Water Compliance	80
Interim First Nations Water Working Group	48, 78

Participants	Submission no.
Irrigation Australia Ltd	9, 58
Karen Oborn	83
Kimberley Land Council	59
Lachlan Valley Water Inc	21
Lifeblood Alliance	67
Local Government Association of Queensland	12, 66
Mark Leland Ames and Merielle Maureen Cooper	14
Martowarra Fitzroy River Council	75
Melissa Ball	13
Murray Irrigation Limited	90
Murray-Darling Basin Authority	36
National Farmers' Federation	32, 70
National Health and Medical Research Council	6
National Irrigators' Council	51, 84
National Parks Association of NSW	33
Northern Land Council	38
NSW Aboriginal Land Council	60
NSW Department of Climate Change, Energy, the Environment and Water	77
NSW Irrigators' Council	16, 88
NT Department of Environment, Parks, and Water Security	72
Office of the ACT Commissioner for Sustainability and the Environment	3
Professor Alex Gardner	46
Professor Alex Gardner and Michael Bennett	74
Professor David Shearman AM	10
Professor R Quentin Grafton and Hon Professor John Williams, Water Justice Hub	40
Professor Sue Jackson and Dr Erin O'Donnell	57
qldwater	29
Queensland Farmers' Federation	96
Ricegrowers' Association of Australia Inc.	37, 86
South Australian Council of Social Service	23
Southern Riverina Irrigators	87
Susie Young, Megan Hills and Irene Perez Lopez	63
Sydney Water	41, 71
Tabitha and Celia Karp	31
TasFarmers	8

Participants	Submission no.
Terri Janke and Company Pty Ltd	18
Turf Australia	93
Unitywater	22
Urban Utilities	65
Victorian Farmers' Federation	89
WA Government	62
Water Research Australia	49
Water Sensitive Cities Australia	45
Water Services Association of Australia	15, 81
WaterNSW	55, 85
Watertrust Australia Ltd	35
WIM Alliance	4

Table A.2 – Consultations

Participants
Australian Academy of Technological Sciences and Engineering
Australian Competition and Consumer Commission
Australian Government Department of Climate Change, Energy, the Environment and Water
Australian Government Inspector-General of Water Compliance
Bureau of Meteorology
Committee on Aboriginal and Torres Strait Islander Water Interests
Commonwealth Environmental Water Office
Cotton Australia
CSIRO
Department of Climate Change, Energy, the Environment and Water (NSW)
Department of Energy, Environment and Climate Action (Vic)
Department of Environment and Water (SA)
Department of Environment, Parks & Water Security (NT)
Department of Natural Resources and Environment (Tas)
Department of Regional Development, Manufacturing and Water (Qld)
Department of Water and Environmental Regulation (WA)
Dr Phil Duncan
Economic Regulation Authority (WA)
Essential Services Commission (Vic)
Essential Services Commission of South Australia

Participants

Environment Centre NT

Environment, Planning and Sustainable Development Directorate (ACT)

Environmental Defenders Office, NT & WA

Independent Pricing and Regulatory Tribunal (NSW)

Indigenous Land and Sea Corporation

Infrastructure WA

Minerals Council of Australia

National Farmers' Federation

National Irrigators' Council

National Native Title Council

National Water Reform Committee

Natural Resources Access Regulator (NSW)

Natural Resources Commission (NSW)

NSW Irrigators' Council

Professor Alex Gardner

Professor Peter Yu

Queensland Competition Authority

South Australian Council of Social Service

Water Services Association of Australia

Table A.3 – Stakeholder working group
Participants

Australian Academy of Technological Sciences and Engineering

Australian Conservation Foundation

Australian Water Association

Coalition of Peaks

Committee on Aboriginal and Torres Strait Islander Water Interests

Minerals Council of Australia

National Farmers' Federation

National Health & Medical Research Council

South Australian Council of Social Services

Water Services Association of Australia




B. Assessment of progress ratings and indicators

In undertaking its assessment of jurisdictions' progress towards achieving the objectives and outcomes of the 2004 National Water Initiative, the Productivity Commission has adopted the following ratings and colour coding.





- **Achieved** (green shading in assessment table): All requirements to achieve the relevant outcomes and objectives of the NWI have been met.
- **Largely achieved** (yellow shading in assessment table): Requirements to achieve the relevant outcomes and objectives of the NWI have generally been met, with some exceptions (for example, there are one or two non-compliant jurisdictions or reforms do not extend to all water users or sectors).
- **Partially achieved** (red shading in assessment table): Only some requirements to achieve the relevant outcomes and objectives of the NWI have been met (for example, there are several non-compliant jurisdictions, or most jurisdictions do not meet a number of key requirements).

Some requirements in the NWI are one off actions (such as removing legislative barriers to water trading) while others require ongoing effort (such as monitoring). One-off actions can be undone, and progress is not unidirectional, hence, 'achieved' does not necessarily indicate that no further action is required in the future.

In addition to the point in time assessments provided by these ratings, the direction of progress since 2021 has also been assessed. Progress signals are used to reflect an overall assessment of whether, on the whole, across jurisdictions, reforms have moved closer to consistency with the NWI since 2021.

- An arrow pointing upward indicates progress. 
- A flat line indicates no change. 
- A downward arrow indicates poorer performance or backsliding. 

In some assessment chapters, the Commission has also indicated the direction of progress in some jurisdictions since 2021. Where a jurisdiction is not shown in a section, it is because the Commission has not identified any significant progress since 2021.

- Jurisdiction has made notable progress. 
- Jurisdiction has fully achieved outcome. 
- Jurisdiction has made no progress or minor incremental gains or losses. 
- Jurisdiction is backsliding or performance is notably poorer. 

References

- ABR (Australian Business Register) 2024, *Home*, <https://www.abr.gov.au/> (accessed 6 May 2024).
- ABS (Australian Bureau of Statistics) 2019, *Gross value of irrigated agricultural production*, <https://www.abs.gov.au/statistics/industry/agriculture/gross-value-irrigated-agricultural-production/latest-release> (accessed 22 April 2024).
- 2023a, *National, state and territory population, June 2023*, <https://www.abs.gov.au/statistics/people/population/national-state-and-territory-population/jun-2023> (accessed 20 March 2024).
- 2023b, *Population Projections, Australia, 2022 (base) - 2071* |, <https://www.abs.gov.au/statistics/people/population/population-projections-australia/latest-release> (accessed 20 February 2024).
- 2023c, *Remoteness Areas - Australian Statistical Geography Standard (ASGS) Edition 3*, <https://www.abs.gov.au/statistics/standards/australian-statistical-geography-standard-asgs-edition-3/jul2021-jun2026/remoteness-structure/remoteness-areas> (accessed 21 March 2024).
- 2023d, *Water Account, Australia, 2021-22 financial year*, <https://www.abs.gov.au/statistics/environment/environmental-management/water-account-australia/latest-release> (accessed 16 February 2024).
- ACCC (Australian Competition and Consumer Commission) 2016, *Review of the water charge rules final advice*.
- 2021, *Murray-Darling Basin water markets inquiry*.
- ACE CRC (Antarctic Climate and Ecosystems Cooperative Research Centre) 2010, *Climate Futures for Tasmania climate modelling: the summary*.
- ACMA (Australian Communications and Media Authority) 2024, *Register of Radiocommunications Licences*, https://web.acma.gov.au/ri/register_search.main_page (accessed 6 May 2024).
- ACT EPSDD (Australian Capital Territory Environment, Planning and Sustainable Development Directorate) 2020, *Environment, Planning and Sustainable Development Directorate Science Plan 2020-2025*.
- 2022, *Report on the EPSDD Science Plan Implementation Plan 2020-2021*, September.
- 2023a, *ACT Water Strategy - 2023 Report Card*, <https://www.environment.act.gov.au/water/water-strategies-and-plans/act-water-strategy/act-water-strategy-2023-report-card> (accessed 21 March 2024).
- 2023b, *Office of Water*, <https://www.environment.act.gov.au/water/office-of-water> (accessed 5 April 2024).
- 2024, *Ginini Flats Wetland Complex Ramsar Site*, <https://www.environment.act.gov.au/nature-conservation/conservation-and-ecological-communities/ginini-flats-wetland-complex-ramsar-site> (accessed 24 April 2024).
- ACT Government 2019a, *ACT Water Strategy 2014–44 Striking the Balance Implementation Plan Two (2019-23)*.
- 2019b, *ACT Climate Change Strategy 2019-2025*.
- 2021a, *Fact Sheet ACT Water Governance Review*.
- 2021b, *Water entitlement search*, <https://services.accesscanberra.act.gov.au/s/public-registers/epa-registers?registerid=water-entitlement> (accessed 20 May 2024).
- 2021c, *Water licence search*, <https://services.accesscanberra.act.gov.au/s/public-registers/epa-registers?registerid=water-licence-search> (accessed 20 May 2024).
- 2023, *Water Resources Amendment Bill 2023: Explanatory Statement and Human Rights Compatibility Statement*.
- ACT OCSE (Australian Capital Territory Office of the Commissioner for Sustainability and the Environment) 2023, *ACT State of the Environment Report 2023*.
- ACT TEDD (Australian Capital Territory Treasury and Economic Development Directorate) 2023, *2022-23 CMTEDD Annual Report*.
- AECOM (AECOM Australia Pty Ltd) 2024, *Mount Morgan Water Supply Security Project*, <https://aecom.com/au/projects/mount-morgan-water-supply-security-project/> (accessed 3 May 2024).
- AEMO (Australian Energy Market Operator) 2024, *Draft 2024 Integrated System Plan for the National Electricity Market*.
- ANAO (Australian National Audit Office) 2014, *Administration of the Improving Water Information Program*, no.18, Canberra.
- Aqwest (Aqwest Bunbury Water) 2023, *Water quality report 2023*.
- ARI (Arthur Rylah Institute) 2023a, *Assessing benefits of water for the environment*, <https://www.ari.vic.gov.au/research/rivers-and-estuaries/assessing-benefits-of-water-for-the-environment> (accessed 2 May 2024).
- 2023b, *Assessing wetland response to water for the environment*, <https://www.ari.vic.gov.au/research/wetlands-and-floodplains/assessing-wetland-response-to-water-for-the-environment> (accessed 2 May 2024).
- ARNECC (Australian Registrars National Electronic Conveyancing Council) 2024, *Land Registries*, https://www.arnecc.gov.au/resources/links/land_registries/ (accessed 6 May 2024).
- ARTD Consultants 2021, *Environmental Water Management Program 2014-2019 Evaluation*, 24 February.
- Arup (Arup Australia Pty Ltd) 2022, *Water for Hydrogen Technical Paper*.
- ATAP (Australian Transport Assessment and Planning) 2022, *Australian Transport Assessment and Planning Guidelines - T2 Cost Benefit Analysis*.
- Australian Government 2007, *A national plan for water security*, 25 January.

- 2017, *Considering climate change and extreme events in water planning and management (2017)*.
- 2022, *National water grid investment framework*.
- , New South Wales Government, Queensland Government, South Australian Government, Northern Territory Government and Great Artesian Basin Coordinating Committee 2019, *Great Artesian Basin strategic management plan*.
- Australian Government Office for the Arts 2024, *Stand-alone Indigenous Cultural and Intellectual Property Legislation*, <https://www.arts.gov.au/what-we-do/indigenous-arts-and-languages/stand-alone-indigenous-cultural-and-intellectual-property-legislation> (accessed 13 March 2024).
- Australian Governments and the Coalition of Peaks 2020, *National Agreement on Closing the Gap*.
- AWA (Australian Water Association) 2019, *Queensland drinking water dams switch on to hydropower*, <https://www.awa.asn.au/resources/latest-news/business/assets-and-operations/queensland-drinking-water-dams-switch-on-to-hydropower> (accessed 18 April 2024).
- and WSAA (Australian Water Association and Water Services Association of Australia Ltd) 2024, *Water Careers, Careers in Water*, <https://www.careersinwater.com.au/> (accessed 19 April 2024).
- Badu Advisory 2023, *Review of the NT's implementation of the National Water Initiative in relation to water planning*, 13 July, commissioned by the Northern Territory Department of Environment, Parks and Water Security.
- Bannister, M 2024, 'Winery fined for stealing 146 Olympic pools worth of water from pipeline in NSW', *9 News*, 28 March.
- Barnett, S and Williamson, D 2020, 'New Approaches for Allocation Reductions and Groundwater Salinity Management in South Australia', in Rinaudo, J-D, Holley, C, Barnett, S and Montginoul, M (eds), *Sustainable Groundwater Management: A comparative analysis of French and Australian policies and implications to other countries*, Global Issues in Water Policy, Springer Nature, Switzerland, pp. 355–363.
- Better Evaluation nd, *Better Evaluation*, <https://www.betterevaluation.org/> (accessed 14 May 2024).
- BOM (Bureau of Meteorology) 2016, *Improving Water Information Programme Progress Report: Advances in Water Information Made by the Bureau of Meteorology in 2015*.
- 2021a, *Australian water markets report 2019-20*.
- 2021b, *Water in Australia 2019-20*.
- 2022, *National Water Account - 2022 Account*, <http://www.bom.gov.au/water/nwa/2022/> (accessed 14 March 2024).
- 2023a, *Australian Water Markets Report 2021-2022*.
- 2023b, *National performance report 2021-22 – urban water utilities*.
- 2023c, *National performance report framework - Water and wastewater service providers performance indicators and definitions handbook 2023*.
- 2024a, *About water markets*, <http://www.bom.gov.au/water/market/about.shtml> (accessed 24 April 2024).
- 2024b, *National performance report 2022-23 - Urban water utilities*.
- 2024c, *National performance report 2024-25 Guidance memo – Water and wastewater service providers with less than 10,000 connection properties*.
- 2024d, *State of the Climate 2022 - Australia's changing climate*, <http://www.bom.gov.au/state-of-the-climate/australias-changing-climate.shtml> (accessed 19 February 2024).
- 2024e, *Water Markets Dashboard*, <http://www.bom.gov.au/water/dashboards/#/water-markets/map> (accessed 1 May 2024).
- 2024f, *Water Restrictions*, <http://www.bom.gov.au/water/restrictions/index.php?serviceArea=767> (accessed 20 March 2024).
- Bowen, C (Australian Government Minister for Climate Change and Energy) 2023, *Australia supports global renewable and energy efficiency pledge*, Media release, 3 December.
- Bridge, M 2022, *Council recommends potable water pipeline in Mount Morgan*, *Pump Industry Magazine*, 9 March, <https://www.pumpindustry.com.au/council-recommends-potable-water-pipeline-in-mount-morgan/> (accessed 6 May 2024).
- Browett, H, Pearce, M and Willis, EM 2012, 'Cost implications of hard water on health hardware in remote Indigenous communities in the central desert region of Australia', *International Indigenous Policy Journal*, vol. 3, no. 3, pp. 1–16.
- BuildSkills Australia 2024, *BuildSkills Australia Roundtable - Darwin*, <https://events.buildskills.com.au/BuildSkillsAustraliaRoundtable-NortherTerritoryDarwin> (accessed 21 March 2024).
- Burdred, K and Sternberg, D 2022, *Biology and reproductive ecology of the Endangered Cooper Creek Catfish (Neosiluroides cooperensis) and implications for its conservation*, *Proceedings of The Royal Society of Queensland*, Vol. 131, pp. 1–13.
- Business Queensland 2024, *Developing water plans*, <https://www.business.qld.gov.au/industries/mining-energy-water/water/catchments-planning/planning/developing> (accessed 21 March 2024).
- Busselton Water 2023, *Annual water quality report 2022-23*.
- Butcher, G (Queensland Government Minister for Regional Development and Manufacturing and Minister for Water) 2023a, *Better water management thanks to subsidised telemetry roll-out in the Queensland Murray-Darling Basin*, Media release.
- 2023b, *New Barron Water Plan and Water Management Protocol*, Media release, 26 June, Queensland Government.
- 2023c, *New Water Strategy highlights Palaszczuk Government's commitment to water infrastructure delivery*, Ministerial Media Statements, <https://statements.qld.gov.au/statements/98917> (accessed 20 March 2024).
- 2023d, *Question on notice no. 1420*, Question on notice, 18 November, 1420, Queensland Parliament.
- Butcher, R, Boulton, AJ, Cottingham, P, Davies, PED, Fenton, A, Hart, BT, Ladson, A, Robinson, W and Schreiber, ESG 2020, *Stage 1 Report - Outcome Evaluation of the Long Term Intervention Monitoring (LTIM) and Environmental Water Knowledge and Research (EWKR) Projects for the Commonwealth Environmental Water Office*, Report to the Commonwealth Environmental Water Office, December, Water's Edge Consulting.
- Cassowary Coast Regional Council 2023, *Boil water alert (Tully and surrounds)*, <https://www.cassowarycoast.qld.gov.au/news/article/1103/boil-water-alert-tully-and-surrounds-> (accessed 22 March 2024).

- CAWI (Committee on Aboriginal and Torres Strait Islander Water Interests) 2023a, *Committee on Aboriginal and Torres Strait Islander Water Interests*, Communiqué #4, December.
- 2023b, *Insights Paper - Pathway to enduring recognition of Aboriginal and Torres Strait Islander Peoples' water interests in national water reform initiatives*.
- CEWH (Australian Government Commonwealth Environmental Water Holder) 2023a, *Commonwealth Environmental Water Holder Water Management Plan 2023-24*, Canberra.
- 2023b, *January 2023 Goulburn Regulated Water Allocation Sale: Outcome report*.
- 2023c, *Response to the Productivity Commission's Murray-Darling Basin Plan: Implementation Review 2023 (interim report)*, 20 November, Submission number 69.
- 2024, *How science informs the use of water for the environment*, FLOW Monitoring, Evaluation, Research, <https://flow-mer.org.au/how-science-informs-the-use-of-water-for-the-environment/> (accessed 19 March 2024).
- CfP (Centre for Population) 2023, *Population Statement 2023*, Canberra.
- Chordia, M, Wickerts, S, Nordelöf, A and Arvidsson, R 2022, 'Life cycle environmental impacts of current and future battery-grade lithium supply from brine and spodumene', *Resources Conservation and Recycling*, vol. 187, no. 106634, pp. 1–11.
- CLC (Central Land Council) 2024, "Not going to let it go": native title holders appeal Singleton water licence ruling, Media release, 27 February.
- Climate Council 2014, *Heatwaves - Hotter, longer, more often*.
- 2019, *Compound costs - How climate change is damaging Australia's economy*.
- 2022, *Climate Risk Map of Australia*, <https://www.climatecouncil.org.au/resources/climate-risk-map/> (accessed 18 April 2024).
- COAG (Council of Australian Governments) 2008, *Coag work program on water - November 2008 - Agreed actions*.
- 2012, *National framework for compliance and enforcement systems for water resource management*.
- Cockayne, B 2021, 'Climate change effects on waterhole persistence in rivers of the Lake Eyre Basin, Australia', *Journal of Arid Environments*, vol. 187, no. 104428, pp. 1–13.
- Commonwealth of Australia 2022, *Implementing Water Reform in the Murray-Darling Basin (2021/22 - 2023/24) schedule to the Federation Funding Agreement - Environment*, <https://federalfinancialrelations.gov.au/sites/federalfinancialrelations.gov.au/files/2023-03/Implementing%20Water%20Reform%20in%20the%20MDB%202021-2024.pdf> (accessed 27 March 2024).
- Cook, M, Gaynor, A, Frost, L, Spearritt, P and Morgan, R 2022a, 'The "yuck factor" pushes a premier towards desalination yet again, but history suggests recycled water's time has come', *The Conversation*, 1 September.
- Cook, PG, Shanafield, M, Andersen, MS, Bourke, S, Cartwright, I, Cleverly, J, Currell, M, Doody, TM, Hofmann, H, Hugmann, R, Irvine, DJ, Jakeman, A, McKay, J, Nelson, R and Werner, AD 2022b, 'Sustainable management of groundwater extraction: An Australian perspective on current challenges', *Journal of Hydrology: Regional Studies*, vol. 44, p. 101262.
- Cook, R, Saffioti, R and McGurk, S (Western Australian Premier; Minister for State and Industry Development, Jobs and Trade; Public Sector Management; Federal-State Relations, Western Australian Deputy Premier; Treasurer; Minister for Transport; Tourism and Western Australian Minister for Training; Water; Youth) 2023, *\$2.8 billion investment to secure Perth's next major water source*, Media release, 4 December.
- Corangamite CMA (Corangamite Catchment Management Authority) 2024, *Corangamite regional catchment strategy - groundwater*, Corangamite Regional Catchment Strategy, <https://corangamite.rcs.vic.gov.au/themes/water/groundwater/> (accessed 8 May 2024).
- Cresswell, ID, Janke, T and Johnston, EL 2021, *Overview: Ecosystems*, Australia State of the environment 2021, Australian Government Department of Agriculture, Water and the Environment, Canberra.
- CSEV (Commissioner for Environmental Sustainability Victoria) 2023, *Victorian State of the Environment 2023 Report*, Summary Report, Victorian Government.
- CSIRO and BOM (Commonwealth Scientific and Industrial Research Organisation and Bureau of Meteorology) 2024a, *Downscaling*, <https://www.climatechangeinaustralia.gov.au/en/learning-support/climate-models/downscaling/> (accessed 1 May 2024).
- 2024b, *Overview*, <https://www.climatechangeinaustralia.gov.au/en/overview/> (accessed 1 May 2024).
- CSIRO (Commonwealth Scientific and Industrial Research Organisation) 2022a, *Rapid national appraisals of new groundwater-based infrastructure opportunities*, <https://www.csiro.au/en/research/natural-environment/water/Water-resource-assessment/Rapid-Appraisals> (accessed 4 April 2024).
- 2022b, *Southern Gulf water resource assessment*, <https://www.csiro.au/en/research/natural-environment/water/Water-resource-assessment/SoGWRA> (accessed 4 April 2024).
- 2023a, *Water resource assessment for the Roper catchment. An overview report from the CSIRO Roper River water resource assessment for the National Water Grid*.
- 2023b, *Water supply for remote Australian communities*, <https://www.csiro.au/en/research/natural-environment/water/Water-resource-assessment/Water-supply-for-remote-Australian-communities> (accessed 4 April 2024).
- 2024a, *Climate projections for Australia*, <https://www.csiro.au/en/research/environmental-impacts/climate-change/Climate-change-information> (accessed 19 March 2024).
- 2024b, *Ecosystem functions in the Murray-Darling Basin*, <https://www.csiro.au/en/research/natural-environment/water/Murray-Darling-Basin/Ecosystem-function> (accessed 4 April 2024).
- 2024c, *Managed aquifer recharge*, <https://research.csiro.au/mar/> (accessed 25 March 2024).
- Currell, M, Jackson, S and Ndehedehe, C 2024, 'Risks in the current groundwater regulation approach in the Beetaloo region, Northern Territory, Australia', *Australasian Journal of Water Resources*, pp. 1–17.
- DAWE (Australian Government Department of Agriculture, Water and the Environment) 2021, *Australia State of the Environment 2021*.
- 2022, *Inland Waters Statistical Baseline Exercise*, August.
- DCCEEW (Australian Government Department of Climate Change, Energy, the Environment and Water) 2019, *National Urban Water Planning Principles*, <https://www.dceew.gov.au/>

water/policy/urban/policy-reform-urban-water/planning-principles (accessed 1 February 2024).

— 2020, *Committee on Aboriginal and Torres Strait Islander Water Interests - Terms of Reference*.

— 2021, *Murray-Darling Basin Economic Development Program Monitoring, Evaluation, Reporting and Improvement Framework*.

— 2022a, *National Strategy (NHMS) and High-Level Implementation Plan for Hydrological Modelling 2022-2027*, 2 September.

— 2022b, *Powering Australia*.

— 2022c, *Regional planning*, <https://www.dcceew.gov.au/environment/epbc/epbc-act-reform/regional-planning> (accessed 4 April 2024).

— 2023a, *Agreement of Murray-Darling Basin Ministers to deliver the Basin Plan in full*, 22 August.

— 2023b, *Climate Projections Roadmap for Australia*.

— 2023c, *Commonwealth Environmental Water Holder's future Science Program*, <https://www.dcceew.gov.au/water/cewo/monitoring/future-science-program> (accessed 19 March 2024).

— 2023d, *Final Submission to Productivity Commission's Murray-Darling Basin Plan Five-year Assessment 2023*, November, Submission 127.

— 2023e, *History of Aboriginal and Torres Strait Islander Peoples' water interests, advocacy and reform*.

— 2023f, *Implementing the Water market reform roadmap*, Progress report, October.

— 2024a, *Committee on Aboriginal and Torres Strait Islander Water Interests (CAWI)*, <https://www.dcceew.gov.au/water/policy/first-nations/cawi> (accessed 21 March 2024).

— 2024b, *Consultation on First Nations water holding arrangements*, <https://www.dcceew.gov.au/water/policy/first-nations/consultation-water-holding-arrangements> (accessed 19 March 2024).

— 2024c, *Consultation on National Environmental Laws 21-23 February 2024*, Draft National Environmental Standards.

— 2024d, *Discussion paper - Seeking views on a future national water agreement*, Draft National Environmental Standards, March.

— 2024e, *Lake Eyre Basin: its rivers and catchments - Strategic Plan*, March.

— 2024f, *Lake Eyre Basin Strategic Plan*, March, Canberra.

— 2024g, *Murray-Darling Basin Aboriginal Water Entitlements Program*.

— 2024h, *Restoring Our Rivers: Delivering the Basin Plan 2012 Draft framework for delivering the 450 GL of additional environmental water*.

— 2024i, *Strategic water purchasing - Bridging the Gap 2023*, <https://www.dcceew.gov.au/water/policy/mdb/commonwealth-water-mdb/strategic-water-purchasing> (accessed 8 May 2024).

— 2024j, *Water markets*, <https://www.dcceew.gov.au/water/policy/markets/reform> (accessed 3 May 2024).

DEWHA (Australian Government Department of the Environment, Water, Heritage and the Arts) 2009, *Water for the Future - National Water Skills Strategy*.

DITRDC (Australian Government Department of Infrastructure, Transport, Regional Development and Communications) nd,

Milingimbi Water Security Strategy, <https://www.nationalwatergrid.gov.au/projects/milingimbi-water-security-strategy> (accessed 13 May 2024a).

— nd, *Yuendumu Water Security and Supply Strategy*, <https://www.nationalwatergrid.gov.au/projects/yuendumu-water-security-and-supply-strategy> (accessed 13 May 2024b).

Doble, R, London, A, Horner, N, Thiruvengkatachari, R, Priestley, S and O'Brien, G 2023, *Water quality review and treatment technology framework for remote community water supply*.

Doolan, J 2016, *The Australian water reform journey*, Australian Water Partnership.

Dula, A, Duncan, P, Sheldon, F, Smith, C, Southwell, M and Townsend, P 2024, *Connectivity Expert Panel Interim Report*, For the NSW Government.

Dunn, K, Rubenstein, N and Bosomworth, K 2020, *Climate change adaptation planning in Victoria's water sector*, RMIT University.

Earle, N, Spencer, W, McCausland, R, Futeran, P, Webster, J and Leslie, G 2023, *Yuwaya Ngarra-li Briefing Paper: Walgett's Drinking Water*, Dharriwaa Elders Group, Community Led Development, UNSW.

EDO (Environmental Defenders Office) 2023, *EDO Briefing Note: Water licences for mining activities – proposed changes to the Water Act 1992 (NT)*.

Espinoza, T, Marshall, S, Limpus, D, Limpus, C and McDougall, A 2022, 'Adaptive management to reduce nest inundation of a critically endangered freshwater turtle: Confirming the win-win', *Environmental Management*, vol. 67, pp. 972–981.

Farrier Swier Consulting 2019, *Victoria's water sector: The PREMIO model for economic regulation*, Victorian Essential Services Commission.

Ferguson, M (Tasmanian Government Minister for Planning) 2022, *State of the Environment Report*, Media release, 29 September.

Fitzgerald, D 2021, 'Darwin rural aquifers vastly over-allocated with water licences declined', *ABC News*, 13 May.

Fitzgerald, R 2023, 'The NT government has proposed changes to the water act. Experts say "the devil is in the detail"', *ABC News*, 20 April.

Foley, M 2024, 'Plibersek swamps Victoria on Murray Darling Water Buybacks', *Sydney Morning Herald*, 10 April.

Frontier Economics and TC&A (Frontier Economics and Tim Cummins & Associates) 2017, *Social and economic impacts of the Basin Plan in Victoria*, Victorian Government.

— 2022, *Social and economic impacts of Basin Plan water recovery in Victoria: 5-year update*, Victorian Department of Environment, Land, Water and Planning.

GABSAC (Great Artesian Basin Stakeholder Advisory Committee) 2023, *Great Artesian Basin Stakeholder Advisory Committee - Meeting communiqué – No 1, June 2023*.

Gardner, A 2024, *Evaluation of the Badu Advisory Report: Review of the NT's implementation of the National Water Initiative in relation to water planning*, Environmental Defenders Office.

Garnaut, R, Davis, G and Dale, A 2021, *Bradfield Regional Assessment and Development Panel report*, Department of Regional Development, Manufacturing and Water.

Geoscience Australia 2018, *Australian resource reviews - Lithium 2018*.

- GHD (GHD Pty Ltd) 2019, *Belmont Drought Response Desalination Plant Environmental Impact Statement*.
- Gillett, Z, Shao, Y, Parker, T, Barnes, M, Reid, K, Arblaster, J, Meyer, A, Pitman, A, Yang, D, Raupach, T, Brown, A, Hitchcock, S and El Rafei, M 2023, *The state of weather and climate extremes 2022*, ARC Centre of Excellence for Climate Extremes, UNSW, Sydney, Australia.
- Glenelg Hopkins CMA (Glenelg Hopkins Catchment Management Authority) 2024, *Glenelg Hopkins regional catchment strategy - groundwater*, Glenelg Hopkins Regional Catchment Strategy.
- Goulburn Broken CMA (Goulburn Broken Catchment Management Authority) 2024, *Goulburn Broken regional catchment strategy - water*, <https://goulburnbroken.rcs.vic.gov.au/themes/water/> (accessed 8 May 2024).
- Goyder Institute for Water Research 2023, *New Project: Measuring the impact of Ground Water extractions on Mound Springs in Northern South Australia*, <https://goyderinstitute.org/measuring-the-impact-of-ground-water-extractions-on-mound-springs-in-northern-south-australia/> (accessed 5 April 2024).
- 2024a, *Murray-Darling Basin 2022-23 flood environmental response in the Coorong – Goyder Institute*, <https://goyderinstitute.org/project/murray-darling-basin-2022-23-flood-environmental-response-in-the-coorong/> (accessed 5 April 2024).
- 2024b, *Stormwater management interventions to improve coastal water quality*, <https://goyderinstitute.org/project/stormwater-management-interventions-to-improve-coastal-water-quality/> (accessed 5 April 2024).
- 2024c, *Vision – Goyder Institute*, <https://goyderinstitute.org/vision-mission/> (accessed 5 April 2024).
- Grafton, Q and Ward, MB 2011, *Dynamically efficient urban water policy*, 10–13, Research Paper, Crawford School of Economics and Government.
- Grill, G, Lehner, B, Thieme, M, Geenen, B, Tickner, D, Antonelli, F, Babu, S, Borrelli, P, Cheng, L, Crochetiere, H, Ehalt Macedo, H, Filgueiras, R, Goichot, M, Higgins, J, Hogan, Z, Lip, B, McClain, ME, Meng, J, Mulligan, M, Nilsson, C, Olden, JD, Opperman, JJ, Petry, P, Reidy Liermann, C, Sáenz, L, Salinas-Rodríguez, S, Schelle, P, Schmitt, RJP, Snider, J, Tan, F, Tockner, K, Valdujo, PH, van Soesbergen, A and Zarfl, C 2019, 'Mapping the world's free-flowing rivers', *Nature Publishing Group, Nature*, vol. 569, no. 7755, pp. 215–221.
- Guivarch, C, Taconet, N and Mejean, A 2021, *Linking Climate and Inequality*, IMF, <https://www.imf.org/en/Publications/fandd/issues/2021/09/climate-change-and-inequality-guivarch-mejean-taconet> (accessed 19 April 2024).
- Hall, NL, Grodecki, H, Jackson, G, Go Sam, C, Milligan, B, Blake, C, Veronese, T and Selvey, L 2021a, 'Drinking water delivery in the outer Torres Strait Islands: A case study addressing sustainable water issues in remote Indigenous communities', *Australasian Journal of Water Resources*, vol. 25, no. 1, pp. 80–89.
- , Lee, A, Hoy, WE and Creamer, S 2021b, 'Five enablers to deliver safe water and effective sewage treatment to remote Indigenous communities in Australia', *Rural and Remote Health*, vol. 21, no. 3, pp. 1–7.
- Harding, DJ and Prior, A 2023, *Evaluation of estuarine models for use in south-east Queensland Water Plan reviews*, Queensland Department of Regional Development Manufacturing and Water.
- Hart, B and Butcher, R 2023, *Mid-Term evaluation of the Murray-Darling Water and Environmental Research Program*, Murray-Darling Basin Authority.
- and Doolan, J 2017, *Decision Making in Water Resources Policy and Management: An Australian Perspective*, Academic Press.
- Healy, D, Middleton, D, Owen, D, Salveson, A, Bishop, J and Turner, N 2020, 'Community acceptance for indirect potable reuse', *Water e-Journal*, vol. 5, no. 1, pp. 1–10.
- Howard, K, Durkin, L, Scroggie, M and Ward, K 2023, *The Living Murray – Turtle and frog condition monitoring in Barmah-Millewa forest*.
- Huerta, CM 2023, *When it's hot in the city, let green spaces do the sweating for you*, The University of Melbourne, <https://pursuit.unimelb.edu.au/articles/when-it-s-hot-in-the-city-let-green-spaces-do-the-sweating-for-you> (accessed 20 March 2024).
- Hughes, L and McMichael, T 2011, *The critical decade: Climate change and health*, Climate Commission.
- Hunter Water 2023, *Compliance and Performance Report 2022-23*, September.
- 2024, *Belmont desalination plant - Modification to environmental impact statement community update*.
- IA (Infrastructure Australia) 2020, *Project business case evaluation summary - Stage 2 Haughton Pipeline Project*.
- Icon Water 2023, *2022-23 Drinking water quality report*.
- IGBP (Global International Geosphere-Biosphere Programme) 2015, *Global freshwater use since 1900*.
- IGWC (Australian Government Inspector-General of Water Compliance) 2022a, *Compliance and enforcement across the Murray-Darling Basin*, June.
- 2022b, 'Steady as it flows' - An assessment of River Murray operations and environmental water management, September.
- 2023a, *2020-21 Metering Report Card*, January.
- 2023b, *2021-22 Metering Report Card*, July.
- 2023c, *Regulatory policy*, October.
- 2024, *Murray-Darling Basin Metering Report Card 01 July 2022 – 30 June 2023*.
- Infrastructure SA 2024, *Northern water project: business case summary*, February.
- Infrastructure WA 2023, *Major Infrastructure Proposal Assessment - New Water Sources for Integrated Water Supply Scheme - Summary Assessment Report*.
- International Association for Public Participation 2019, *IAP2 Published Resources*, <https://iap2.org.au/resources/iap2-published-resources/> (accessed 3 December 2020).
- Jacobs (Jacobs Group (Australia) Ptd Ltd) 2024, *Environmental Impact Statement - Modification 1: Belmont Permanent Desalination Plant*.
- Jin, Y, Behrens, P, Tukker, A and Scherer, L 2019, 'Water use of electricity technologies: A global meta-analysis', *Renewable and Sustainable Energy Reviews*, vol. 115, p. 109391.
- Jobs and Skills Australia 2024, *Skills Priority List - Waste Water or Water Plant Operator*, <https://www.jobsandskills.gov.au/data/skills-shortages-analysis/skills-priority-list?code=712921> (accessed 2 May 2024).

Joint Council on Closing the Gap 2023, *Eleventh Meeting of the Joint Council on Closing the Gap - Communique*, Communique.

Kebede, AA, Kalogiannis, T, Van Mierlo, J and Berecibar, M 2022, 'A comprehensive review of stationary energy storage devices for large scale renewable energy sources grid integration', *Renewable and Sustainable Energy Reviews*, vol. 159, no. 112213, pp. 1–19.

Landscape South Australia Hills and Fleurieu 2023, *Fleurieu Coastal Catchment Summary*.

Latham, B 2023, 'A Comparison of Disadvantage and Urban Heat Island Effect In Melbourne, Australia', presented at International Conference on Countermeasures to Urban Heat Islands (IC2UHI), Melbourne.

Loram, L and Semmler, E 2021, 'Emergency water to cost ratepayers \$70k per week, as they seek solutions', *ABC News*, 14 April.

Lynch, L 2024, 'State forks out billions on desal as recycled water gets the tick', *The Australian*, 27 February.

Manwaring, R 2010, 'Unequal voices: "Strategic" consultation in South Australia', *Australian Journal of Public Administration*, vol. 69, no. 2, pp. 178–189.

McGurk, S (Western Australian Government Minister for Training and Workforce Development; Water; Industrial Relations) 2023, *Water priorities reset to focus on practical measures*, Media release, <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/Water-priorities-reset-to-focus-on-practical-measures-20231221> (accessed 4 March 2024).

MDBA (Australian Government Murray-Darling Basin Authority) 2017, *Basin plan water resource plan requirements position statement 1M WRP imposing obligations*.

— 2021, *Submission to the Productivity Commission, National Water Reform 2020: Draft Report*, publication no: 12/21, March.

— 2022, *Annual Water Take Report 2020-2021: Report on Basin wide water availability, use and Cap compliance*, September, Canberra.

— 2023, *Types of water modelling*, <https://www.mdba.gov.au/water-management/water-resource-modelling/types-water-modelling> (accessed 4 April 2024).

— 2023a, *Progress and outcomes – an improving system*, <https://www.mdba.gov.au/climate-and-river-health/water-environment/progress-and-outcomes-improving-system> (accessed 19 March 2024).

— 2023b, *Water trade | Murray–Darling Basin Authority*, <https://www.mdba.gov.au/water-use/water-markets/water-trade> (accessed 1 May 2024).

— 2024, *The Living Murray*, <https://www.mdba.gov.au/climate-and-river-health/water-environment/living-murray> (accessed 19 March 2024).

— 2024a, *Basin Condition Monitoring Program | Murray–Darling Basin Authority*, <https://www.mdba.gov.au/water-management/basin-plan/monitoring/basin-condition-monitoring-program> (accessed 4 April 2024).

— 2024b, *Murray–Darling Water and Environment Research Program*, Get Involved @ MDBA, <https://getinvolved.mdba.gov.au/murray-darling-water-and-environment-research-program> (accessed 4 April 2024).

— 2024c, *Science and research | Murray–Darling Basin Authority*, <https://www.mdba.gov.au/about-us/what-we-do/science-and-research> (accessed 4 April 2024).

Miles, S (Queensland Deputy Premier, Minister for State Development, Infrastructure, Local Government and Planning and Minister Assisting the Premier on Olympic and Paralympic Games Infrastructure) 2023, *\$10.8 million flows to drought-hit Central Queensland community*, Media release, 31 January.

MLDRIN, NBAN and NAILSMA (Murray Lower Darling Rivers Indigenous Nations, Northern Basin Aboriginal Nations and Northern Australian Indigenous Land and Sea Management Alliance) 2018, *A pathway to cultural flows in Australia*.

— 2024, *National Cultural Flows Research Project*, <http://culturalflows.com.au/research/background-research-reports> (accessed 2 May 2024).

Mount Morgan Promotions and Development Inc 2024, *About us*, <https://www.mountmorgan.org.au/About-Us> (accessed 16 April 2024).

National Water Grid (Australian Government National Water Grid) 2024, *Mount Morgan Water Supply Pipeline*, <https://www.nationalwatergrid.gov.au/projects/mount-morgan-water-supply-pipeline> (accessed 6 May 2024).

Neville, L (Victorian Government Minister for Water) 2022, *Striking a sustainable balance for the Goulburn River*, Media release, 15 June.

NHMRC (National Health and Medical Research Council) 2022, *Australian Drinking Water Guidelines 6 2011 - Version 3.8 Updated September 2022*.

NIAA (Australian Government National Indigenous Australians Agency) 2023, *National Agreement on Closing the Gap Outcome 15 – Aboriginal and Torres Strait Islander people maintain a distinctive cultural, spiritual, physical and economic relationship with their land and waters*, <https://www.niaa.gov.au/2023-commonwealth-closing-gap-implementation-plan/delivering-outcomes-and-targets/outcome-15-%E2%80%93-aboriginal-and-torres-strait-islander-people-maintain-distinctive-cultural-spiritual-physical-and-economic-relationship-their-land-and-waters> (accessed 21 March 2024).

— 2022, *Indigenous Ranger Sector Strategy 2022–2028 - Consultation Draft*.

NNTC (National Native Title Council) 2024, *Closing the Gap – Inland Waters Target Framework*, <https://nntc.com.au/our-agenda/closing-the-gap/> (accessed 21 March 2024).

NRE Tas (Department of Natural Resources and Environment Tasmania) 2019, *Ramsar Wetlands*, <https://nre.tas.gov.au/conservation/flora-of-tasmania/tasmanias-wetlands/ramsar-wetlands> (accessed 24 April 2024).

— 2022a, *Rural Water Use Strategy Implementation Plan (2022-2025)*, March.

— 2022b, *Surface Water Allocation Decision Framework*, December.

— 2022c, *Tasmanian Aboriginal Freshwater Interests What are we learning?*

— 2023a, *Draft Amended Mersey River Catchment Water Management Plan - Impact Assessments*.

— 2023b, *Draft Amended Mersey River Catchment Water Management Plan 2023*, Public Exhibition, July, Primary Industries and Water Division.

— 2023c, *Great Forester River Catchment Annual Report 2022/23*.

- 2023d, *Pathway to Updating Tasmania's Hydrological Models with New Climate Science - Full Report - Catchment Yield Science Update Project (Phase 1)*, August.
- 2023e, *Rural Water Use Strategy Progress Report 2023*.
- 2023f, *Water Accountability Framework Review*, <https://nre.tas.gov.au/water/water-legislation-policies-and-strategies/rural-water-use-strategy/activities-underway/water-accountability-framework-review> (accessed 18 March 2024).
- 2023g, *Water Management Statements*, <https://nre.tas.gov.au/water/water-management-statements> (accessed 21 March 2024).
- 2024a, *Annual River Reports*.
- 2024b, *Groundwater Assessment*, <https://nre.tas.gov.au/water/water-legislation-policies-and-strategies/rural-water-use-strategy/activities-underway/groundwater-assessment> (accessed 19 March 2024).
- 2024c, *Hydrological Monitoring Network Review*, <https://nre.tas.gov.au/water/water-legislation-policies-and-strategies/rural-water-use-strategy/activities-underway/hydrological-monitoring-network-review> (accessed 5 April 2024).
- NRMMC (Natural Resource Management Ministerial Council) 2010, *National Water Initiative Pricing Principles*.
- NSWALC (NSW Aboriginal Land Council) 2023, *Submission to the Productivity Commission's Murray-Darling Basin Plan: Implementation Review 2023*, sub. 101.
- NSW DCCEEW (New South Wales Department of Climate Change, Energy, the Environment and Water) 2018, *Internationally significant wetlands*, <http://www.environment.nsw.gov.au/topics/water/wetlands/internationally-significant-wetlands> (accessed 24 April 2024).
- 2023, *Transparent and translucent flows*, Water, <https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/water-sharing-plans/environmental-rules/transparent-and-translucent-flows> (accessed 14 May 2024).
- 2024a, *Have your say: Water*, <https://water.dpie.nsw.gov.au/have-your-say> (accessed 18 March 2024).
- 2024b, *NSW Alternatives to Buybacks Plan*, PUB24/194.
- 2024c, *NSW General Purpose Water Accounting Reports*.
- 2024d, *Proposed new method to calculate value of illegal water take*.
- 2024e, *Regional Aboriginal Water Committees*, <https://water.dpie.nsw.gov.au/plans-and-programs/aboriginal-water-program/regional-aboriginal-water-committees> (accessed 4 March 2023).
- 2024f, *Regional water strategies program*, <https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/regional-water-strategies> (accessed 19 March 2024).
- 2024g, *Use of water for the environment in NSW: Outcomes 2021–22*, <http://www.environment.nsw.gov.au/topics/water/water-for-the-environment/planning-and-reporting/water-for-environment-outcomes-2021-22> (accessed 1 May 2024).
- 2024h, *Water for environment outcomes 2022-23*, <http://www.environment.nsw.gov.au/topics/water/water-for-the-environment/planning-and-reporting/water-for-environment-outcomes-2022-23> (accessed 23 April 2024).
- 2024i, *What water users need to know*, <https://water.dpie.nsw.gov.au/our-work/nsw-non-urban-water-metering/what-water-users-need-to-know> (accessed 29 April 2024).
- 2024j, *Yarning with communities on water management*, <https://water.dpie.nsw.gov.au/our-work/projects-and-programs/aboriginal-water-program/yarning-with-communities-on-water-management> (accessed 18 March 2024).
- 2024k, *Regional water strategies program*, <https://www.dpie.nsw.gov.au/water/our-work/plans-and-strategies/regional-water-strategies> (accessed 21 May 2024).
- NSW DoH (New South Wales Department of Health) 2022, *Drinking water in rural and regional NSW - Water quality*, <https://www.health.nsw.gov.au:443/environment/water/Pages/drinkwater-nsw.aspx> (accessed 14 May 2024).
- 2023a, *Drinking water in Sydney - Water quality*, <https://www.health.nsw.gov.au:443/environment/water/Pages/drinkwater-syd.aspx> (accessed 14 May 2024).
- 2023b, *Drinking water in the Hunter - Water quality*, <https://www.health.nsw.gov.au:443/environment/water/Pages/drinkwater-hunter.aspx> (accessed 14 May 2024).
- 2023c, *Incorporating health-based targets into drinking water management systems and Section 60 approvals - Fact sheets*, <https://www.health.nsw.gov.au:443/environment/factsheets/Pages/incorporating-hbts-into-dwms-and-s60.aspx> (accessed 18 March 2024).
- NSW DOI (New South Wales Department of Industry) 2018, *Applying the high ecological value aquatic ecosystem (HEVAE) framework to riverine ecosystems*.
- NSW DPE (New South Wales Department of Planning and Environment) 2022a, *2020-21 Active Management Annual Evaluation and Review - Full report - Full report on active management in the unregulated water sources of the Barwon-Darling, Gwydir and Macquarie-Bogan*, DOC23/247072.
- 2022b, *A new water sharing plan for the Lower North Coast - A summary of changes made to the Water Sharing Plan for the Lower North Coast Unregulated and Alluvial Water Sources 2009*, Fact Sheet, PUB22/33.
- 2022c, *General Purpose Water Accounting Report - Barwon-Darling - 2020-21*, PUB23/858.
- 2022d, *Greater Sydney Water Strategy*.
- 2022e, *Lower Hunter Water Security Plan*.
- 2022f, *NSW Water Efficiency Framework*, PUB22/814.
- 2022g, *NSW water operations workforce and training analysis*, PUB22/796.
- 2022h, *Procedures Manual for the Murrumbidgee Regulated River (2022) - prerequisite policy measures*.
- 2022i, *Regulatory and assurance framework for local water utilities*, PUB22/498.
- 2022j, *Summary of changes - A summary of the changes made to Water Sharing Plan for the Coffs Harbour Area Unregulated and Alluvial Water Sources 2009*, Fact Sheet, PUB22/29.
- 2022k, *Water operations skills and training action plan*, PUB22/1271.
- 2023, *NSW Government submission – Interim Report, Productivity Commission's 2023 inquiry into the effectiveness and implementation of the Basin Plan (2012) and water resource plans*.
- 2023a, *2021-22 Active Management Annual Evaluation and Review - Full report on active management in the*

unregulated water sources of the Barwon–Darling, Gwydir and Macquarie–Bogan, DOC23/247072.

— 2023b, *Guide to groundwater management in NSW*.

— 2023c, *Local water utility performance*, Water, <https://www.dpie.nsw.gov.au/water/our-work/local-water-utilities/local-water-utility-performance> (accessed 15 May 2024).

— 2023d, *Long-term extraction limit compliance assessment for upper namoi and lower namoi regulated river water source*, PUB22/1113.

— 2023e, *LTAEL compliance assessment for Greater Metropolitan Region Unregulated River Water Sources*, PUB23/384.

— 2023f, *NSW Government response - Office of the NSW Chief Scientist and Engineer independent review into the 2023 fish deaths in the Darling-Baaka River at Menindee*, PUB23/1136.

— 2023g, *Southern inland roadshow report 2023 - Non-urban water metering reform*, PUB23/818.

— 2023h, *Summary of changes - A summary of changes made to the Water Sharing Plan for the Tweed River Area Unregulated and Alluvial Water Sources 2023*, Fact Sheet, PUB22/398.

— 2023i, *Summary of changes - A summary of the changes made to the Water Sharing Plan for the Bega River Area Regulated, Unregulated and Alluvial Water Sources 2023*, Fact Sheet, PUB21/401.

— 2023j, *Summary of changes - A summary of the changes made to the Water Sharing Plan for the Richmond River Area Unregulated, Regulated and Alluvial Water Sources 2023*, Fact Sheet, PUB21/401.

— 2023k, *What We Heard - Draft Water Sharing Plan for the Castlereagh Unregulated River Water Sources 2024*, PUB23/1185.

— 2024, *What we are working on now*, <https://www.dpie.nsw.gov.au/water/our-work/projects-and-programs/environmental-water-management-in-nsw/what-we-are-working-on-now> (accessed 20 March 2024).

NSW DPIE (New South Wales Department of Planning, Industry and Environment) 2020a, *Assessment of take and protection during first flush flows in the Northern Basin*, PUB20/730.

— 2020b, *Net Zero Plan - Stage 1: 2020-2030*.

— 2021a, *New South Wales Water Strategy: Towards 2050*, <https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/nsw-water-strategy> (accessed 21 March 2024).

— 2021b, *NSW Water Strategy: Priority 4*, <https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/nsw-water-strategy/toward-2050/priority-4> (accessed 22 March 2024).

— 2021c, *Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2021 - Fact sheet*, PUB21/383, Summary of changes.

— 2021d, 'DPIE Water Knowledge Division', https://www.industry.nsw.gov.au/__data/assets/pdf_file/0015/415023/nswic-presentation.pdf (accessed 22 March 2024).

— 2022a, *Floodplain harvesting in the NSW Border Rivers*, https://water.dpie.nsw.gov.au/__data/assets/pdf_file/0020/524621/border-rivers-regulated-rule-summary-sheet.pdf (accessed 6 May 2024).

— 2022b, *New South Wales Water Strategy - Priority 2*, [https://water.dpie.nsw.gov.au/our-work/plans-and-](https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/nsw-water-strategy/toward-2050/priority-2)

[strategies/nsw-water-strategy/toward-2050/priority-2](https://water.dpie.nsw.gov.au/our-work/plans-and-strategies/nsw-water-strategy/toward-2050/priority-2) (accessed 21 March 2024).

— 2022c, *Safe and Secure Water program: Grants program guidelines*, https://water.dpie.nsw.gov.au/__data/assets/pdf_file/0006/335580/sswp-grants-program-guidelines.pdf (accessed 8 March 2024).

— 2022d, *Using new technology for measuring river health*, <https://water.dpie.nsw.gov.au/our-work/science-data-and-modelling/surface-water/latest-science/using-new-technology-for-measuring-river-health> (accessed 4 April 2024).

— 2023a, *Climate risk data and water modelling*, <https://water.dpie.nsw.gov.au/our-work/science-data-and-modelling/modelling/climate-risk-data-and-water-modelling> (accessed 4 April 2024).

— 2023b, *Groundwater projects and schemes*, <https://water.dpie.nsw.gov.au/our-work/science-data-and-modelling/groundwater-management-and-science/groundwater-projects-and-schemes> (accessed 4 April 2024).

— 2023c, *Improve access to skills and training*, Water, <https://water.dpie.nsw.gov.au/our-work/local-water-utilities/funding-and-other-programs/twrrp-phase-1/town-water-risk-reduction-program/improve-access-to-skills-and-training> (accessed 7 April 2024).

— 2023d, *The program*, <https://water.dpie.nsw.gov.au/our-work/local-water-utilities/funding-and-other-programs/twrrp-phase-1/town-water-risk-reduction-program/about> (accessed 4 April 2024).

— 2024a, *Environmental water trades register*, <https://www.dpie.nsw.gov.au/water/our-work/projects-and-programs/environmental-water-management-in-nsw/environmental-water-data/held-environmental-water-data/environmental-water-trades-register> (accessed 1 May 2024).

— 2024b, *Technical training courses*, <https://water.dpie.nsw.gov.au/our-work/local-water-utilities/technical-training-courses> (accessed 18 March 2024).

NSW EPA (New South Wales Environment Protection Authority) 2024, *NSW State of the Environment*, Table 16.3 Environmental water delivered in inland rivers of NSW 2017-18 to 2019-20 (ML).

NSW Government (New South Wales Government) 2024a, *Cultural Watering Plans*, <https://water.dpie.nsw.gov.au/plans-and-programs/aboriginal-water-program/cultural-watering-plans> (accessed 4 March 2024).

— 2024b, *Regional Aboriginal Water Committees*, Regional Aboriginal Water Committees, <https://water.dpie.nsw.gov.au/plans-and-programs/aboriginal-water-program/regional-aboriginal-water-committees> (accessed 4 March 2023).

— 2020, *Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources 2020*.

— 2023a, *Access Licence Dealing Principles (Special Areas No. 2) Amendment Order 2023*.

— 2023b, *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023*.

NSW IPART (Independent Pricing and Regulatory Tribunal New South Wales) 2022, *Delivering customer value - Our water regulatory framework*.

NSW IPC (New South Wales Information and Privacy Commission) nd, *NSW Privacy Laws*, <https://www.ipc.nsw.gov.au/privacy/nsw-privacy-laws> (accessed 6 May 2024).

- NSW NRAR (New South Wales Natural Resources Access Regulator) 2024a, *Huge fines for wine company and vineyard manager who illegally tapped irrigation pipeline*, <https://www.nrar.nsw.gov.au/news/huge-fines-for-wine-company-and-vineyard-manager-who-illegally-tapped-irrigation-pipeline> (accessed 20 May 2024).
- 2024b, *NRAR uses satellites to watch for illegal floodplain harvesting*, <https://www.nrar.nsw.gov.au/news/nrar-uses-satellites-to-watch-for-illegal-floodplain-harvesting> (accessed 4 December 2024).
- 2024c, *Regional compliance breakdown*, <https://www.nrar.nsw.gov.au/progress-and-outcomes/qr-reports/regional-compliance-breakdown> (accessed 20 March 2024).
- NSW NRC (New South Wales Natural Resources Commission) 2022a, *Review of the Water Sharing Plan for the NSW Border Rivers Unregulated River Water Sources 2012*, Final Report, June.
- 2022b, *Review of the Water Sharing Plan of the Castlereagh Unregulated River Water Sources 2011*, Final Report, D21/4755.
- 2023, *Water sharing plan reviews: issue brief #1*, D23/0745.
- 2024, *Our role in water management*, <https://www.nrc.nsw.gov.au/water/home> (accessed 30 April 2024).
- NSWIC (New South Wales Irrigators' Council) 2023, *Submission to Review of the NSW Non-Urban Metering Policy - November 2023*.
- NT DENR (Northern Territory Department of Environment and Natural Resources) 2019a, *Katherine Tindall Limestone Aquifer Water Allocation Plan 2019-2024*, Water Resources Division.
- 2019b, *Ooloo Dolostone Aquifer Water Allocation Plan 2019-2029*.
- NT DEPWS (Northern Territory Department of Environment, Parks and Water Security) 2021a, *Alice Springs Water Allocation Plan 2016-2026 - Technical Review, 7/2021*, Water Resources Division Report.
- 2021b, *Compliance and enforcement priorities 2021-2026*, <https://nt.gov.au/environment/water/licensing/rules/compliance-and-enforcement-priorities-2021-2026#1--measuring-and-reporting-water-use> (accessed 22 May 2024).
- 2022a, *Beetaloo Strategic Regional Environmental and Baseline Assessment (SREBA)*.
- 2022b, *Report Card - Compliance and Enforcement Priorities 2021-22*, https://nt.gov.au/__data/assets/pdf_file/0005/1300100/compliance-and-enforcement-priorities-report-card-2021-22.pdf (accessed 22 May 2024).
- 2023a, *Consultation Summary - draft Georgina Wiso Water Allocation Plan 2023-2031*.
- 2023b, *Georgina Wiso 2023-2031 Implementation Actions*, 14/2023.
- 2023c, *Georgina Wiso Background Report 2023-2031*, 13/2023.
- 2023d, *REPORT CARD Compliance and Enforcement Priorities 2022–2023 Water Resources Division*.
- 2023e, *Safeguarding Northern Territory's water resources: the 2022-2023 Compliance and Enforcement Report*, [https://depws.nt.gov.au/news/2023/compliance-and-enforcement-report#:~:text=The%20introduction%20of%20quarterly%20water,commendable%2094%25%20by%20March%202023](https://depws.nt.gov.au/news/2023/compliance-and-enforcement-report#:~:text=The%20introduction%20of%20quarterly%20water,commendable%2094%25%20by%20March%202023.). (accessed 19 March 2024).
- 2023f, *Strategic Regional Environmental and Baseline Assessment (SREBA)*, <https://depws.nt.gov.au/onshore-gas/sreba> (accessed 19 March 2024).
- 2023g, *Water resources compliance plan 2023-24*, https://nt.gov.au/__data/assets/pdf_file/0003/1300098/water-resources-compliance-plan-2023-24.pdf (accessed 22 May 2024).
- 2024, *Western Davenport and Ti Tree Water Advisory Committee: Meeting 9 minutes*.
- 2023h, *Review of the NT's implementation of the National Water Initiative in relation to water planning*, 13 July.
- NT Government (Northern Territory Government) 1992, *Northern Territory Water Act 1992*.
- 2016a, *Ramsar wetland sites*, <https://nt.gov.au/environment/soil-land-vegetation/ramsar-wetland-sites> (accessed 24 April 2024).
- 2016b, *Water Act Licensing and Permit System*, <https://www.ntlis.nt.gov.au/walaps-portal/report/current/swel> (accessed 20 May 2024).
- 2022, *Memorandum of Understanding between the Department of Health and Power and Water Corporation and Indigenous Essential Services Pty Ltd for Drinking Water*, October.
- 2023, *Laramba Water Treatment Plant officially opened*, Water Security, <https://watersecurity.nt.gov.au/news/2023/laramba-water-treatment-plant-officially-opened> (accessed 20 March 2024).
- 2024a, *Surface water – wet season flows policy announced*, Media release, 28 February.
- 2024b, *Water science program*, <https://nt.gov.au/environment/water/water-in-the-nt/water-science> (accessed 5 April 2024).
- 2024c, *Water trade register*, NT.GOV.AU, <https://nt.gov.au/environment/water/licensing/water-extraction-licence/water-trade-register> (accessed 20 May 2024).
- NT OWS (Northern Territory Government Office of Water Security) 2023a, *Territory Water Plan*.
- 2023b, *Consultation summary report - Draft Territory water plan*.
- 2023c, *Territory Water Plan*.
- NWC (National Water Commission) 2009, *Australian water reform 2009: second biennial assessment of progress in implementation of the national water initiative*.
- 2011a, *The National Water Initiative — securing Australia's water future: 2011 assessment*.
- 2011b, *Urban water in Australia: future directions 2011*.
- 2014, *Fourth Assessment of the 2004 National Water Initiative*.
- O'Donnell, E 2021, 'Rivers as living beings: rights in law, but no rights to water?', *Griffith Law Review*, vol. 29, no. 4, pp. 643–668.
- 2022, 'Repairing our relationship with rivers: water law and legal personhood', *Research Agenda for Water Law (forthcoming)*, Edward Elgar Publishing Ltd.
- OECD (Leflaive and Hjort) 2020, *Addressing the social consequences of tariffs for water supply and sanitation -*

- environment working paper no. 166, Organisation for Economic Co-operation and Development.
- 2013, *Water Security for Better Lives*.
- 2015, *The OECD Principles on Water Governance*.
- Office of the Auditor General Western Australia 2021, *Delivering Essential Services to Remote Aboriginal Communities – Follow-up*.
- Office of the Premier of Victoria 2021, *Water Grants To Help Make Every Drop Count*, <http://www.premier.vic.gov.au/water-grants-help-make-every-drop-count> (accessed 20 March 2024).
- O'Mara, K, Beesley, L, Kopf, K, Burford, M, Douglas, M, Stewart-Koster, B and Kennard, M 2023, *Water abstraction impacts on flow dependent fisheries species of the Northern Territory, Australia - a synthesis of current knowledge and future research needs*, FRDC Project No. 2021-114, Fisheries Research and Development Corporation, Queensland, Australia.
- One Basin CRC 2024, *One Basin CRC*, <https://onebasin.com.au> (accessed 4 April 2024).
- Overton, I 2020, *Water for Coal - Coal mining and coal-fired power generation impacts on water availability and quality in New South Wales and Queensland*, Australian Conservation Foundation.
- Palaszczuk, A and Butcher, G (Queensland Premier and Minister for the Olympic and Paralympic Games and Queensland Minister for Regional Development and Manufacturing and Minister for Water) 2023, *Water Security Program delivers roadmap to meet growing SEQ population*, 10 October.
- Parliament of the Commonwealth of Australia 2023, *Water Amendment (Restoring Our Rivers) Act 2023 (Cth)*, https://classic.austlii.edu.au/au/legis/cth/num_act/waora2023415/sch1.html (accessed 21 March 2024).
- PC (Productivity Commission) 2011, *Australia's Urban Water Sector - Vol. 1*, Report no. 55, Canberra.
- 2012, *Barriers to Effective Climate Change Adaptation*, Report no. 59, Canberra.
- 2017, *National Water Reform*, Report no. 87, Canberra.
- 2018, *Murray-Darling Basin Plan: Five-year Assessment*, Report no. 90, Canberra.
- 2020a, *A Guide to Evaluation under the Indigenous Evaluation Strategy*, Canberra.
- 2020b, *Indigenous Evaluation Strategy*, Canberra.
- 2021a, *Assessment of the National Water Initiative implementation progress (2017-2020)*, National Water Reform 2020, Report no. 96, Canberra.
- 2021b, *National Water Reform 2020*, Canberra.
- 2021c, *National Water Reform 2020 Inquiry Report - Supporting Paper D - Securing Aboriginal and Torres Strait Islander people's interests in water*.
- 2021d, *National Water Reform 2020 Inquiry Report - Supporting Paper G - Urban Water Services: regional and remote communities*.
- 2021e, *National Water Reform 2020 Inquiry Report - Supporting Paper B - Water Trading Markets*.
- 2023a, *Murray-Darling Basin Plan: Implementation review 2023*, Inquiry Report no. 103, Canberra.
- 2023b, *Murray-Darling Basin Plan: Implementation review 2023 - Interim Report*, Canberra, October.
- 2024, *Review of the National Agreement on Closing the Gap*, Study report, Factsheets, Canberra.
- Pepper, R, Andersen, A, Ashworth, P, Beck, V, Hart, B, Jones, D, Priestly, B, Ritchie, D and Smith, R 2018, *Scientific inquiry into hydraulic fracturing in the Northern Territory: final report*, Northern Territory Government, Darwin, N.T.
- Plibersek, T (Australian Government Minister for the Environment and Water) 2022, *Reforming Australia's water markets: Media releases, Tanya Plibersek*, <https://minister.dcceew.gov.au/plibersek/media-releases/reforming-australias-water-markets> (accessed 13 May 2024).
- 2023a, *Bridging the Gap under the Murray-Darling Basin Plan*, Media release, 22 February.
- 2023b, *Historic deal struck to guarantee a future for the Murray-Darling Basin*, Media release, 22 August, <https://minister.dcceew.gov.au/plibersek/media-releases/historic-deal-struck-guarantee-future-murray-darling-basin> (accessed 18 March 2024).
- and Hanson-Young, S (Minister for the Environment and Water and Greens Spokesperson for Environment and Water) 2023a, *Joint media release: Strengthening the Restoring Our Rivers Bill*, Media release, 27 November.
- and — 2023b, *Joint media release: Strengthening the Restoring Our Rivers Bill*, Media release, 27 November.
- Pollard, M 2023, *Waterhole Persistence Monitoring in the Gulf Water Plan Area: Flinders and Gilbert catchments*, May, Environmental Flows Assessment Program, North Water Planning and Science, Queensland Department of Regional Development Manufacturing and Water.
- PowerWater (Northern Territory Power and Water Corporation) 2022, *Annual drinking water quality report - 2022*.
- PSU AESE (Pennsylvania State University Department of Agricultural Economics, Sociology, and Education) 2024, *Why Community Engagement Matters*, <https://aese.psu.edu/research/centers/cecd/engagement-toolbox/engagement/why-community-engagement-matters> (accessed 19 April 2024).
- QAO (Queensland Audit Office) 2024, *Report on a page - Local government 2023*.
- QCA (Queensland Competition Authority) 2022, *Seqwater Bulk Water Price Review 2022-26*.
- Qld DEC (Queensland Department of Energy and Climate) 2024, *Queensland Climate Action Plan*, <https://www.des.qld.gov.au/climateaction/theplan/qld-climate-action-plan> (accessed 15 March 2024).
- Qld DES (Queensland Department of Environment and Science) 2021, *State of the Environment*, <https://www.stateoftheenvironment.des.qld.gov.au/home> (accessed 14 March 2024).
- Qld DESI (Queensland Department of Environment, Science and Innovation) 2013, *Water quality, water quantity and aquatic ecosystem monitoring*, <https://wetlandinfo.des.qld.gov.au/wetlands/assessment/monitoring/current-and-future-monitoring/> (accessed 17 April 2024).
- 2021a, *Environmental Flows Assessment Program (EFAP)*, <https://wetlandinfo.des.qld.gov.au/wetlands/resources/tools/assessment-search-tool/environmental-flows-assessment-program-efap/> (accessed 17 April 2024).
- 2021b, *Healthy waters for Queensland: Environmental values, management goals and water quality objectives - Frequently asked questions*.

- 2021c, *Queensland environmental values (EVs) and water quality objectives (WQOs)*, <https://wetlandinfo.des.qld.gov.au/wetlands/resources/tools/assessment-search-tool/queensland-environmental-values-evs-and-water-quality-objectives-wqos/> (accessed 14 March 2024).
- 2023, *\$700,000 investment to enhance Queensland water modelling*, [https://www.des.qld.gov.au/our-department/news-media/mediareleases/2023/\\$700,000-investment-to-enhance-queensland-water-modelling](https://www.des.qld.gov.au/our-department/news-media/mediareleases/2023/$700,000-investment-to-enhance-queensland-water-modelling) (accessed 5 April 2024).
- 2024a, *Nationally (DIWA) and internationally important (Ramsar) wetlands*, <https://wetlandinfo.des.qld.gov.au/wetlands/management/national-international-important-wetlands/> (accessed 24 April 2024).
- 2024b, *Search - Dept of Environment, Science and Innovation - DESI - environmental flows assessment program*, https://qldgov.softlinkhosting.com.au/liberty/opac/search.do?mode=ADVANCED&=AUTHOR&=KEYWORD&queryTerm=environmental%20flows%20assessment%20program&operator=AND&timeScale=ANY_TIME&searchTarget=THIS_LIBRARY&activeMenuItem=false (accessed 17 April 2024).
- Qld DILGP (Queensland Department of Infrastructure, Local Government and Planning) 2017, *State Planning Policy*.
- Qld DNRM (Queensland Department of Natural Resources and Mines) 2012, *Environmental Flows Assessment Program - Summary Report - 2011-12*.
- Qld DNRME (Queensland Department of Natural Resources, Mines and Energy) 2018, *Mount Morgan regional water supply security assessment*.
- Qld DoH (Queensland Department of Health) 2022a, *Department of Health Annual Report 2022-23*, September.
- 2022b, *Drinking water*, Queensland Health, <https://www.health.qld.gov.au/public-health/industry-environment/environment-land-water/water/quality/drinking> (accessed 14 May 2024).
- Qld DRDMW (Queensland Department of Regional Development, Manufacturing and Water) 2018, *Water plan monitoring, reporting and review*, Collection; Text, corporateName=The State of Queensland, <https://www.business.qld.gov.au/industries/mining-energy-water/water/catchments-planning/planning/monitoring-review> (accessed 14 May 2024).
- 2020, *Water Planning Science Plan - 2020-2030*.
- 2021, *Irrigation pricing discounts*, jurisdiction=Queensland; sector=government; corporateName=Department of Regional Development, Manufacturing and Water, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/irrigation-pricing-discounts> (accessed 22 May 2024).
- 2021a, *Queensland water markets optimisation action plan*.
- 2021b, *Water allocations register*, Collection; Text, corporateName=The State of Queensland, <https://www.business.qld.gov.au/industries/mining-energy-water/water/water-markets/register> (accessed 20 May 2024).
- 2022a, *Annual Report 2021-2022*.
- 2022b, *Guideline for the preparation, review and audit of drinking water quality management plans*, 1 October.
- 2023, *Bathymetry of Cooktown Crossing: Mitchell River at GS: 919014A*, March, Environmental Flows Assessment Program, North Region Water Planning and Science group.
- 2023a, *Annual Report 2022-23*.
- 2023b, *First Nations Water Strategy*, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/first-nations-water-strategy> (accessed 17 April 2024).
- 2023c, *Mary Basin water plan*, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/mary-basin-water-plan> (accessed 14 March 2024).
- 2023d, *Minjerrabah water reserves - Submissions summary report*.
- 2023e, *Queensland non-urban water measurement policy - Implementation plan*.
- 2023f, *Queensland water strategy*.
- 2023g, *Queensland's water plans in a variable and changing climate: Towards climate resilience and sustainable water management*.
- 2023h, *Rural Water Futures - Progress report 2022-23*.
- 2023i, *Telemetry implementation requirements*, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/rural-water-futures/strengthened-water-measurement/telemetry-implementation-requirements> (accessed 22 May 2024).
- 2023j, *Urban water risk assessment project*, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/urban-water-risk-assessment-project> (accessed 5 April 2024).
- 2023k, *Water reserves for North Stradbroke Island (Minjerrabah)*.
- 2024, *Water Skills Partnerships*, https://qldwater.com.au/water_skills_partnership (accessed 5 April 2024).
- 2024a, *Market information*, Collection; Text, corporateName=The State of Queensland;, <https://www.business.qld.gov.au/industries/mining-energy-water/water/water-markets/market-information> (accessed 20 May 2024).
- 2024b, *Processing times for water trades*, <https://www.business.qld.gov.au/industries/mining-energy-water/water/water-markets/processing-times> (accessed 21 May 2024).
- 2024c, *Water entitlements*, Open Data Portal, <https://www.data.qld.gov.au/dataset/water-entitlements> (accessed 1 May 2024).
- 2024d, *Mary Basin water plan consultation*, Department of Regional Development, Manufacturing and Water, <https://www.rdmw.qld.gov.au/water/consultations-initiatives/mary-basin-water-plan> (accessed 13 May 2024).
- qldwater 2022, 'qldwater Newsletter Issue 33/June 2022'.
- Queensland Audit Office 2024, *Local government 2023 Report 8: 2023-24*.
- Queensland Government 2020, *Indigenous Councils Critical Infrastructure Program (ICCIP)*, State Development and Infrastructure, <https://www.statedevelopment.qld.gov.au/local-government/for-councils/grants/current-programs/indigenous-councils-critical-infrastructure-program> (accessed 20 March 2024).
- 2022, *Bulk water prices for South East Queensland*, <https://www.business.qld.gov.au/industries/mining-energy-water/water/industry-infrastructure/pricing/bulk-water/urban-seq> (accessed 8 March 2024).
- 2023, *Water Plan (Barron)*.
- Rajapakse, J, Rainer-Smith, S, Millar, GJ, Grace, P, Hutton, A, Hoy, W, Jeffries-Stokes, C and Hudson, B 2019, 'Unsafe

drinking water quality in remote Western Australian Aboriginal communities', *Geographical Research*, vol. 57, no. 2, pp. 178–188.

Rockhampton Regional Council 2021, *Latest Mount Morgan Water Restrictions*, <https://www.rockhamptonregion.qld.gov.au/AboutCouncil/News-and-announcements/Latest-News/Latest-Mount-Morgan-Water-Restrictions> (accessed 22 April 2024).

— 2022, *Priority Projects 2022*.

— 2024a, *Fitzroy River Water - About us*, <https://www.rockhamptonregion.qld.gov.au/CouncilServices/Fitzroy-River-Water/About-us> (accessed 16 April 2024).

— 2024b, *Mount Morgan water restrictions lifted with dam reconnection*, <https://www.rockhamptonregion.qld.gov.au/AboutCouncil/News-and-announcements/Latest-News/Mount-Morgan-water-restrictions-lifted-with-dam-reconnection> (accessed 22 April 2024).

Rosa, L, Sanchez, DL, Realmonte, G, Baldocchi, D and D'Odorico, P 2021, 'The water footprint of carbon capture and storage technologies', *Renewable and Sustainable Energy Reviews*, vol. 138, no. 110511, pp. 1–13.

Rose, J, Walsh, J and Hone, S 2024, *Environmental water trade: making every drop count*, Australian Bureau of Agriculture and Resource Economics and Sciences, Canberra.

Rosewarne, E, Hunnisett, C, Bennett-Brook, K, Coombes, J, Corby, C, Feeny, E, Leslie, G, McCausland, R, McKenzie, B, Webster, J and Spencer, W 2021, *A community in action: How Walgett is redefining food systems*.

Royal Commission into National Natural Disaster Arrangements 2020, *Royal Commission into National Natural Disaster Arrangements Report*.

SA AGD (South Australian Attorney-General's Department) 2024, *How have we got here?*, <https://www.agd.sa.gov.au/first-nations-voice/about-south-australias-first-nations-voice-model> (accessed 10 April 2024).

SA ALLB (South Australian Arid Lands Landscape Board) 2021, *Water Allocation Plan for the Far North Prescribed Wells Area*.

— 2024, *Far North Prescribed Wells Area Water Allocation Plan*.

SA DEW (South Australian Department for Environment and Water) 2019a, *South Australian Licensed Water Use Metering Specification*.

— 2019b, *South Australia's Metering Framework*.

— 2021a, *Aboriginal Waterways Assessments*, Department for Environment and Water, <https://www.environment.sa.gov.au/news-hub/news/articles/2021/02/aboriginal-water-assessments> (accessed 21 March 2024).

— 2021b, *Setting our future urban water directions - Support Paper 1: Water supply for the future – All options on the table*.

— 2021c, *Water Compliance Reporting and Planning - 2020-2021*.

— 2022a, *Adelaide Plains Water Allocation Plan*.

— 2022b, *Climate Change Science and Knowledge Plan for South Australia*.

— 2022c, *South Australian River Murray Water for the Environment Report 2021-22*.

— 2022d, *South Australia's progress towards the implementation of meters compliant with Australian Standard 4747: Meters for non-urban water supply*.

— 2023a, *Healthy Coorong, Healthy Basin - Trials and Investigations Project key findings - Scientific evidence-base to inform restoration of the Coorong - 2023*.

— 2023b, *Tracking changes in South Australia's environment - 51 trend and condition report cards | 2023*.

— 2023c, *Water Compliance Reporting and Planning - 2022-23*.

— 2024a, *About water monitoring*, <https://www.environment.sa.gov.au/topics/water/monitoring/about> (accessed 17 April 2024).

— 2024b, *Environmental monitoring*, <https://www.environment.sa.gov.au/topics/river-murray/improving-river-health/environmental-monitoring> (accessed 17 April 2024).

— 2024c, *Project Coorong - Scientific Trials and Investigations*, <https://www.environment.sa.gov.au/topics/coorong/healthy-coorong-healthy-basin/scientific-trials-investigations> (accessed 5 April 2024).

— 2024d, *South Australia's 2022-23 Non-Urban Water Metering and Water Take Report*.

— 2024e, *Statutory review for the Borders Groundwater Agreement*, <https://www.environment.sa.gov.au/topics/water/resources/border-groundwaters-agreement/statutory-review> (accessed 23 April 2024).

— nd, *Wetlands*, <https://www.environment.sa.gov.au/topics/water/wetlands> (accessed 24 April 2024).

— 2024f, *Department for Environment and Water - Water Register*, Department for Environment and Water, <https://www.environment.sa.gov.au/topics/water/water-markets-and-trade/water-register> (accessed 20 May 2024).

— and Victorian DELWP (South Australian Department for Environment and Water and Victorian Department for Environment, Land, Water and Planning) 2022, *South Australian-Victorian Border Groundwaters Agreement Review Committee, Annual Report*, 37.

SA DoH (South Australian Department of Health) 2024, *Safe drinking water legislation*, Text, <https://www.sahealth.sa.gov.au/wps/wcm/connect/Public+Content/SA+Health+Internet/About+us/Legislation/Safe+drinking+water+legislation> (accessed 14 May 2024).

SA DPTI (South Australian Department of Planning Transport and Infrastructure) 2017, *The 30-Year Plan for Greater Adelaide - 2017 update*.

SA EPA (South Australian Environmental Protection Authority) 2023, *The State We're In*, Summary Report, State of the Environment.

— 2024, *Aquatic ecosystem monitoring, evaluation and reporting*, Water quality: monitoring, https://www.epa.sa.gov.au/environmental_info/water_quality/water_quality_monitoring (accessed 20 May 2024).

SA Government (South Australian Government) 2010, *Water for Good - A plan to ensure our water future to 2050*.

— 2022, *Landscape South Australia (Water Register) Regulations 2020*.

SA HFLB (South Australian Hills and Fleurieu Landscape Board) 2024, *First Nations WAP Engagement*, <https://www.landscape.sa.gov.au/hf/our-priorities/water/water-planning/water-allocation-planning/mount-lofty-ranges-water>

- allocation-plan-consultation/first-nations-wap-engagement (accessed 21 March 2024).
- SA LSAB (South Australian Landscape SA Boards) 2021, *Aboriginal and Torres Strait Islander Statement of Commitment*.
- SA MRLB (South Australian Murraylands and Riverland Landscape Board) 2024, *Aboriginal Partnerships Program*, <https://www.landscape.sa.gov.au/mr/projects/community-projects/aboriginal-partnerships> (accessed 21 March 2024).
- SA Water 2023, *2022-23 South Australian Water Corporation Annual Report*, 29 September.
- Saunders, B (Queensland Government Assistant Minister for Train Manufacturing, Regional Development and Jobs) 2024, *First pipes laid for \$88.2 million Mount Morgan Pipeline*, Media release.
- Scholes-Robertson, NJ, Gutman, T, Howell, M, Craig, J, Chalmers, R, Dwyer, KM, Jose, M, Roberts, I and Tong, A 2022, 'Clinicians' perspectives on equity of access to dialysis and kidney transplantation for rural people in Australia: a semistructured interview study', *BMJ Open*, vol. 12, no. 2, p. e052315.
- Seqwater 2023a, *Drinking water service annual report 2022-23*.
- 2023b, *South East Queensland water security program 2023*.
- Sheldon, F and Hamilton, D nd, *Dams and the false sense of water security*, Enlighten, Griffith University, <https://enlighten.griffith.edu.au/dams-and-the-false-sense-of-water-security/> (accessed 10 June 2023).
- Shing, H (Victorian Government Minister for Water) 2024, *Statement from the Minister for Water*, 11 April, Victoria.
- S&P Global Market Intelligence 2022, *CO2 reduction meets water-use tension in hunt for lithium*, <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/co2-reduction-meets-water-use-tension-in-hunt-for-lithium-71742617> (accessed 18 April 2024).
- Standards Australia 2013, *ATS 4747.8-2013 Meters for non-urban water supply, Part 8: In-service compliance for non-urban water meters*.
- Steffen, W, Bambrick, H, Dean, A, Gergis, J, Hughes, L, Rice, M and Vertessy, RA 2018, *Deluge and drought: Australia's water security in a changing climate*, Climate Council of Australia, Surry Hills, N.S.W.
- Stone, B, Hess, JJ and Frumkin, H 2010, 'Urban Form and Extreme Heat Events: Are Sprawling Cities More Vulnerable to Climate Change Than Compact Cities?', *Environmental Health Perspectives*, vol. 118, no. 10, pp. 1425–1428.
- Sydney Water 2023, *Annual Report 2022-23*.
- Tasmanian DHHS (Tasmanian Department of Health and Human Services) 2015, *Tasmanian drinking water quality guidelines*.
- Tasmanian DoH (Tasmanian Department of Health) 2023, *Drinking water quality guidelines and reports*, <https://www.health.tas.gov.au/health-topics/environmental-health/drinking-water-quality/drinking-water-quality-guidelines-and-reports> (accessed 14 May 2024).
- Tasmanian DPIPWE (Tasmanian Department of Primary Industries, Parks, Water and Environment) 2021a, *Great Forester River Catchment water management plan*, September, Hobart.
- 2021b, *Rural water use strategy*.
- Tasmanian DSG (Tasmanian Department of State Growth) 2023, *Tasmania's Climate Change Action Plan 2023-25*.
- Tasmanian Economic Regulator (Office of the Tasmanian Economic Regulator) 2022a, *Report on the state of the Tasmanian water and sewerage industry 2021-22*.
- 2022b, *Investigation into Taswater's prices and services for the period 1 July 2022 to 30 June 2026*.
- Tasmanian Irrigation 2024a, *Buy / Trade Existing Entitlements*, Tasmanian Irrigation, <https://www.tasmanianirrigation.com.au/water-trading> (accessed 21 May 2024).
- 2024b, *Water Entitlement Register*, <https://www.tasmanianirrigation.com.au/water-entitlement-register-2> (accessed 6 May 2024).
- Tasmanian PC (Tasmanian Planning Commission) 2024, *State of the Environment Report 2024: Approach*, Tasmanian Planning Commission, <https://www.planning.tas.gov.au/other-resources/state-of-the-environment/state-of-the-environment-report-2024> (accessed 13 May 2024).
- Tasmanian RECFIT (Renewables, Climate and Future Industries Tasmania) 2024, *Statewide climate change risk assessment*, https://recfit.tas.gov.au/statewide_climate_change_risk_assessment (accessed 5 April 2024).
- Taylor, K, Poelina, A, Nikolakis, W, Larsen, L and Grafton, RQ 2022, *Indigenous Water Reserves in Australia Policy Brief*, Water Justice Hub and Martuwarra Fitzroy River Council.
- Taylor, KS 2019, *What does 'water security' mean for Australia? A review of Australian policy*, Parliament of Australia.
- Terri Janke and Company 2022, *Indigenous Cultural and Intellectual Property (ICIP)*, <https://www.terrijanke.com.au/icip> (accessed 20 March 2024).
- The Australian Water Partnership 2023, *Aboriginal Waterways Assessments informing water use at Chowilla Floodplain – Australian Water Partnership*, 21 March, <https://waterpartnership.org.au/aboriginal-waterways-assessments-informing-water-use-at-chowilla-floodplain/> (accessed 13 March 2024).
- The University of Melbourne 2023, *How to protect Indigenous Knowledge and creative IP from exploitation*, <https://study.unimelb.edu.au/study-with-us/professional-development/blog/how-to-protect-indigenous-knowledge-and-creative-ip-from-exploitation> (accessed 20 March 2024).
- Todd, C, Wootton, H and Koehn, J 2023, *Reintroduction strategies for Southern Pygmy Perch to Gunbower Island wetlands using a metapopulation model*, 374, Arthur Rylah Institute for Environmental Research Technical Report Series, Arthur Rylah Institute.
- Tonkin, T, Deane, A, Trindall, A, Weatherall, L, Madden, T, Moore, B, Earle, N, Nathan, M, Young, S, McCausland, R, Leslie, G, Bennett-Brook, K, Spencer, W, Corby OAM, C, Webster, J and Rosewarne, E 2023, *Key findings from the Food and Water Security Surveys in Walgett - Yuwaya Ngarra-li Community Briefing Report*, University of New South Wales, the Dharriwaa Elders Group, and Walgett Aboriginal Medical Service.
- Treasury (Australian Government Department of Treasury) 2023, *Commonwealth Evaluation Toolkit*, <https://evaluation.treasury.gov.au/toolkit/commonwealth-evaluation-toolkit> (accessed 14 May 2024).
- UN (United Nations) 2007, *United Nations Declaration on the Rights of Indigenous Peoples*.
- 2015, *Transforming our world: The 2030 agenda for sustainable development*.

- UN Water Expert Group on Water and Climate Change 2023, *Water requirements of climate mitigation measures: early estimates now available*, Media release, 5 December.
- UNESCO (United Nations Educational, Scientific and Cultural Organization) 2020, *The United Nations world water development report 2020 - water and climate change*.
- UNFCCC (United Nations Framework Convention on Climate Change) 2023, 'First global stocktake', presented at Conference of the Parties serving as the meeting of the Parties to the Paris Agreement Fifth session, 13 December.
- UNSW (University of New South Wales) 2024, *Aboriginal organisations demand action: Walgett drinking water health threat*, <https://www.unsw.edu.au/news/2023/04/aboriginal-organisations-demand-action-walgett-drinking-water-health-threat> (accessed 20 March 2024).
- UNU (United Nations University) 2013, *Water security and the global water agenda - a UN-water analytical brief*.
- Upper Murrumbidgee Waterwatch 2022, *Catchment Health Indicator Program - 2022*.
- USGS (US Geological Survey) 2024, *Mineral Commodity Summaries 2024*.
- Vanweydeveld, E 2022, *Closing the water for people and communities gap*, Water Services Association of Australia.
- VCOSS (Victorian Council of Social Services) 2021, *Feeling the heat*.
- VEWH (Victorian Environmental Water Holder) 2020, *Seasonal Watering Plan 2020-21*.
- 2022, *Reflections: Water for the Environment in Victoria 2021-22*.
- 2023a, *Reflections: Water for the Environment in Victoria 2022-23*.
- 2023b, *Seasonal Watering Plan 2023-24*.
- Victorian DEECA (Victorian Department of Energy, Environment and Climate Action) 2022, *Introducing the VicWaCi 2 Program*, Video Recording, <https://www.water.vic.gov.au/our-programs/climate-change-and-victorias-water-sector/hydrology-and-climate-science-research/climate-science-webinars> (accessed 18 March 2024).
- 2023a, *Desalination history*, Water and catchments, Water and catchments, <https://www.water.vic.gov.au/water-sources/desalination/desalination-history> (accessed 13 May 2024).
- 2023b, *Long-term water resource assessments and strategies*, <https://www.water.vic.gov.au/our-programs/long-term-water-resource-assessments-and-strategies> (accessed 29 April 2024).
- 2023c, *Victoria's 2035 emissions reduction target - Driving real climate action*.
- 2023d, *Water compliance report 2022-23: The 9th annual non-urban water compliance report*.
- 2024a, *Non-urban metering implementation annual report 2022-23*.
- 2024b, *Significant wetlands*, <https://www.water.vic.gov.au/waterways/wetlands/significant-wetlands> (accessed 24 April 2024).
- 2024c, *Victorian water accounts 2021-22*, <https://accounts.water.vic.gov.au/> (accessed 19 March 2024).
- Victorian DELWP (Victorian Department for Environment, Land, Water and Planning) 2024, *Managing Delivery Risks in the River Murray System - Water Register*, <https://www.waterregister.vic.gov.au/about/news/333-managing-delivery-risks-in-the-river-murray-system> (accessed 6 May 2024).
- 2016, *Water for Victoria - Water Plan*.
- 2020, *Victorian Non-Urban Water Metering Policy*.
- 2020a, *Non-urban water metering in Northern Victoria*.
- 2021, *Victoria's water in a changing climate - Insights from the Victorian Water and Climate Initiative*.
- 2022a, *Central and Gippsland Region Sustainable Water Strategy - Final Strategy*.
- 2022b, *Environmental Water Management Plan Guidelines - for Rivers and Wetlands (Version 6)*.
- 2022c, *Water is Life: Traditional Owner access to Water Roadmap*.
- 2022d, *Integrated Water Management - Progress Report*.
- 2022e, *Non-urban Water Metering in Northern Victoria Annual Implementation Report 2022*, https://www.water.vic.gov.au/__data/assets/pdf_file/0038/669953/non-urban-water-metering-implementation-victoria-2022.pdf (accessed 20 May 2024).
- Victorian DoH (Victorian Department of Health) 2022, *Drinking water legislation*, State Government of Victoria, Australia, <https://www.health.vic.gov.au/water/drinking-water-legislation> (accessed 14 May 2024).
- 2024, *Annual report on drinking water quality in Victoria 2022-23*, February.
- Victorian Government 2020, *A framework for place-based approaches - The start of a conversation about working differently for better outcomes*.
- 2022, *Goulburn to Murray trade rule review*, Engage Victoria, <https://engage.vic.gov.au/goulburn-murray-trade-rule-review> (accessed 8 May 2024).
- 2023a, *Action status report - July 2023 - Water for Victoria*.
- 2023b, *Victorian Government Submission to the Productivity Commission's Inquiry into the Murray Darling Basin Plan: Implementation Review 2023*, sub. 74.
- Victorian Water Register 2024a, *Home*, <https://waterregister.vic.gov.au/> (accessed 1 May 2024).
- 2024b, *Large Water Owners - Water Register*, <https://www.waterregister.vic.gov.au/water-trading/market-insights/large-water-owners> (accessed 20 May 2024).
- 2024c, *Status of trading applications*, <https://waterregister.vic.gov.au/water-trading/status-of-trading-applications> (accessed 20 March 2024).
- 2024d, *Water Register - Water Register*, https://www.waterregister.vic.gov.au/index.php?option=com_copypofrecord&etype=BEE&view=payment&Itemid=175 (accessed 20 May 2024).
- 2024e, *Water shares - Water Register*, <https://www.waterregister.vic.gov.au/water-entitlements/about-entitlements/water-shares> (accessed 21 May 2024).
- 2024f, *Water trading - Water Register*, <https://www.waterregister.vic.gov.au/water-trading> (accessed 21 May 2024).
- WA DBCA (Western Australian Department of Biodiversity, Conservation and Attractions) 2024, *Wetlands*, <https://www.dbca.wa.gov.au/management/wetlands> (accessed 24 April 2024).

- WA DoC (Western Australian Department of Communities) 2023a, *Test results for nitrate in water in REMS communities: 2012-14; 2018-20; 2020-21, 2021-22 and 2022-23*.
- 2023b, *Test results for uranium in water in REMS communities: 2012-14; 2018-20; 2020-21, 2021-22 and 2022-23*.
- WA DoH (Western Australian Department of Health) 2023, *Drinking water in Western Australia*, Healthy WA, https://www.healthywa.wa.gov.au/Articles/A_E/Drinking-water-in-Western-Australia (accessed 14 May 2024).
- WA DPC (Western Australian Department of the Premier and Cabinet) 2020a, *Conservation Estate factsheet - Yamatji Nation Indigenous Land Use Agreement*.
- 2020b, *Governance factsheet - Yamatji Nation Indigenous Land Use Agreement*.
- 2020c, *Water factsheet - Yamatji Nation Indigenous Land Use Agreement*.
- WA DWER (Western Australian Department of Water and Environmental Regulation) 2020, *Derby groundwater allocation plan - For public comment*, 69, Water Resource Allocation and Planning Report series.
- 2021a, *Environmental management of groundwater from the Jandakot Mound groundwater resources*, Annual compliance assessment report, July 2020-June 2021.
- 2021b, *Studying Perth's deep aquifers to improve groundwater management*, HG67, Hydrogeological record series.
- 2022a, *Environmental management of groundwater from the Jandakot Mound groundwater resources*, Annual compliance assessment report, July 2021-June 2022.
- 2022b, *Gnangara groundwater allocation plan*, 76, Water resource allocation and planning.
- 2023a, *Annual report 2022–23 - Agency performance*.
- 2023b, *Climate Adaptation Strategy - Building WA's climate resilient future*.
- 2023c, *Environmental management of groundwater from the Gnangara Mound groundwater resources*, Annual compliance assessment report, July 2021-June 2022.
- 2023d, *Water allocation planning in the Fitzroy - Policy Position Paper*.
- 2024a, *Environmental management of groundwater from the Gnangara Mound groundwater resources*, Annual compliance assessment report, July 2022-June 2023.
- 2024b, *Healthy Rivers - River Health Assessments*, <https://rivers.dwer.wa.gov.au/overview/> (accessed 5 April 2024).
- 2024c, *Monitoring, managing and improving water quality*, <https://www.wa.gov.au/service/environment/monitoring-managing-and-improving-water-quality> (accessed 20 March 2024).
- 2024d, *Waangaamaap – Serpentine groundwater allocation statement*.
- 2024e, *Water Register*, <https://maps.water.wa.gov.au/#/webmap/register> (accessed 6 May 2024).
- 2024f, *Water Register | Western Australian Government*, <https://www.wa.gov.au/service/natural-resources/water-resources/water-register> (accessed 20 May 2024).
- WA Government (Western Australian Government) 2023a, *Cockburn groundwater allocation plan*, <https://www.wa.gov.au/service/natural-resources/water-resources/cockburn-groundwater-allocation-plan> (accessed 30 April 2024).
- 2023b, *Transfer of remote services a licence for success*, <https://www.wa.gov.au/government/announcements/transfer-of-remote-services-licence-success> (accessed 21 March 2024).
- 2023c, *Water allocation planning*, <https://www.wa.gov.au/service/natural-resources/water-resources/water-allocation-planning> (accessed 21 March 2024).
- 2024a, *Aboriginal Water and Environment Advisory Group*, <https://www.wa.gov.au/service/environment/environment-information-services/aboriginal-water-and-environment-advisory-group> (accessed 21 March 2024).
- 2024b, *Groundwater investigations technical reports*, <https://www.wa.gov.au/service/natural-resources/water-resources/groundwater-investigations-technical-reports> (accessed 5 April 2024).
- 2024c, *Murray groundwater allocation plan*, <https://www.wa.gov.au/service/natural-resources/water-resources/murray-groundwater-allocation-plan> (accessed 30 April 2024).
- 2024d, *New training to support Aboriginal rangers manage water resources*, <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/New-training-to-support-Aboriginal-rangers-manage-water-resources-20240503> (accessed 3 May 2024).
- 2024e, *Water service licensing and licence exemptions*, <https://www.wa.gov.au/service/building-utilities-and-essential-services/water-supply/water-service-licensing-and-licence-exemptions> (accessed 14 May 2024).
- 2024f, *What's our goal for Gnangara groundwater?*, <https://www.wa.gov.au/service/natural-resources/water-resources/whats-our-goal-gnangara-groundwater> (accessed 4 March 2024).
- Walker, GR, Crosbie, RS, Chiew, FHS, Peeters, L and Evans, R 2021, 'Groundwater Impacts and Management under a Drying Climate in Southern Australia', *Water*, vol. 13, no. 24, p. 3588.
- Water Corporation 2009, *Water forever: towards climate resilience*.
- 2022, *Drinking water quality annual report 2021-22*.
- 2023, *Transfer of remote power and water a licence for success*, <https://www.watercorporation.com.au/About-us/Media-releases/2023/April-2023/Transfer-of-remote-power-and-water-a-licence-for-success> (accessed 2 May 2024).
- nd, *Aboriginal Communities Water Services Program*, <https://www.watercorporation.com.au/Outages-and-works/Ongoing-Works/Aboriginal-Communities-Water-Services> (accessed 22 March 2024).
- WaterConnect (South Australian WaterConnect) 2024, *Water Trading in South Australia*, <https://apps.waterconnect.sa.gov.au/wtr/ProcessingTimes.aspx> (accessed 3 May 2024).
- nd, *Water Licence & Permit Register Default*, <https://www.waterconnect.sa.gov.au/Systems/WLPR/Pages/Default.aspx> (accessed 6 May 2024).
- WaterNSW 2023, *NSW Water Register*, Emma Goldrick, <https://www.waternsw.com.au/customer-services/nsw-water-register> (accessed 20 May 2024).
- 2024a, *NSW Water Register*, <https://waterregister.waternsw.com.au/water-register-frame> (accessed 1 May 2024).
- 2024b, *Trade statistics*, <https://www.waternsw.com.au/customer-services/ordering-and-trading/trade-statistics> (accessed 21 May 2024).

Wensing, E, Taylor, K, Cannon, P and MacArthur, L 2023, *National First Nations Water Roundtable - Securing Water rights for First Nations' self determination*, Australian National University.

Wheeler, SA, Xu, Y, Zuo, A, Haensch, J and Seidl, C 2023, *Identifying the water related economic values of the Murray-Darling Basin and rating the quality of water economic studies*, School of Economics and Public Policy, University of Adelaide.

WHO (World Health Organization) 2017, *Guidelines for drinking-water quality: fourth edition incorporating first addendum*, Geneva.

WSAA (Water Services Association of Australia) 2020, *All options on the table - urban water supply options for Australia*.

— 2021, *All options on the table: Toolkit on purified recycled water for drinking*, <https://www.wsaa.asn.au/all-options-table-toolkit-purified-recycled-water-drinking> (accessed 29 April 2024).

Wu, M and Xu, H 2018, *Consumptive Water Use in the Production of Ethanol and Petroleum Gasoline — 2018 Update*, Argonne National Laboratory.

Yue, M, Lambert, H, Pahon, E, Roche, R, Jemei, S and Hissel, D 2021, 'Hydrogen energy systems: A critical review of technologies, applications, trends and challenges', *Renewable and Sustainable Energy Reviews*, vol. 146, no. 111180, pp. 1–21.

Zhai, S, Huang, P, Marshall, J and Lobegeiger, J 2022, *Between a hot place and hypoxia: Modelling fish-kill risk in Queensland waterholes*, Queensland Department of Environment and Science.

Zhang, Z, Zhang, L, Xu, H, Creed, IF, Blanco, JA, Wei, X, Sun, G, Asbjornsen, H and Bishop, K 2023, 'Forest water-use efficiency: Effects of climate change and management on the coupling of carbon and water processes', *Forest Ecology and Management*, vol. 534, no. 120853, pp. 1–12.