



Australian Government
Productivity Commission

National Water Reform

Productivity Commission Draft Report

September 2017

This is a draft report prepared for further public consultation and input. The Commission will finalise its report after these processes have taken place.

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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).

Opportunity for further comment

You are invited to examine this draft inquiry report and comment on it by written submission to the Productivity Commission, preferably in electronic format, by 19 October 2017 and/or by attending a public hearing. Further information on how to provide a submission is included on the inquiry website: <http://www.pc.gov.au/inquiries/current/water-reform/make-submission#lodge>.

The final report will be prepared after further submissions have been received and public hearings have been held. The final report will be forwarded to the Australian Government by the 31 December 2017.

Public hearing dates and venues

Location	Date	Venue
Canberra	Monday 16 October	Dialogue 4 National Circuit, Barton
Sydney	Tuesday 17 October	Tuscan Room SMC Conference and Function Centre 66 Goulburn Street
Brisbane	Thursday 19 October	Mercure Hotel 85-87 North Quay
Melbourne	Tuesday 24 October	Rattigan Rooms 1-2 L12, 530 Collins Street
Perth	Thursday 26 October	Travelodge Perth Floreat A 417 Hay Street

Commissioners

For the purposes of this inquiry and draft report, in accordance with section 40 of the *Productivity Commission Act 1998* the powers of the Productivity Commission have been exercised by:

Jane Doolan Commissioner
John Madden Associate Commissioner

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 during an inquiry they must disclose the interests.

Dr Jane Doolan has advised the Commission that she is:

- Deputy Chair, Western Water
- Independent Chair, Yarra Consultative Committee

Terms of reference

I, Scott Morrison, Treasurer, pursuant to Parts 2 and 3 of the *Productivity Commission Act 1998*, hereby request that the Productivity Commission undertake an Inquiry into progress with the reform of Australia's water resources sector. The Inquiry should have a particular emphasis on the progress of all Australian governments in achieving the objectives, outcomes and timelines anticipated under the Intergovernmental Agreement on a National Water Initiative (NWI).

Background

State and Territory governments are primarily responsible for the management of water resources within their jurisdictions. The Commonwealth has played a role in funding the acceleration of reform, leadership and coordination, and management of some transboundary resources where agreed by relevant jurisdictions.

While Australia's water resources are generally regarded as well managed, our need to do so is also greater than most countries. There is scope to further improve the water sectors' effectiveness and efficiency, including through consistent and coordinated regulatory and management arrangements that are aligned with the NWI.

Reform of the water sector has been ongoing over several decades, reflecting the fundamental importance of water to our economy and the significant challenges involved in managing a shared natural resource often impacted by 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), the *Water Act 2007* (Cwth) and the Murray-Darling Basin Plan (November 2012).

The Inquiry into the reform of Australia's water resources sector will also fulfil the statutory requirement for the first of the Productivity Commission's triennial assessments of progress towards achieving the objectives and outcomes of the NWI required by section 88 of the *Water Act 2007* and should be read in conjunction with that Act. The findings and outcomes of the 2014 Triennial Review of the NWI undertaken by the National Water Commission are also relevant to the Inquiry.

Under the *Water Act 2007*, the Productivity Commission is also responsible for five-yearly inquiries into the effectiveness of the implementation of the Murray-Darling Basin Plan and the associated Basin state water resource plans, with the first inquiry to be completed by 31 December 2018.

Scope of the inquiry

The Inquiry should assess progress towards achieving the objectives and outcomes of the NWI. The Commission should draw on published reports, available data sources and information requested from NWI parties. As the NWI was agreed in 2004, the scope of the Inquiry is broader than that explicitly required by legislation. The Inquiry should also examine whether the water reforms agreed in the NWI, along with any other subsequent reforms adopted by COAG, are achieving their intended outcomes.

In undertaking the Inquiry, the Commission should assess:

- progress in jurisdictional adoption of NWI principles
- the outcomes to date of the NWI and related water reform efforts, taking account of other drivers of reform
- progress against the recommendations in the National Water Commission's National Reform Assessment 2014, and
- the extent to which the NWI reforms are adequate to support government responses to emerging or changing water management challenges, including in the urban sector.

The Commission should also consider:

- the potential and realised benefits of NWI implementation
- the scope for improving the NWI, addressing current and future challenges
- broader water policy issues and the role of the NWI in improving outcomes, in particular:
 - the interaction of water policy with other policy areas such as energy, agriculture, planning, urban supply
 - whole-of-cycle water management
 - provision to regional, rural and remote communities, and
 - the economically efficient provision of water infrastructure.

The Commission should avoid any duplication between this Inquiry and the subsequent Inquiry into the effectiveness of the implementation of the Basin Plan and the state and territory water resource plans.

The Commission should make recommendations on actions that the parties to the NWI might take to better achieve the NWI objectives and outcomes, and recommendations for future reform priorities.

The prioritisation of areas for future reform efforts should reflect the Commission's view as to those areas where continued efforts are required to improve economic, social and environmental outcomes, maintain the gains achieved to date, or where improved outcomes will be delivered from further development of water resources. In doing so, the Commission may consider the effectiveness of water reforms adopted by COAG subsequent to the NWI,

such as the 2008 *Work Programme on Water* and the 2012 *Next Steps in National Water Reform: Preparation for the Future*.

Process

The Commission should undertake a comprehensive consultation process including establishing a stakeholder working group in accordance with section 89 of the *Water Act 2007*, holding hearings, inviting public submissions and releasing a draft report to the public. The Commission should consult with Commonwealth, state and territory governments, consumer representatives and industry stakeholders, including from the irrigated agriculture, mining and urban water supply sectors.

In conducting the analysis, the Commission should have regard to the submissions and reports of all relevant inquiries and government responses, including reports by the National Water Commission, Infrastructure Australia and the Harper Competition Policy Review. The Commission should also take into account reform initiatives at the jurisdictional level relevant to the scope of the inquiry.

The final report is to be provided to the Government by 31 December 2017.

Scott Morrison
Treasurer

[Received 1 February 2017]

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Acknowledgments

The Commission has used a range of information sources in preparing this draft report. The Commission is grateful for the contributions made by stakeholders through their submissions and comments, and their participation in meetings, roundtables and workshops. The Commission also thanks the Stakeholder Working Group (members are listed in appendix A) for their input.

The Commission requested information from Australian, State and Territory Government departments that have responsibilities for water. The Commission is grateful to them for providing this information and for their broader participation in the inquiry.

Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics
ABS	Australian Bureau of Statistics
ACCC	Australian Consumer and Competition Authority
ANAO	Australian National Audit Office
Basin Plan	Murray-Darling Basin Plan
BOM	Bureau of Meteorology
CEWH	Commonwealth Environmental Water Holder
CEWO	Commonwealth Environmental Water Office
CMA	Catchment management authority
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CRC	Cooperative Research Centres
CSO	Community Service Obligation
DENR	Department of Environment and Natural Resources (NT)
DEWNR	Department of Environment, Water and Natural Resources (SA)
DPI	Department of Primary Industries (NSW)
ERA	Economic Regulation Authority (WA)
ERRR	Economic real rate of return
ESC	Essential Services Commission (Vic)
FCA	Federal Court of Australia
GDP	Gross domestic product
GL	Gigalitre
GVIAP	Gross value of irrigated agricultural production
IVT	Inter-valley transfer
IPART	Independent Pricing and Regulatory Tribunal (NSW)
IWCM	Integrated water cycle management
IWIP	Improving Water Information Program
LLS	Local Land Services
MDB	Murray-Darling Basin
MDBA	Murray-Darling Basin Authority

MERI	Monitoring, evaluation, reporting and improvement
ML	Megalitre
MLDRIN	Murray Lower Darling Rivers Indigenous Nations
NAIF	Northern Australia Infrastructure Facility
NBAN	Northern Basin Aboriginal Nations
NCP	National Competition Policy
NPR	National Performance Report
NRM	Natural resource management
NWC	National Water Commission
NWI	National Water Initiative
NWIDF	National Water Infrastructure Development Fund
NWILF	National Water Infrastructure Loan Facility
NWMS	National Water Market System
OEH	Office of Environment and Heritage (NSW)
OTTER	Office of the Tasmanian Economic Regulator
QCA	Queensland Competition Authority
RMC	River Murray Commission
RMO	River Murray Operations
SAR	Strategic Aboriginal Reserve
SCA	State Constructing Authorities
TLM	The Living Murray
VEWH	Victorian Environmental Water Holder
WSUD	Water sensitive urban design
WTP	Wastewater treatment plant

Glossary

Adaptive management	An iterative process of learning from experience and using new information to improve environmental management.
Bulk water services	The harvesting and storage of water using infrastructure (such as dams), and the transport of that water to users (primarily through natural watercourses, pipes or channels) often over large distances. Bulk water infrastructure can supply water for both urban and irrigation use.
Capital bias	A bias in decision making towards capital expenditure and away from operating and maintenance expenditure.
Carryover	The option to hold a portion of unused seasonal water allocations for use at a later date. This typically involves storing the allocated water in a physical storage, such as a dam.
Community Service Obligation	Obligations placed on businesses to provide services that cannot be funded entirely from user charges.
Complementary waterway management activities	Activities that protect or enhance river, wetland and floodplain environments. These include the management of land use, vegetation, fauna, recreational uses of water and water quality, but exclude the provision of environmental flows.
Consumption based pricing	Water pricing where a charge is applied to each unit of water consumed.
Consumptive pool	The amount of water resource that can be made available for consumptive use in a given water system under the rules of the relevant water plan.
Conveyance loss	Water that is lost in transit and not available for use due to evaporation or leakage.
Corporatisation	The creation of a separate legal entity (a corporation) to undertake specific functions.
Diffuse pollution	Pollution which originates from many sources, such as runoff from agricultural land.
Direct potable reuse	Mixing treated wastewater or stormwater directly into drinking water supplies.

Distribution services (irrigation)	Transporting water via a network of pipes and/or channels to properties serviced by the system and located away from a watercourse.
Environmental flow	A flow regime applied to a river, wetland or floodplain to improve or maintain environmental outcomes.
Environmental outcomes	Maintaining ecosystem function (for example, through periodic inundation of floodplain wetlands); biodiversity; water quality; and river health targets.
Environmental transfers	Water allocations owned by an environmental water holder that are transferred within or between water systems to achieve environmental watering objectives.
Environmental watering	The delivery or use of held environmental water to achieve environmental outcomes.
Externalities	The effects of consumption or production decisions on people other than those directly involved.
Extractive industries	Mining, petroleum, and unconventional gas (for example, coal seam gas) industries.
Financing	The manner in which capital is raised to pay for infrastructure. Financing can take the form of debt or equity raised from either the public or private sector.
Flow regime	The volume, location and timing of water provided by water managers.
Funding	Refers to who ultimately pays for infrastructure. In the case of water infrastructure this can be water users (such as irrigators), other beneficiaries of the infrastructure (such as towns protected from flood) and/or governments.
Gigalitre	One billion (1 000 000 000) litres.
Greenfields	Undeveloped or agricultural land being considered for, or undergoing, urban development.
Groundwater	Water located underground in permeable soil or rock. It includes both naturally occurring water and water pumped underground for storage. However, it does not include water held in underground tanks, pipes or other works.
Held environmental water	Water access entitlements held and used (usually by governments) for the purpose of achieving environmental outcomes.
Indirect potable reuse	When treated wastewater or stormwater is added to a water body such as a dam, with the intention that it will mix with other sources and be used to supply drinking water. It differs

	from ‘direct potable reuse’ by being stored in a water body before reuse.
Integrated water cycle management	A range of approaches to supplying or managing water that considers all aspects of the water cycle. These include reusing wastewater or stormwater, or managing stormwater using ‘water sensitive urban design’.
Interception	The interception of surface or ground water that would otherwise flow, directly or indirectly, into a watercourse, lake, wetland, aquifer, dam or reservoir.
Liveability	The extent to which a place meets the social, environmental and economic needs of its inhabitants.
Long-term average annual yield	The expected average annual allocation for a water entitlement over the long term. Often used to compare entitlements that have different degrees of reliability.
Lower bound pricing	A pricing definition used under the National Water Initiative whereby water services recover their ongoing costs and an allowance for future asset replacement and refurbishment.
Megalitre	One million (1 000 000) litres.
Outcomes-focused regulation	Regulations that specify the outcome to be achieved without prescribing the means to achieve that outcome.
Other public benefits	Mitigating pollution, public health (for example, limiting noxious algal blooms), Indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values (defined under the National Water Initiative).
Overallocation	Where 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.
Overuse	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.
Planned potable reuse	The deliberate reuse of wastewater or stormwater to augment drinking water supplies. It can either be ‘direct’, or ‘indirect’. It contrasts with unplanned potable reuse, which occurs when treated wastewater enters a natural water system from which other users draw drinking water.
Point source pollution	Pollution originating from an identifiable source, such as a pipe or other conveyance.

Potable water	Water that is safe to drink or use for food preparation.
Planned environmental water	Rules contained in water plans that constrain the volume and timing of extractions, in order to ‘leave water behind’ for the environment. Examples of rules-based provisions include minimum stream flows, caps on the take of water for consumptive use and cease-to-pump rules.
Regulated system	A surface water system in which water can be stored and flow levels can be controlled through the use of structures such as dams or weirs.
Retailer-distributor	A water service provider that purchases bulk water from a separate provider, and then transports (‘distributes’) and sells that water to end users. A retailer-distributor is not ‘vertically-integrated’ as it does not provide bulk water services.
Riparian	The land next to a river or stream.
Surface water	Water that flows over land and in water courses or artificial channels and is able to be captured and stored and supplemented from dams and reservoirs.
Sustainable Diversion Limit	The limit on quantities of surface water and groundwater that can be taken for consumptive use from Murray Darling Basin water resources, having regard to environmental, social and economic impacts.
Unbundling	The separating of historic water entitlements (which bundled together water, land, water use, delivery and works approvals) into separate entitlements or licences.
Unregulated system	A surface water system that is not controlled through the use of infrastructure to store and release water.
Upper bound pricing	The definition of full cost recovery under the National Water Initiative. It involves recovering all of the costs of providing water services, including a market-reflective return on the capital used to provide them and the full recovery of that capital.
Vertically integrated	Where one provider undertakes the entire water supply chain, sourcing bulk water, treating, transporting and retailing water to customers, and then transporting, treating and disposing of wastewater.
Water access entitlement	A perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan (also known as a ‘water entitlement’).

Water accounting	Identifying, recognising, quantifying, reporting and assuring information about water, the rights or other claims to that water and the obligations against that water.
Water allocation	The specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan.
Water planning processes	A planning process that establishes rules for sharing water between the environmental needs of the river or aquifer and water users, and also between different types of water use such as town supply, rural domestic supply, stock watering, industry and irrigation.
Water recovery	The acquisition of a water access right for the purpose of achieving an environmental outcome.
Water sensitive urban design	Designing buildings and landscapes to reduce or slow stormwater runoff (including by increasing the extent to which water infiltrates the soil) and provide opportunities for stormwater reuse.
Water system	A system that is hydrologically connected and described at the level desired for management purposes, such as a catchment, basin or aquifer, or sub-components of these.
Water use right	A right to use water at a specific location and / or for a specific purpose.

OVERVIEW

Key points

- It is crucial that Australia manages its water resources well, given our dry and highly variable climate, and the importance of water to our economy.
- The National Water Initiative (NWI) has made a significant contribution to this objective, over more than a decade.
- While much of the attention has been on the Murray-Darling Basin, the NWI remains nationally relevant and the principles it contains are sound.
- There has generally been good progress in implementing the NWI, and its objectives and outcomes have largely been met.
 - Legislative and policy frameworks are in place for water entitlements, planning, trading, accounting and the provision of water for the environment in most jurisdictions. These are the key foundations of water management.
 - Urban water and irrigation infrastructure services have been improved through institutional and pricing reforms.
- Water reform has delivered significant benefits to irrigators, other water users and the broader community.
 - The expansion of water trading has provided irrigators with greater flexibility to manage change.
 - There is some evidence of improved ecological outcomes from increased environmental flows, but it will take time for the full benefits to be realised.
- However, there remains further work to do. Governments need to:
 - complete unfinished business from the NWI
 - address gaps and limitations in existing policy settings
 - respond to the challenges posed by population growth, climate change and changing community expectations, including the cultural and economic aspirations of Indigenous people.
- Reform priorities include:
 - maintaining the key foundations of water management and preventing bad policy habits re-emerging
 - improving national policy settings in areas such as entitlement and planning arrangements for extractive industries, and the water requirements of Indigenous people
 - enhancing national policy settings in:
 - ... urban water management, including clearer roles and responsibilities for supply augmentation planning, enabling decentralised solutions and more outcomes-focused environmental regulation
 - ... environmental water management, including better integration with waterway management, strengthening institutional and governance arrangements, and improved monitoring and evaluation for adaptive management
 - ... new irrigation infrastructure, where the focus needs to be on ensuring environmental sustainability and financial viability *before* any government resources are committed for construction.
- Continued guardianship of gains to date and new reform priorities are strong reasons for Australian, State and Territory Governments to recommit to a renewed NWI.

Overview

Australia's water sector is viewed internationally as a world leader in water management. We live in one of the driest countries in the world with a highly variable climate. We, more than most countries, need to manage our water resources well because of the fundamental importance of water to our economy and the environment, and the significant challenges we face in managing a natural resource often impacted by periods of scarcity.

Our reputation on the world stage is the direct result of thoughtfulness and, for the most part, co-operation by the Australian, State and Territory Governments in water reform over the past 20 years. The cornerstone of Australia's more recent water reform efforts is the 2004 National Water Initiative (NWI). The NWI is a shared commitment by governments to: increase the efficiency of Australia's water use; provide investment confidence and supply security for rural and urban communities; provide greater certainty for the environment; and ensure regular reporting and independent assessment of progress.

The Productivity Commission was tasked with the role of monitoring the progress of the NWI, formerly undertaken by the National Water Commission. This review is the first activity in an ongoing program of work for the Commission, which will include assessing progress against the objectives and outcomes of the NWI every three years. For this first review the terms of reference have been widened to consider future reform priorities and the scope for improving the NWI to enable necessary reform.

Water reform and the National Water Initiative

Up until the 1980s, governments took a development-oriented approach to the management of water, with the focus on expanding irrigated agriculture and supplying the needs of growing cities and towns. Governments invested in dams and other water infrastructure without requiring that user charges recovered costs. Water rights were issued relatively freely, without always respecting the limits of water resources. While this approach arguably served Australia reasonably well at the time, by the 1980s a range of pressures and problems were emerging. These included environmental problems (such as salinity, algal blooms and deteriorating river and wetland health) and a growing awareness that traditional approaches to providing water infrastructure services, were costly and lacked incentives to improve service delivery over time.

In response, some State and Territory Governments began reforming aspects of water policy, with a comprehensive national approach commencing in 1994 with COAG's Water Reform Framework. This set out an ambitious agenda covering: pricing and institutional reform; the clarification of property rights; allocation of water to the environment; and the development of water trading.

The NWI was developed in 2004 as an extension of the 1994 reform agenda, to maintain the momentum of reform and to respond to overallocation, and also to address water scarcity issues arising from the early years of what was later to become known as the Millennium Drought (1997 to 2009). The aim of the NWI was to provide greater certainty for investment and the environment (box 1).

Box 1 Objectives and elements of the National Water Initiative

The NWI aimed to create a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes by achieving the following objectives:

- clear and nationally-compatible characteristics for secure water access entitlements
- transparent, statutory-based water planning
- statutory provision for environmental and other public benefit outcomes, and improved environmental management practices
- complete the return of all currently overallocated or overused systems to environmentally-sustainable levels of extraction
- progressive removal of barriers to trade in water and meeting other requirements to facilitate the broadening and deepening of the water market, with an open trading market to be in place
- clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool
- water accounting which is able to meet the information needs of different water systems in respect to planning, monitoring, trading, environmental management and on-farm management
- policy settings which facilitate water use efficiency and innovation in urban and rural areas
- addressing future adjustment issues that may impact on water users and communities
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

To fulfil these objectives, the NWI included eight key elements for which there were agreed outcomes and actions:

1. Water access entitlements and planning frameworks
2. Water markets and trading
3. Best practice water pricing and institutional arrangements
4. Integrated management of water for environmental and other public benefit outcomes
5. Water resource accounting
6. Urban water reform
7. Knowledge and capacity building
8. Community partnerships and adjustment.

In 2007, the Australian Government introduced its National Plan for Water Security, which led to a range of reforms to the management of the Murray-Darling Basin (MDB), including the commencement of the Basin Plan in 2012 and a process for returning water to the environment. COAG also agreed to a range of specific measures in 2008, 2009 and 2013 to clarify and provide more detailed policy guidance on several aspects of the NWI, including urban water, water markets, and knowledge and capacity building.

What has been achieved through water reform?

Overall, good progress has been made

Most jurisdictions have made good progress in meeting the objectives and outcomes of the NWI. A summary of progress with reform is in table 1.

Notwithstanding these broad improvements, progress has slowed since the early years of implementing NWI water reforms (a point also made by the National Water Commission in their assessment of progress in 2014). Some slowing of progress is inevitable given that many key water reforms have, to a large extent, already been implemented; however, there are areas of reforms that remain unfinished.

Understanding the benefits of past water reforms and the factors that led to their successful implementation is important because it provides lessons for future reform and also an appreciation of what would be lost if there were backsliding.

The outcomes of past water reform

National water reforms have significantly improved the way in which water resources are managed and water services are delivered, and this has resulted in significant benefits for the community.

Water resource management

The introduction of NWI-consistent *water entitlement and planning frameworks* has created secure property rights and established transparent processes for deciding how water is shared between environmental and ‘consumptive’ use (that is, use by people and businesses), thereby capping consumptive use and providing water for the environment. These have been the fundamental steps in providing the systems that enable water trading and the establishment of water markets. The system of property rights and water planning has also underpinned the move towards improved environmental sustainability.

Table 1 Summary of progress

1. Water access entitlements and planning frameworks

- All jurisdictions, except Western Australia and the Northern Territory, have created statutory-based, clear and secure long-term water rights for consumptive uses.
- Water planning arrangements have been established for the majority of areas of intensive water use across Australia. Most jurisdictions have more than 80 per cent of water use managed under water plans. This means the sharing of water resources between consumptive uses and the environment has been established in consultative processes, informed by scientific and other assessments.

2. Water markets and trading

- Water markets have been established that have allowed water to be traded to higher value uses and other steps have been taken to improve the efficiency of water markets, most notably in the Murray-Darling Basin.

3. Best practice water pricing and institutional arrangements

- Urban service providers are generally pricing at the levels required by the NWI, despite some instances of underpricing.
- Independent economic regulators set prices or revenues for major urban water suppliers in New South Wales, Victoria, South Australia, Tasmania and the ACT. Western Australia, the Northern Territory, Queensland and regional New South Wales are exceptions in various forms.
- Cost-reflective pricing outcomes are generally being achieved for most *existing* irrigation infrastructure, but *new* irrigation infrastructure has tended to be underpriced. Queensland, Western Australia and Tasmania could make better use of economic regulation.
- There is inconsistent recovery of water planning and management costs from users across Australia.

4. Integrated management of water for environmental and other public benefit outcomes

- Environmental sustainability has been supported by formal provisions of water for the environment and progress has been made on rebalancing overallocated systems.
- All jurisdictions have managers with responsibility for environmental flows, and some arrangements are in place to coordinate water use in shared resources.

5. Water resource accounting

- Water metering, accounting and compliance systems are in place in all jurisdictions.

6. Urban water reform

- Water reuse, water use efficiency, water sensitive urban design and innovation has improved since the introduction of the NWI.
- Jurisdictions have taken action to address water quality issues, with some evidence of success.

7. Knowledge and capacity building

- There have been advances in knowledge and capacity across areas identified in the NWI.

8. Community partnerships and adjustment

- All jurisdictions have set in legislation, or policy, minimum requirements for stakeholder engagement and consultation when developing and reviewing water plans.
 - State and Territory Governments have delivered improved decision making through open and timely consultation with stakeholders. This has been supported by the publication of supporting information at key decision points.
-

There is widespread agreement that these reforms have produced significant financial benefits. Water entitlements are now valuable business assets, with financial institutions accepting them as collateral for loans. The capacity to trade water has provided incentives for more efficient water use and infrastructure investment. Water trading has allowed water to move to higher value uses and has become a vital business management tool for irrigators, giving them flexibility to respond to changing climatic and market conditions. The benefits have been greatest during drought, as it has allowed the limited water supply to move to higher value uses, such as keeping perennial plantings, like fruit trees and grapevines, alive. One estimate is that water trading in the southern MDB increased Australia's gross domestic product by \$220 million in 2008-09 (in 2008-09 dollars) (a drought year).

The southern MDB is the most important water market in Australia. The value of entitlements on issue in the southern MDB was over \$13 billion in 2015-16 and annual turnover in the entitlement market was about 7 per cent of market value. The removal of trade barriers, quicker and easier trade approval processes, and better market information have enabled rapid growth in water trade, including across state borders. As a result, new industries, such as nut growing, have developed rapidly and established industries have become significantly more efficient. Reforms have contributed to improved water efficiency and economic growth. Over the 10 years to the late 2000s, on-farm irrigation efficiency in the cotton industry increased from 57 to 70 per cent.

While trading values are largest within the southern MDB, reforms have also opened up trade in other regions, including the northern MDB, cane growing areas of Queensland, groundwater systems in South Australia, and in southern Victoria. Trade between the irrigation and urban sector is still restricted in various ways, but it has increased the overall value to the economy when it has occurred.

The provision of *water for the environment* is also a key achievement of the reforms. In less developed systems, water plans have capped consumptive use and specified environmental flow provisions that should ensure the sustainability of these systems. In overallocated systems, additional water is being recovered for the environment. Since the Australian Government commenced recovering large quantities of water for the environment within the MDB, its holdings have grown to 2562 gigalitres of entitlements, with a long-term average annual yield of 1781 gigalitres (as at 31 July 2017). These entitlements, which represent 14 per cent of water entitlements within the MDB, are managed by the Commonwealth Environmental Water Holder (CEWH). The recovery of large volumes of water for the environment in overallocated systems has occurred only in recent years and it will take some time for the full environmental benefits to be realised. However, there is already some evidence of improved water quality and ecological outcomes at the local scale from increased environmental flows. These mitigated some of the most severe impacts of the drought by enabling environmental managers to protect key refuges and prevent some species extinctions.

Water service delivery

The modernisation of institutional arrangements for urban and irrigation infrastructure services has improved efficiency in water service delivery. Across both sectors, water pricing has played an increasing role in guiding investment decisions and levels of cost recovery have improved.

Institutional and pricing reforms in the *urban water sector* have brought significant benefits. The corporatisation of water utilities and introduction of independent economic regulation in many major urban areas has improved efficiency by separating service delivery from policy making, which increased the transparency of investment decisions and promoted more efficient pricing. The Commission has previously estimated that Australia's gross domestic product was about 0.35 per cent higher over the 1990s due largely to institutional and pricing reforms in the urban water sector. If gains of this magnitude had been maintained through to today, this would represent an annual economic gain of over \$5 billion (in 2017 dollars).

The widespread introduction of consumption-based pricing (along with restrictions and awareness campaigns during droughts) changed consumer behaviour, leading to more efficient water use. For example, between 2000 and 2016 median annual water consumption in cities and towns decreased from 280 kilolitres to 182 kilolitres per residential property.

In the *irrigation infrastructure sector*, corporatisation and economic regulation of bulk water assets now cover the vast majority of water delivered. The corporatisation of bulk water providers has delivered more efficient water services and a stronger commercial focus that has benefited both irrigators and governments. Separating service delivery from the broader role of government has allowed more focused policy making to occur.

Local ownership and management of distribution networks, which has been introduced in New South Wales, Western Australia, South Australia and parts of Queensland, is generally considered to have improved productivity, accountability, long-term planning and responsiveness to irrigators. For example, Coleambally Irrigation's user charges fell by 5 per cent in real terms between 2008-09 and 2016-17.¹

Overall, water reform under the NWI has delivered significant benefits to irrigators, other water users and the broader community.

¹ These productivity gains were driven by a number of factors including (but not limited to) management actions and investment by Coleambally Irrigation (and government) to improve the operating efficiency of their distribution infrastructure.

Why is further reform needed?

Notwithstanding the benefits of the water reforms implemented through the NWI:

- further agreements are essential to guide future co-operation, and without a severe drought to give focus to all minds, poor public policy may well re-emerge
- there is still unfinished business from the NWI that needs completion
- taking an adaptive management approach to national water reform by reviewing the experience of implementation is essential. This has already revealed some gaps and limitations in the NWI
- future challenges, such as climate change, will have major implications for water management, and a co-operative structure to deal with these issues is crucial to good public policy.

Jurisdictions should progress unfinished business from the NWI

There are several policy areas where jurisdictions still need to undertake further reform, some of which have languished for too long. The most urgent and important of these are discussed below. (There are other less significant issues specific to individual States and Territories that are identified in the relevant chapters.)

Western Australia and the Northern Territory should modernise their entitlement regimes

The NWI envisages clear and secure water rights that are separate from land, readily tradeable and defined as a perpetual or open-ended share of the resource. However, Western Australia and the Northern Territory have not yet introduced legislation to create the statutory-based entitlement and planning arrangements that provide for these features. Delay in adopting legislative reforms is likely to constrain economic activity in these jurisdictions, as investors will not have certainty about water rights and allocation arrangements. This may also potentially undermine environmental outcomes.

It is particularly important that these jurisdictions undertake these reforms now, given the prospect of new developments in northern Australia. As development increases, statutory-based entitlement and planning arrangements provide users with a secure, legally-defined water right and transparency for everyone about how water will be allocated. Such arrangements also provide greater certainty that development will be environmentally sustainable in the long term (as reasonably stipulated in the NWI).

All jurisdictions should improve economic regulation for the urban water sector

The use of independent bodies to set or review water prices has been a driver of better outcomes for urban water service provision. However, these arrangements are not currently in place for retailer-distributors in south-east Queensland (though price-monitoring was in place up to 2014) or in the Northern Territory. Further, existing processes in Western Australia and for bulk water in south-east Queensland would be enhanced by giving regulators a standing reference to set or review prices, rather than leaving the occurrence of a review subject to ministerial discretion. Where independent economic regulation has been introduced, there has been significant improvements in the rigour and transparency of water utility decision making, and this has reduced the politicisation of water supply decisions. Moreover, there is significant support from the water industry for strengthening economic regulation to provide certainty and encourage private investment.

The performance of regional urban water utilities needs to improve

Small regional water service providers face unique challenges including higher costs as a result of serving small and highly-dispersed population centres, and difficulties in attracting skilled staff. This makes it harder to provide adequate and affordable services that meet relevant health, safety and environmental standards. It can also make service providers dependent on government grants to maintain services, which can in turn distort decision making, reduce efficiency and result in underpricing, which is occurring in New South Wales, and possibly also Queensland.

The NWI recognises that remote communities that are expensive to serve can receive assistance in the form of transparent Community Service Obligation (CSO) payments. However, New South Wales and Queensland are providing assistance in the form of grants that are poorly targeted, and biased towards capital projects. These capital grants should be replaced by CSO payments that are tightly targeted at high-cost service areas and not tied to capital expenditure.

One way to overcome some of the challenges faced by small regional providers is to amalgamate them into larger entities so as to achieve economies of scale. Collaboration — for example joint procurement, joint planning and shared services — is another way, and is a more flexible approach to achieving economies of scale. It also overcomes some of the problems with amalgamation of local government-owned providers, which can undermine the ‘economies of scope’ that arise between water services and other local government functions. There has already been some amalgamation of regional water utilities in New South Wales and Queensland, though not to the same extent as in other States and Territories. Contingent CSO payments may provide an opportunity to promote further collaboration among these regional water utilities.

Governments should ensure better engagement of Indigenous people in water planning

Ensuring that cultural values are recognised and provided for in water plans has been an ongoing concern for Indigenous communities. This concern led to the NWI including provisions relating to Indigenous water. In recent years, some States and Territories have made progress in ensuring that water planning includes adequate consultation with Indigenous communities and explicitly considers the protection of cultural values. However, Western Australia and Tasmania have not yet established specific mechanisms for engaging Indigenous people in water planning. The complementary issue of providing Indigenous communities with access to water for economic development purposes is yet to be addressed, although several States and Territories have started discussions on this.

Policy makers should learn from experience

The experience of 13 years of implementation revealed some gaps and limitations in the NWI. This period included the worst years of the Millennium Drought, which proved to be a stress test for water management systems and the robustness of the NWI. As discussed earlier, experience during this period emphasised the importance of water planning, entitlement and market reforms and the need to maintain them, and their supporting processes of water accounting and compliance, into the future.

During this drought each of the large capital cities made major investments in new infrastructure, including desalination plants. These decisions were made quickly and were highly controversial, with questions raised about the efficiency of the investments. This highlighted areas where improvements to current water management practices are required. Most notably, improvements in planning and decision-making processes for major urban water supply augmentation are needed to ensure that decisions are deliberated, transparent and all options are considered.

Experience in implementing the NWI showed that adaptation was also needed in other areas of water management, for example:

- as extractive industries (such as mining, petroleum, and unconventional gas) grew significantly over this period, there were fears that they could adversely affect the environment and consumptive water users if not properly accounted for in water entitlement and planning frameworks
- as water utilities increased their use of recycled water and stormwater, there was concern that these new sources needed to be brought into water entitlement frameworks to provide additional security for these investments and to protect other entitlement holders
- as significant volumes of water were recovered for the environment, it became clear that the NWI did not provide adequate direction on the contemporary issues faced by environmental water managers in managing a large and growing portfolio of environmental water

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- while the NWI provided high-level outcomes for urban water management, it provided little policy guidance to the sector on issues other than pricing
 - as water reform progressed, it became clear that the NWI provisions for community adjustment were not properly targeted.

Finally, in some parts of Australia, as the reform program matured over 13 years, some elements have moved from an establishment phase to a new phase where the frameworks are in place, functioning well and are well accepted by stakeholders and communities. These include water entitlements, water planning, water markets and water accounting. The priority for these mature parts of the system is to protect and maintain these frameworks and allow continuous improvement to deal with contemporary issues. Failure to do so properly will result in erosion in stakeholder, investor and community confidence in our system of water management.

There are significant challenges that need to be addressed

There are significant challenges facing the water sector that have emerged or intensified in the 13 years since the NWI was signed. These challenges need to be addressed in policy frameworks, including the NWI, to ensure that policy frameworks are up to date and can continue to serve the Australian population into the future. The key challenges are:

- population growth and urbanisation — by 2050, there is expected to be an additional 8.3 to 13.3 million people living in Australia’s capital cities and the Australian population is expected to be between 34.3 and 41.9 million people
- climate change — rainfall and runoff have already declined in some regions and CSIRO predicts future decreases in runoff across much of southern Australia as well as an increase in the frequency of extreme droughts
- changing community expectations — these have changed significantly over 13 years, in many cases, reflecting community experience during the Millennium Drought. The drought highlighted the social dependence of both urban and rural communities on water and water environments when many of these environments dried up and the related services ceased. As a result, there is now far more appreciation of the contribution that water management and water environments can make to amenity, liveability, recreation and regional tourism.

Effectively, water managers in the future will have to manage a potentially reducing water resource in key parts of Australia to meet the demands of a rapidly increasing population for a wider range of water services.

Given the unfinished business from the NWI, the potential areas for improvement and challenges facing the water sector, the Commission considers there is still considerable scope to improve the efficiency, productivity and environmental sustainability of Australia’s water use and prepare for an uncertain future. There is still a real need to continue on with water reform.

What are the future reform priorities?

The Commission has identified the key priorities for a future national water reform agenda. These are:

- maintaining the key foundations of water management (prevent backsliding)
- reflecting evolving water management practices, acting on lessons learnt during implementation of the NWI and taking account of the challenges of population growth, climate change and evolving community expectations:
 - revise policy settings in a number of areas, outlined below
 - significantly enhance policy settings for urban water, environmental management and new infrastructure investment.

Maintaining the key foundations

It is essential to maintain the achievements of the NWI in water entitlements and planning, water markets, water accounting and compliance, water pricing and governance. They are the key foundations underpinning sustainable water resource management and efficient infrastructure service delivery. There must be no backsliding if we are to maintain and build on the gains of past reform.

Water sector policy has been enabled by a strong commitment to community and stakeholder engagement in all areas of water management, and to building knowledge and capability to enable innovation. These will also need to be maintained to deliver the new priorities for reform.

Revising existing policy settings

There are areas where revisions to current policy settings are required to deal with contemporary issues and concerns. These revisions should be made by States and Territories as quickly as possible.

Arrangements for extractive industries

Since 2004, the growth of extractive industries has increased competition for water resources in many parts of Australia. The NWI is ambiguous about how it applies to extractive industries. In some cases, alternative water rights arrangements for extractive industries exist outside the water entitlement and planning frameworks, raising concerns about risks to the supply of other water users and the environment. There are also concerns that alternative water rights arrangements may inhibit water trading.

Water entitlement and planning frameworks should more fully incorporate all major water uses. Governments should remove entitlement exemptions for extractive industries (unless there is a compelling reason otherwise), so they are issued entitlements under the same framework applied to other consumptive users.

Transparent water planning processes provide a more effective means of considering the management of water use by extractive industries than relying on separate (and in some cases, non-transparent) management arrangements.

Incorporating alternative water sources

Water entitlement frameworks should enable inclusion of recycled water and stormwater to facilitate their use in situations such as managed aquifer replenishment and streamflow enhancement. This will protect other entitlement holders and reduce barriers to investment in these supply options. For example, without arrangements in place to allow for extraction of managed aquifer recharge, any water injected into the aquifer would add to the pool available for all groundwater users. This would undermine the incentive for any party to invest in a managed aquifer recharge project.

Developing contemporary water entitlement and planning frameworks

Contemporary guidance on water planning is needed to underpin the second and third generation water plans now being developed across Australia. One important addition should be a process for regularly assessing the impact of climate change on water resources. Where these are significant and detrimental, the next water plan review should fundamentally re-examine the objectives of the plan (including environmental and consumptive) and the consequent balance between environmental and consumptive uses of water to ensure that it is suited to a drier climate.

More fully recognising the water requirements of Indigenous people

Accommodating the distinctive water requirements of Indigenous communities is a key feature of the NWI. However, governments must undertake further work to recognise the water requirements of Indigenous people in water entitlement and planning frameworks, taking into account the distinction between the provision of water for cultural purposes and for economic development.

There is more work to do in all jurisdictions to achieve clear, measureable and well-informed Indigenous cultural objectives in water plans, tangible actions in support of the achievement of those objectives, and monitoring and reporting arrangements that promote accountability and foster learning about what does (and does not) work. Environmental water management should also take into account the protection of cultural values wherever this is compatible with its primary objectives.

Where State and Territory Governments provide access to water for Indigenous economic development, they should source water within existing water entitlement frameworks, such as by purchasing water on the market or as part of transparent processes for releasing unallocated water. They should also ensure adequate supporting arrangements (such as training and business development) are in place to enable Indigenous communities to maximise the value of the resource, involve Indigenous communities in program design, and ensure future governance arrangements are specified and implemented.

Removing remaining barriers to trade

Trade restrictions designed to protect production, water infrastructure utilisation or employment in particular locations or industries are not permitted under the NWI and considerable progress has been made in removing them. However, some restrictions still remain. Of these, restrictions on purchasing, or otherwise transferring, water between the irrigation and urban sectors are the most costly to the community. Gains from trade in water between the two sectors can be significant — households are frequently willing to pay between 10 and 100 times more for water than the price irrigators are willing to accept. Restrictions on trade between the two sectors have also resulted in the development of higher-cost sources of water for urban supply — for example, desalination plants.

The main contention for preventing trade is that it would have a negative effect on communities reliant on irrigation. However the Commission has assessed that these effects are likely to be modest. Given the potential gains from trade, State and Territory Governments should continue to remove trade rules, policies (whether or not explicitly stated) and other barriers that prevent water being traded, or otherwise transferred, between the irrigation and urban sectors.

Better targeting adjustment assistance

Programs and measures to assist individuals and communities to adjust to water-related structural change have been largely focused within the MDB. This is due to a combination of overallocated water resources and a past dependence on water within many regional economies.

To date the Australian Government has spent over \$8 billion to recover water in ways that minimise the adverse impacts of rebalancing under the Basin Plan. The Basin States have also funded projects focused on adjustment assistance and regional development.

In addition to this government spending on water recovery, a combination of the ability to trade water and the extended implementation time for the Basin Plan has given entitlement holders the tools and necessary support to respond to reduced water availability.

Looking forward, governments should focus assistance programs on developing the capacity of communities to deal with the impact of structural adjustment. Doing so will require

governments to avoid broad industry assistance measures and to consider all factors impacting communities (not just water reform).

Enhancing national policy settings

There are three key priorities for a future national water reform agenda. These areas require a significant enhancement of current policy settings and, associated with this, considerable effort by all governments to make the necessary changes.

Making urban water management more robust and responsive

Future urban water management will have to provide water supply and sewerage services for rapidly growing cities and towns, while being efficient and affordable. Accompanying this will be expectations of improved urban amenity and the liveability of cities in a potentially drier climate.

More robust major supply augmentation planning is one imperative. Australia's experience during the Millennium Drought showed that bulk water augmentation decisions can be very costly and highly contentious. Past Commission analysis indicates inefficient augmentation decisions in Perth and Melbourne could impose costs on consumers as high as \$3.2 to \$4.2 billion over 20 years, substantially sourced to a late start in planning. Jurisdictions should improve arrangements for major supply augmentation planning in cities by:

- ensuring that roles and responsibilities are clearly allocated between governments and utilities, and that planning processes involve all relevant bodies
- requiring that decision-making processes are consistent with good planning principles — which require transparency, early adaptation to new information, and full consideration of all options for augmentation. In the latter case, this would encompass both centralised and decentralised approaches, including indirect and direct potable reuse and use of stormwater.

Competition can promote efficiency, even with monopoly water utilities. Jurisdictions have adopted a range of reforms to promote competition, such as removing obstacles to private sector investment in the water and wastewater industries, and the potential for third party access to existing infrastructure. The most advanced is New South Wales, which legislated the *Water Industry Competition Act 2006* (NSW). There is likely to be scope for other jurisdictions to take further action through, for example, enhancing regulatory frameworks.

The Commission has previously highlighted the potential for more flexible pricing (this could include 'scarcity pricing') to achieve greater efficiency in balancing water supply and demand. While current policy does not preclude going beyond consideration of a simple estimate of the long-run marginal cost of supply in setting water prices, there may be value in considering the case for further guidance on this issue. It will be too late to do this once we again enter a drought phase.

In recent years, there has been a move towards the use of more decentralised approaches to providing water and wastewater services. These include on-site wastewater treatment and reuse, stormwater harvesting, and managing stormwater locally through water-sensitive urban design measures, such as rehabilitating wetlands. These approaches are collectively referred to as integrated water cycle management (IWCM). While IWCM offers a range of benefits — social, environmental and liveability — it is difficult to measure and value some of these benefits. The benefits can also be challenging to capture when they are spread across multiple beneficiaries. But these opportunities may matter at local levels and, if implemented widely, their effect on the urban water sector may be significant. Governments should ensure that these approaches can be considered alongside conventional centralised approaches by developing IWCM plans for major growth corridors and significant infill developments accompanied by evaluation of costs and benefits.

Current environmental regulations for the management of wastewater and sewerage may not be flexible enough and may preclude the adoption of alternative approaches — such as IWCM — that can achieve environmental objectives more cost effectively. Prescriptive regulations can also forgo opportunities to make cities more liveable — for example, by using IWCM to provide the water needed to sustain parklands, ponds and street trees. The Commission considers that there is potential for greater community benefits by taking a more outcomes-focused approach to environmental regulation.

Improving environmental management

Australian governments have invested significantly in providing water for the environment through water plans and by acquiring entitlements. To get the best possible environmental, social and economic outcomes from that investment, it is critical that water for the environment is managed efficiently and effectively. This requires additional work in three key areas:

- integrated management of environmental water and waterways
- governance arrangements for managing entitlement-based environmental water
- monitoring, evaluation, reporting and adaptive management.

It is important to recognise that providing water for the environment is not necessarily sufficient to achieve improvements in environmental health. Other complementary waterway management activities — for example, water quality improvement, habitat restoration and the management of pest species — have a direct impact on these outcomes. As a result, it is critical that efforts to deliver environmental flows and to manage rivers, wetlands and floodplains are coordinated and aimed at common objectives at the local scale.

These activities are usually managed by separate bodies that can lack the authority or incentives to coordinate the development of their priorities. Better coordination could be achieved by integrating planning responsibilities from the bottom up, where possible, and having the same local organisation set objectives for environmental flows and waterway

management. Where this is not feasible due to the scale and cost of change, State and Territory Governments should amend their legislation, policies and planning frameworks (as relevant) to ensure objectives are consistent and planning processes are coordinated to deliver improved environmental outcomes at the local scale.

As a result of water recovery efforts in overallocated systems, environmental water managers have entitlements worth billions of dollars and make important decisions on the use and trade of water that can affect regional environments and communities, are of significant interest to other water users, and involve substantial funds. It is critical that the community has confidence in the objectivity of the body making these decisions and that decisions are free from public and political influence, whether real or perceived. To ensure this, decisions on water use and trade should be made by independent bodies at ‘arm’s length’ from governments. Institutional separation from government should be accompanied by simple and widespread community access to water holders’ decision-making processes.

The need for independence is particularly relevant to the CEWH given the scale of (and public interest in) the Commonwealth holdings. Greater independence in arrangements in New South Wales also merits consideration. Governments should primarily exercise their undoubted responsibility via setting clear legislative and policy frameworks to guide the operation of these bodies, but should not then interfere in operational matters.

We propose streamlining planning and delivery arrangements for environmental water and removing duplication in roles and responsibilities. This is particularly important given that organisations at three scales (local, state and territory, and national) are involved in these activities. In that context, there would be significant efficiencies in disbanding The Living Murray program. It adds unnecessary complexity and coordination to an already difficult task, now that the Basin Plan provides a framework that seeks to benefit the entire system. Further streamlining should come from environmental water holders generally, and the CEWH in particular, devolving management to state or local levels, where capability exists.

Effective and efficient management of environmental water also requires adaptive management to ensure continuous improvement over time. This is particularly important for entitlement-based environmental water, which requires decision making in the face of uncertainty. Timely information is critical to learning. Governments need to improve efforts to monitor and review the environmental and other public benefit outcomes from flow management.

We recognise this is not easy to do, so effort should be commensurate with the risk to these outcomes and their value to the community. Improvement will require better coordination (particularly for shared resources), more consistent methods, and long-term investment. Governments should also provide for independent auditing to increase accountability.

Delivering new irrigation infrastructure that is viable and sustainable

With over \$4 billion of Australian Government grants and loans available for irrigation infrastructure projects, and funding also available from State and Territory Governments, it is crucial that poor past decisions and outcomes are not repeated. As set out in the NWI, the focus needs to be on ensuring the environmental sustainability and financial viability of new infrastructure *before* any government resources are committed for construction. Without this focus there are risks that public funds will be wasted, water users will be left with assets they cannot afford and costly environmental damage will be left for future generations.

Past irrigation infrastructure projects have been justified by benefits that have overwhelmingly been captured by private irrigators, but with no thought given to the recovery of capital costs from them. As a result, an important check on the viability of those projects — irrigators' preparedness to pay — was missing.

The role of governments in new irrigation infrastructure should be to deliver cost-reflective pricing, independent assurance of project viability, investor confidence and environmental sustainability. Specifically:

- NWI-consistent entitlement and planning frameworks should be in place before any new infrastructure is considered — this includes northern Australia, where such structures are weak or nonexistent
- an independent analysis should be completed and made available for public comment before any government announcement on new infrastructure is made
 - the analysis should: assess economic and financial viability of the new infrastructure; quantify the benefits delivered and the recipients of those benefits; and assess users' willingness to pay for the infrastructure through a combination of ongoing infrastructure charges and the purchase of water entitlements
- governments should not provide grant funding for infrastructure, or that part of infrastructure, that is for the private benefit of irrigators. Government grants should be limited to those projects, or parts of projects, delivering a clearly articulated and evaluated public good
- the financial risk of new infrastructure should be reduced by requiring the presale of water entitlements as a precondition for commencing construction.

Governments need to exercise caution in any decision to provide finance (such as loans) for new irrigation infrastructure where the private sector is unwilling to accept the same risks. That unwillingness may be a commercially and economically sound decision. Governments should only provide loans (or financial support) once robust decision-making frameworks are in place that, in addition to the points above, provide for:

- a selection of projects on merit, without favour or bias
- ongoing monitoring against agreed performance measures and the implementation of remedial action should the investment underperform
- public reporting of investment performance.

Progressing reform

The new reforms proposed by the Commission could be advanced in (at least) three ways: jurisdictions could go it alone and pursue reforms as and where they are relevant; bilateral agreements could be formed between jurisdictions to pursue reform actions; or the reforms could be packaged and progressed as a *national* reform agenda.

The NWI has served Australia well. It has spurred difficult reform across the water sector, produced sizeable benefits and been widely supported by the water sector, industry and stakeholders. Understanding why is important for considering the next steps in water policy.

The design and implementation of the NWI is likely to have been an important contributor to its effectiveness. First, it is an inclusive, national agreement involving all governments with material responsibilities for managing water resources and providing water. In signing up to the NWI, all governments agreed the objectives for water management and committed to a clear agenda and rationale for water reform that was visible to all water users and stakeholders. In establishing the process for independent review of progress, they showed they were willing to be held accountable for their actions.

Second, the objectives, outcomes and actions are generally clear and measureable, and progress against reform commitments has been independently monitored and scrutinised regularly. Third, the agreement provides jurisdictions with sufficient flexibility to progress reform in least-cost ways, given local conditions.

Finally, in establishing the NWI, governments not only worked on water reform within their jurisdictions, but established systems for working together on the mechanics of reform. They have developed principles and guidelines for various aspects of the NWI key elements. They have jointly responded to the independent reviews of progress. In doing so, they have shared information and ensured greater coordination across jurisdictions and greater consistency in management arrangements. This has provided stakeholders and investors with greater certainty.

The Commission considers that retaining and renewing the NWI is the best approach to progressing national water reform.

The NWI — recommit, revise and enhance

Progressing the new areas for reform through a renewed NWI would preserve and build on the strengths of the NWI as an enduring blueprint for national reform. It would also mean that the national water reform agenda is consolidated. Renewing the NWI would ensure existing reform commitments remain on the agenda, while providing an opportunity for new reforms to come into prominence.

Progressing reform through a renewed NWI would also allow governments to capitalise on the considerable goodwill and buy-in associated with the NWI, potentially smoothing the way for future reform efforts.

The Commission recommends that the Australian, State and Territory Governments recommit to a revised and enhanced NWI that maintains gains to date; progresses the unfinished business; and provides guidance on new reform priorities that have emerged as a result of current and future challenges facing the water sector.

However, the development of a renewed NWI is not a prerequisite for — and need not hold up — jurisdictions progressing with the Commission’s recommended reform priorities. The Australian, State and Territory Governments should get on with progressing reform.

Negotiating a new agreement

Implementation of the new reforms proposed by the Commission variously involve the commitment of the Australian, State and Territory Governments. While this means that not all governments need to be involved in progressing reforms in all areas, it is still important to have agreement led at a national level. The Commission recommends that a renewed NWI be negotiated through COAG.

A renewed NWI to be in place by 2020

The Commission considers that a renewed NWI could be negotiated within three years — in time for the 2020 inquiry into progress towards achieving the objectives and outcomes of the NWI. Jurisdictions should update the actions they commit to after six years to ensure that they remain relevant. Jurisdictions should develop a renewed NWI in an open and public manner. Indigenous people should be more directly involved in developing provisions relevant to them. As such, the Commission recommends that an Indigenous working group be established to provide advice on the development of relevant provisions.

Monitoring and reporting on progress

Ongoing audit and assessment of progress against reform commitments by an independent body lifts public confidence. Moreover, each government can be surer that others are playing their part. A three year cycle of assessment of progress against a renewed NWI would give jurisdictions sufficient time between reviews to make meaningful progress (for example, by passing new legislation or undertaking a comprehensive consultation exercise), while also maintaining reform momentum.

Draft recommendations and findings

Chapter 2 — Water reform — past, present and future

DRAFT FINDING 2.1

Water reform has brought about significant benefits to communities and stakeholders; however, there is further work to do. There is unfinished business in some areas of the National Water Initiative, and in some jurisdictions, that should be progressed. There is also a range of future challenges facing the water sector that will require further water reform.

Chapter 3 — Water entitlements and planning

DRAFT FINDING 3.1

Entitlement and planning reforms have provided economic benefits and promoted certainty through more transparent and inclusive decision making. They have also enabled a significant move towards improved environmental outcomes.

However, there are still areas where further reform and / or ongoing effort is required to meet the outcomes and objectives of the National Water Initiative. These include the failure of Western Australia and the Northern Territory to enact the legislation required to create secure, National Water Initiative-consistent water access entitlements.

DRAFT RECOMMENDATION 3.1

State and Territory Governments should ensure that entitlement and planning reforms are maintained and improved.

Priorities are:

- a. Western Australia and the Northern Territory should establish statutory-based entitlement and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable
- b. State and Territory Governments should ensure that water entitlement and planning arrangements explicitly incorporate extractive industries, such as by ensuring entitlements for extractive industries are issued under the same framework that applies to other consumptive users unless there is a compelling reason otherwise
- c. State and Territory Governments should develop a process to regularly assess the impact of climate change on water resources. Where this is considered to have been significant and detrimental, they should ensure that the next water plan review fundamentally reassesses the objectives of the plan (including environmental and consumptive) and the consequent balance between environmental and consumptive use of water, to ensure it is suited to a drier climate
- d. State and Territory Governments should ensure that, as water plans reach the end of their planning cycle, suitable review processes are undertaken that allow optimisation of water use and system operation across all users, include explicit consideration of Indigenous cultural values and involve adequate community and stakeholder engagement
- e. State and Territory Governments should ensure that their entitlement frameworks can incorporate alternative water sources, such as stormwater, wastewater, and managed aquifer recharge, so they do not present a barrier to efficient investment in these supply options.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 3.1(b) to 3.1(e).

DRAFT FINDING 3.2

Indigenous access to water resources to achieve cultural values is increasingly addressed by using specific mechanisms for engaging with Indigenous groups in the development of water plans – the exceptions are Western Australia and Tasmania.

The Northern Territory Government is also taking steps to provide Aboriginal landowners with increased opportunity to access water resources for economic development.

There has been evidence of environmental water managers using held environmental water to achieve Indigenous cultural objectives, without forgoing environmental benefits.

DRAFT RECOMMENDATION 3.2

State and Territory Governments should ensure that:

- a. Indigenous cultural objectives are explicitly identified and provided for in water plans, and progress in achieving Indigenous cultural objectives is regularly monitored and publicly reported on
- b. there is public reporting of how Indigenous cultural objectives have been considered in the management of environmental water — both held and planned.

DRAFT RECOMMENDATION 3.3

Where State and Territory Governments provide access to water for Indigenous economic development they should:

- a. source water within existing water entitlement frameworks, such as by purchasing water on the market or as part of transparent processes for releasing unallocated water
- b. ensure adequate supporting arrangements (such as training and business development) are in place to enable Indigenous communities to maximise the value of the resource
- c. involve Indigenous communities in program design
- d. ensure future governance arrangements are specified and implemented.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 3.3 (a) to 3.3 (d).

Chapter 4 — Water trading

DRAFT RECOMMENDATION 4.1

Australian, State and Territory Governments should maintain trade reforms to date and improve arrangements to facilitate open and efficient water markets.

Priorities are:

- a. State and Territory Governments should remove those residual trading rules, policies (whether or not explicitly stated) and other barriers that prevent water being traded, or otherwise transferred, between the irrigation and urban sectors
- b. the Australian Government should commission an independent review of the effectiveness and efficiency of service standards for trade approvals. The review should consider whether the standards should require shorter approval times
- c. the role of governments in providing water market information should be focused on ensuring the quality and accessibility of basic trading data. In fulfilling this role, State and Territory Governments should improve the quality and accessibility of trade data in water registers.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendation 4.1 (a).

Chapter 5 — Environmental management

DRAFT RECOMMENDATION 5.1

Australian, State and Territory Governments should ensure that their policy frameworks provide for the efficient and effective use of environmental water to maximise environmental outcomes, and where possible, provide additional community outcomes relating to water quality, Indigenous values, recreation and economic benefits.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

DRAFT RECOMMENDATION 5.2

State and Territory Governments should ensure the management of environmental flows is integrated with complementary waterway management at the local level.

To achieve this:

- a. State and Territory Governments should ensure that consistent management objectives for rivers, wetlands and floodplains govern the use of environmental water and complementary waterway management activities
- b. where possible, one planning process should be used to set objectives for both activities, but if not, State and Territory Governments should ensure planning at the local level is aligned and coordinated. Planning processes should also provide explicitly for other public benefit outcomes where these are compatible with environmental outcomes.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 5.2 (a) and 5.2 (b).

DRAFT RECOMMENDATION 5.3

Where governments own significant environmental water holdings, they should ensure that decisions on the use of the holdings are made by independent bodies at arm's length from government.

The Australian and New South Wales Governments should review current governance arrangements for held environmental water to ensure holdings are managed:

- a. independently of government departments and political direction
- b. by statutory office holders with an appropriate range of expertise.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

DRAFT RECOMMENDATION 5.4

Australian, State and Territory Governments should ensure there are clear roles and responsibilities for managing environmental water in shared resources, with no duplication.

Consistent with this principle, The Living Murray program should be disbanded as there is no clear rationale for its continued existence in the context of the Murray-Darling Basin Plan. Each Basin jurisdiction should manage its share of former Living Murray entitlements as part of its broader portfolio of held environmental water. The Murray-Darling Basin Authority should complete the divestment of its holdings.

DRAFT RECOMMENDATION 5.5

Where capable partners are available, Australian, State and Territory Governments should devolve the use of held environmental water to the lowest practical level, consistent with the principle of subsidiarity.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

DRAFT RECOMMENDATION 5.6

Australian, State and Territory Governments should improve monitoring, evaluation, auditing and reporting to demonstrate the benefit of allocating water to the environment, build public trust in its management, keep managers accountable and make better use of environmental water over time.

Priorities are:

- a. Australian, State and Territory Governments should increase their focus on monitoring environmental and other public benefit outcomes — not just flow delivery — where additional effort would be commensurate with the risk to, and value of, those outcomes
- b. monitoring and evaluation should involve collaborative and complementary partnerships, consistent methods that enable the synthesis of outcomes across different temporal and spatial scales, and long-term investment. In the Murray-Darling Basin, governments should develop a strategy to coordinate monitoring and evaluation of the outcomes of environmental flows, both planned and held
- c. all managers of environmental flows should publicly report on whether outcomes have been achieved or not, and the reasons why
- d. Australian, State and Territory Governments should establish arrangements for independent auditing of environmental flow outcomes to support transparency
- e. managers of held environmental water should use the results of monitoring, evaluation and research to improve water use as part of an adaptive management cycle. To achieve this, managers should clearly allocate responsibility and provide adequate resourcing for adaptive management.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendation 5.6 (e).

Chapter 6 — Urban water

DRAFT FINDING 6.1

Metropolitan and jurisdiction-wide providers' pricing practices are generally consistent with the requirements of the National Water Initiative. However, there is some evidence of underpricing in south-east Queensland (bulk water) and Tasmania.

Some providers in regional New South Wales are pricing below the level required by the National Water Initiative. It is not possible to determine whether pricing practices among smaller regional Queensland providers are consistent with the National Water Initiative due to a lack of data.

DRAFT FINDING 6.2

The New South Wales Government's definition of 'full cost recovery' is not consistent with the requirements of the National Water Initiative to achieve lower bound pricing.

DRAFT RECOMMENDATION 6.1

State and Territory Governments should ensure that independent economic regulation is in place for all urban water service providers of an appropriate scale, to further promote efficient service delivery.

Priorities are:

- a. extending independent price regulation to retailer-distributors in south-east Queensland and the Northern Territory's Power and Water Corporation
- b. establishing a standing reference for the Economic Regulation Authority in Western Australia and the Queensland Competition Authority to set or review prices.

DRAFT RECOMMENDATION 6.2

To promote competition by comparison, Australian, State and Territory Governments should ensure that performance monitoring data are transparently reported for providers of all sizes and subject to independent scrutiny.

Priorities are:

- a. the Queensland Government extending the reporting of financial information to service providers with fewer than 10 000 connections
- b. the New South Wales and Queensland Governments requiring appropriately qualified independent bodies to review financial performance frameworks to ensure that the pricing practices of regional service providers are monitored for consistency with National Water Initiative pricing principles
- c. the Bureau of Meteorology, and the New South Wales and Queensland Governments, requiring providers to report a financial return metric that excludes developer charges and contributed assets alongside the economic real rate of return metric.

DRAFT RECOMMENDATION 6.3

State and Territory Governments should:

- a. ensure that roles and responsibilities for supply augmentation planning are clearly allocated between governments and utilities
- b. require that decision-making processes are consistent with good planning principles, in particular that they consider all options fully and transparently, including both centralised and decentralised approaches (including indirect and direct potable reuse, and reuse of stormwater), and are adaptive in response to new information.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendation 6.3 (b).

DRAFT FINDING 6.3

In some cases integrated water cycle management (IWCM) projects will be justified by their benefits to a single beneficiary. In other cases, the multiple potential benefits of these approaches, such as improved liveability and ecological health of urban waterways, mean that collaboration across multiple beneficiaries will be required to capture these benefits.

To ensure that this complexity does not mean that cost-effective IWCM opportunities are missed, governments should ensure that material barriers and distortions to the adoption of IWCM approaches are removed from the general policy framework.

DRAFT RECOMMENDATION 6.4

State and Territory Governments should ensure that decentralised integrated water cycle management (IWCM) approaches are considered on an equal footing alongside other water supply and management approaches, particularly in the planning of new developments to support growth.

Priorities are:

- a. ensuring that place-based IWCM plans are developed for major growth corridors and significant infill development locations
- b. ensuring that options identified in IWCM plans are considered in water system planning, including both high-level system-wide planning and detailed investment planning, and in land-use planning
- c. ensuring that IWCM projects are implemented when they are shown to be cost-effective (considering their full range of benefits)
- d. reviewing the role that developer charges play in planning for new developments.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 6.4 (a) to 6.4 (d).

DRAFT FINDING 6.4

Environmental regulations applying to wastewater treatment plants and sewer overflows can be overly prescriptive in many cases, and so can exclude alternative approaches that achieve the desired environmental outcomes at lower cost. Further, some alternative approaches can offer better environmental and social outcomes, such as improved urban amenity and reuse of wastewater as environmental flows to improve waterway health.

DRAFT RECOMMENDATION 6.5

State and Territory Governments should ensure that current environmental regulations protect urban waterway health as cost-effectively as possible, and do not prevent the achievement of other public benefits.

Priorities are:

- a. reviewing existing regulatory regimes for wastewater discharges, beneficial use of wastewater and sewer overflows to ensure that they are sufficiently flexible and outcomes-focused
- b. considering the need to amend relevant national policies and standards.

DRAFT FINDING 6.5

The substantial capital subsidies available for water and sewerage projects in regional New South Wales and regional Queensland are inconsistent with the National Water Initiative.

DRAFT RECOMMENDATION 6.6

To improve service efficiency and address remaining water quality issues, funding arrangements for local water utilities in regional New South Wales and regional Queensland should be significantly reformed.

These States should replace existing capital grants to water utilities with Community Service Obligation payments that are not tied to capital expenditure, and are tightly targeted at unviable (high-cost) regional and remote services.

DRAFT FINDING 6.6

About half of small providers (with fewer than 10 000 connections) in New South Wales participate in some form of regional collaborative arrangement or obtain services from a larger regional entity, and 18 of 50 small providers in Queensland participate in the Queensland Water Regional Alliance Program. While these jurisdictions have made progress, there is likely to be further scope for them to capture economies of scale through collaboration.

DRAFT RECOMMENDATION 6.7

Local water utilities and State Governments in New South Wales and Queensland should strategically examine opportunities to improve service delivery through collaboration. Contingent Community Service Obligation payments may provide an opportunity to promote this collaboration.

Chapter 7 — Water infrastructure for agriculture

DRAFT FINDING 7.1

The pricing of government-owned bulk irrigation and distribution services has tended toward lower bound outcomes in Queensland, Western Australia and Tasmania, where economic regulators have not been responsible for setting prices. In New South Wales and Victoria, where economic regulators have been responsible for setting prices, upper bound outcomes have generally been achieved.

DRAFT RECOMMENDATION 7.1

State and Territory Governments should ensure the delivery of government-owned irrigation infrastructure services is underpinned by full cost recovery and economic regulation that is proportionate to the scale of the regulated service.

Priorities are:

- a. any terms of reference issued to the Queensland Competition Authority by the Queensland Government for advice on the pricing of irrigation infrastructure services should be aligned to the National Water Initiative Pricing Principles. The reason(s) for any Government decision to diverge from price recommendations based on those principles should be published
- b. the Western Australian Government should amend the role of the Economic Regulation Authority (ERA) so that irrigation bulk water customers can request the ERA to review the infrastructure prices and / or services proposed by Water Corporation (WA) as part of bulk water supply contract negotiations
- c. the Tasmanian Government should amend the role of the Office of the Tasmanian Economic Regulator (OTTER) so that irrigation bulk water and distribution customers of Tasmanian Irrigation can request OTTER to review the infrastructure prices and / or services of Tasmanian Irrigation
- d. an equitable share of the cost of any price review requested by users should be treated as a regulatory cost and passed through to users at the discretion of the bulk water supplier in Western Australia and Tasmania.

DRAFT RECOMMENDATION 7.2

Relevant jurisdictions should ensure that the cost of River Murray Operations (RMO) are recovered from water users. RMO costs should also be subject to a periodic independent review. Specifically:

- a. South Australia should pass through RMO costs to bulk water entitlement holders
- b. RMO should be subject to transparent and independent five-yearly efficiency reviews overseen by the economic regulators in New South Wales, Victoria and South Australia. The next review should be completed by 31 December 2019.

DRAFT FINDING 7.3

The transfer of existing irrigation distribution networks to local ownership and management in New South Wales, South Australia, Western Australia and parts of Queensland has benefited irrigators. In exchange, irrigators have accepted responsibility for all the risks and costs associated with ownership — including the potential for, and costs of, a distribution network’s financial failure.

Local ownership and management is the preferred model for any *new* distribution network. In contrast, the transfer of *existing* government-owned distribution networks to local ownership needs to be considered on a case-by-case basis.

There are rules in place to limit the exploitation of market power by distribution networks in the Murray-Darling Basin. Those rules and the approach to their enforcement:

- are proportionate to the risk posed and potential detriment
- are focused on outcomes and seek to avoid undue limits on the ability of networks to manage their business risks (such as declining water delivery volumes)
- have been subject to a transparent review process to ensure they remain fit for purpose.

DRAFT FINDING 7.4

The past failure of governments to deliver new irrigation infrastructure projects that are financially viable, environmentally sustainable and economically efficient is due to a combination of factors, including:

- prices that do not reflect the full cost of infrastructure due to governments providing grants for what is essentially private infrastructure
- poor analysis of the viability of new infrastructure projects
- an absence of robust water entitlement and planning frameworks.

DRAFT RECOMMENDATION 7.3

Governments should not provide grant funding for irrigation infrastructure, or that part of infrastructure, that is for the private benefit of irrigators. Rather, Australian, State and Territory Governments should ensure that:

- a. National Water Initiative-consistent water entitlements and planning are in place before any new irrigation infrastructure is considered (including infrastructure being financed under the Northern Australian Infrastructure Facility)
- b. government grant funding is limited to those projects, or parts of projects, delivering a public good. Any grant funding should be subject to an independent analysis of the project being completed and available for public comment before any government announcements on new infrastructure are made. The analyses should establish that the project will be:
 - ... environmentally sustainable
 - ... economically viable and deliver public benefits that are at least commensurate with the grant funding being provided
- c. government financing (such as loans) for infrastructure generating private benefits should only be provided after:
 - ... an independent assessment has confirmed the finance can be repaid on commercial terms. The assessment should be released for public comment before any announcement on new infrastructure is made
 - ... robust governance arrangements have been put in place to deliver merit-based decision making and the ongoing monitoring of (and public reporting on) the government's investment
 - ... sufficient water entitlements have been sold to reduce the project's risk profile and provide assurance the finance will be repaid.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 7.3 (a) to 7.3 (c).

Chapter 8 — Other National Water Initiative elements

DRAFT FINDING 8.1

Ongoing research and capacity building will be central to Australia's ability to deliver the sustainable management of water resources in the face of challenges from climate change, population growth and increasing community expectations.

DRAFT RECOMMENDATION 8.1

Australian, State and Territory Governments should:

- a. identify the key knowledge and capacity building priorities needed to support the ongoing implementation of the National Water Initiative (including the revisions and enhancements recommended in this report)
- b. develop mechanisms through which the jurisdictions can work cooperatively and share knowledge to build overall capability and capacity.

Australian, State and Territory Governments should update relevant provisions in the National Water Initiative to align with recommendations 8.1 (a) and 8.1 (b).

DRAFT FINDING 8.2

State and Territory Governments have delivered improved decision-making through open and timely consultation with stakeholders on water planning. This has been supported by the publication of relevant supporting information for consultation at key decision points.

State and Territory Governments have taken steps to document the outcomes from water plans and whether plan objectives have been achieved.

The Murray-Darling Basin Authority has increased stakeholder consultation and engagement since 2011.

DRAFT RECOMMENDATION 8.2

Where Governments consider there are significant and rapid adjustment issues affecting communities as a consequence of water reform, the response should:

- a. avoid industry assistance and subsidies
- b. consider all the factors impacting on the community (not just water reform)
- c. target investment to developing the capacity of the community to deal with the impacts of structural adjustment
- d. be subject to monitoring and publicly reported evaluation of outcomes.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 8.2 (a) to 8.2 (d).

Chapter 9 – Progressing reform

DRAFT RECOMMENDATION 9.1

Australian, State and Territory Governments should recommit to a renewed National Water Initiative through COAG by 2020. This should:

- a. maintain the achievements in water entitlements and planning, water markets, water accounting, water pricing and governance, knowledge and capacity building, and community engagement delivered by the current National Water Initiative as the key foundations underpinning sustainable water resource management and efficient infrastructure service delivery
- b. revise a number of policy settings:
 - ... incorporating extractive industries and alternative water sources into water entitlement frameworks
 - ... water planning to take account of climate change and enable ongoing optimisation
 - ... Indigenous access to water for economic purposes
 - ... arrangements for water trading between irrigation and urban sectors
 - ... better targeted adjustment assistance
- c. significantly enhance policy settings relating to:
 - ... urban water management to ensure innovative and efficient provision of services in the future under the combined pressures of population growth and climate change
 - ... environmental water management to ensure maximum return on government investment in this area
 - ... decision making on building and supporting new infrastructure for agriculture.

DRAFT RECOMMENDATION 9.2

In developing the renewed National Water Initiative, Australian, State and Territory Governments should:

- a. consult with relevant stakeholders, including by establishing an Indigenous working group to provide advice on the development of relevant provisions
- b. ensure that progress with implementing a renewed National Water Initiative continues to be independently monitored and reported on every three years.

1 About this inquiry

In February 2017, the Australian Government requested the Productivity Commission to undertake an inquiry into Australia's water sector.² This inquiry is the first of the Productivity Commission's triennial assessments of progress toward achieving the objectives and outcomes of the National Water Initiative (NWI).

This draft report outlines the Commission's draft findings and recommendations upon which the Commission invites comment. Comments can be provided by written submission (preferably in electronic format) by 19 October 2017 and / or by attending a public hearing.

The Commission will provide a final report to the Australian Government by 31 December 2017.

1.1 Background to this inquiry

The NWI sits at the centre of Australia's modern water reform efforts. It committed Australian, State and Territory Governments to reforms in water resource management and the delivery of water services.³ The overarching objective of the NWI is to ensure the sustainable and efficient use of Australia's water resources.

The National Water Commission (NWC) was established to oversee the implementation of the NWI. It periodically assessed the jurisdictions' progress on NWI reforms and provided recommendations to spur further reform. The NWC was also made responsible for undertaking reviews of the implementation of the Murray-Darling Basin Plan (Basin Plan) following the Basin Plan's adoption in 2012.

The NWC completed its final assessment of progress under the NWI in 2014 and was abolished in 2015. Amendments to the *Water Act 2007* (Cwlth) transferred responsibility for assessing the progress under the NWI and Basin Plan to the Productivity Commission. Under the Water Act, the Commission is now required to undertake inquiries into progress towards achieving the objectives and outcomes of the NWI every three years (National Water Reform inquiries), and inquiries into the effectiveness of the implementation of the Basin Plan every five years.

² The terms of reference are contained at the front of this report.

³ Seven jurisdictions agreed to the NWI in 2004 and all parties had agreed by 2006.

This draft report relates to the first Commission task — the National Water Reform inquiry. The first Basin Plan implementation inquiry will commence in 2018.

1.2 What has the Commission been asked to do?

The terms of reference give the Productivity Commission a wider scope of inquiry than that specified under the provisions of the Water Act. The Commission has been asked to assess:

- progress in jurisdictional adoption of NWI principles
- the outcomes to date of the NWI and related water reform efforts, taking account of other drivers of reform
- progress against the recommendations in the National Water Commission's National Reform Assessment 2014
- the extent to which the NWI reforms are adequate to support government responses to emerging or changing water management challenges, including in the urban sector.

The Commission has also been asked to consider:

- the potential and realised benefits of NWI implementation
- the scope for improving the NWI, addressing current and future challenges
- broader water policy issues and the role of the NWI in improving outcomes, in particular:
 - the interaction of water policy with other policy areas such as energy, agriculture, planning and urban supply
 - whole-of-cycle water management
 - provision to regional and remote communities
 - the economically efficient provision of water infrastructure.

In line with the terms of reference, the Commission has minimised duplication with the upcoming inquiry into the implementation of the Basin Plan. Accordingly, this inquiry will not consider:

- the development of the State and Territory water resources plans called for by the Basin Plan
- the Basin Plan's Environmental Watering Strategy.

Substantive and nationally relevant policy issues (such as water trading and the institutional and management arrangements for environmental water) have, however, been considered as part of this inquiry.

1.3 The Commission's approach to this report

The Commission has four main tasks under the terms of reference for this inquiry.

- Assess progress in achieving the objectives and outcomes of the NWI and related water reform (including past recommendations of the NWC and Council of Australian Governments (COAG) reform initiatives).
- Consider the potential and realised benefits of implementing the NWI.
- Make recommendations on future water reform priorities.
- Consider the implementation of reform and the scope for improving the NWI.

The Commission has drawn on publicly available data sources, published reports, its own analysis, information supplied by the jurisdictions and information supplied by participants in their submissions in undertaking these tasks. It has also drawn on the advice and expertise of its Stakeholder Working Group (section 1.4). The Commission has used qualitative assessments where there are no quantitative measures of the impact of reform.

An overall assessment of progress against the NWI's objectives and outcomes are detailed in appendix B. Progress against the recommendations of the NWC (2014c) is set out in appendix C.

Chapter 2 describes the outcomes and benefits of national water reform (including from the implementation of the NWI). It also outlines the future challenges facing the water sector.

In considering future water reform priorities, the Commission based its analysis on three broad areas of the water sector:

- *water resource management*: water planning and the system of water entitlements (chapter 3); water trading (chapter 4); and, environmental management (chapter 5)
- *water services* which comprises the capture, storage and delivery of water for urban use (chapter 6) and agricultural use (chapter 7)
- *key supporting mechanisms* including: water accounting, measurement and compliance; community engagement and consultation; and, the generation of knowledge and water management capacity (chapter 8).

In each of the chapters 3–8, the Commission has summarised reform progress to date and the benefits this has yielded. In doing so, areas of unfinished business from the NWI have been identified. The areas of unfinished business have been considered alongside the current and emerging challenges identified through submissions, consultation and the Commission's research to form the basis of further reform opportunities analysed in each chapter. On the basis of that analysis, draft findings and recommendations for future policy actions have been made.

In determining draft recommendations, the Commission's guiding principle was that reforms must advance the efficient and sustainable use of Australia's water resources *and* deliver a net benefit to the community. Draft recommendations are based on examination of the likely costs and benefits of any given policy. Where such an examination was not possible, a judgment was made based on the weight of evidence before the Commission.

In the final chapter (chapter 9), the Commission has examined the value of the NWI as a policy vehicle for achieving reform and how the NWI might best be leveraged to progress the reform agenda set out in this draft report.

1.4 Conduct of the inquiry

The inquiry is being undertaken according to requirements set out in both the *Productivity Commission Act 1998* (Cwlth) and the *Water Act 2007* (Cwlth).

The Commission released an issues paper on 16 March 2017. The Commission has consulted widely, drawing on input from participants through bilateral meetings, roundtable discussions and written submissions (appendix A).

In addition, and in accordance with the Water Act, a stakeholder working group was established to serve as a forum for the exchange of information and views on matters relevant to this inquiry. The group first met on 23 February 2017, and subsequently on 23 May 2017. The members of the group are listed on the inquiry web page and also in Appendix A (<http://www.pc.gov.au/inquiries/current/water-reform/working-group>).

The Commission invites written submissions on this draft report.

2 Water reform — past, present and future

Key points

- The development of Australia's water resources has been concentrated in the south-east and south-west, where the majority of Australians reside and where most major irrigation systems are located. Irrigated agriculture is Australia's major water user, consuming more than three times as much water as the urban sector.
- Australia is one of the driest countries in the world and has a highly variable climate. This makes good water management and efficient service delivery particularly important.
- Management of the Australian water sector from Federation to the late-1970s was primarily development-oriented; building dams and delivery systems to supply cities, towns and agricultural producers, and to support regional development. This development-oriented approach led to a number of problems including environmental degradation and the inefficient operation and maintenance of infrastructure.
- To address these problems a period of reform began in the mid-1980s, with a national approach adopted in 1994 through the COAG Water Reform Framework. The national approach was extended in 2004 as the National Water Initiative (NWI).
- Overall, good progress has been made in implementing the NWI. The key achievements and benefits from those reforms have been:
 - *water planning arrangements* are in place for most areas where water is used intensively. By balancing consumptive and environmental water use these plans provide a firm foundation for sustainable water use. While the full benefits of providing water for the environment will take time to realise, there is already some evidence of improved ecological outcomes from environmental flows
 - *NWI-consistent water entitlements* are in place in all jurisdictions except Western Australia and the Northern Territory. Water entitlement frameworks have underpinned the development of *water markets and trading*. The resultant benefits have included:
 - ... flexibility for irrigators in managing their businesses through the ability to trade water and obtain loans using water entitlements as collateral
 - ... water being traded to its highest value uses. This has helped maintain the value of agricultural production in dry years and supported production growth in other years
 - moves toward *cost-reflective pricing* have seen government subsidies reduce to the point where most of today's urban and irrigation service providers are generating sufficient revenue from user charges to operate without a government subsidy
 - the *separation of water service provision from the policy-making functions of government* has been achieved in all jurisdictions. This has delivered more cost-efficient water services and allowed governments to become more focused on policy making.
- However, there is further work to do. There is unfinished business from the NWI that jurisdictions need to progress and there are a range of current and future challenges facing the water sector that will require further water reform.

This chapter gives an overview of Australia’s water resources and outlines the path of water reform since the 1980s. In doing so, it examines the outcomes and benefits of that reform. The chapter concludes with an analysis of the challenges facing the water sector that the Commission views as important considerations for future reform priorities.

2.1 Managing Australia’s water resources

Under the *Australian Constitution*, the management of water resources is vested in the States and Territories. In many instances they are also responsible for the provision of water services to their respective communities. The Australian Government takes an oversight, facilitation and funding role — particularly in the management of water resources that span jurisdictional borders, such as the Murray-Darling Basin (MDB) (Hart and Doolan 2017).

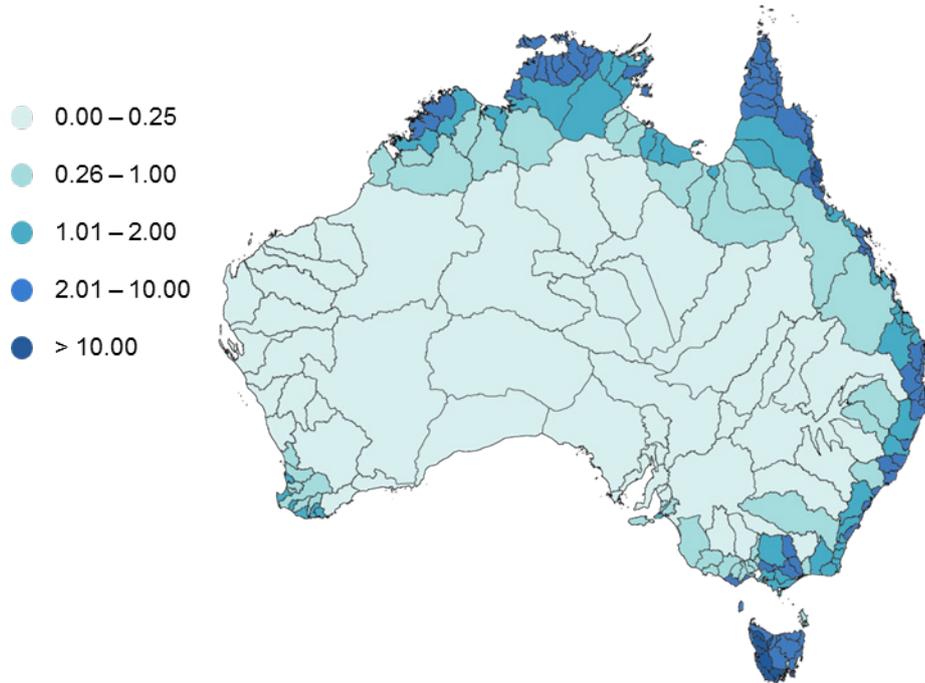
However, not all water services are delivered by State and Territory Governments. In some cases, water services are delivered by local governments and local authorities, while in other (regional) areas people self-supply. Also, in New South Wales, Western Australia, South Australia and parts of Queensland irrigation distribution services are provided by user-owned cooperatives.

How Australia’s water is sourced and used

Australia is the driest populated continent in the world. It has a highly variable climate, with a history of recurrent droughts often punctuated by large floods. Australia’s surface water resources are concentrated around its coastal rim (figure 2.1), as is most of the nation’s water use (figure 2.2). Most water resource development and use has occurred in south-east and south-west Australia where the majority of Australia’s population resides and where most major irrigation systems (including those of the MDB) are located.

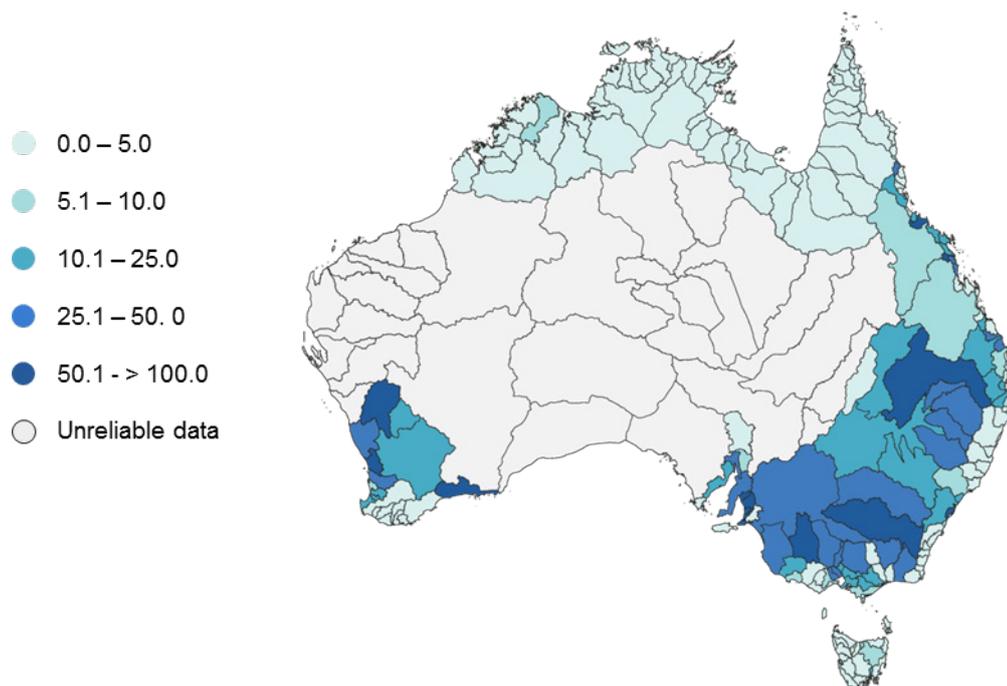
Figures 2.1 and 2.2 highlight that relatively little water development has occurred across Tasmania, in the north of Australia and in some small coastal catchments. These are areas with available water resources that could potentially be developed.

Figure 2.1 Availability of surface water
Runoff (ML/hectare)



Source: Prosser (2011).

Figure 2.2 Surface water used
Percentage of available surface water used



Source: Prosser (2011).

12 850 gigalitres of water was extracted from the environment in 2015-16. Of total extractions, 78 per cent was surface water (box 2.1) while 18 per cent was sourced from groundwater (figure 2.3). Irrigated agriculture and industry were Australia’s largest water users in 2015-16 and combined accounted for 72 per cent of Australia’s water use (figure 2.4). By comparison, urban water uses (including household consumption) accounted for 18 per cent of the water consumed in 2015-16.

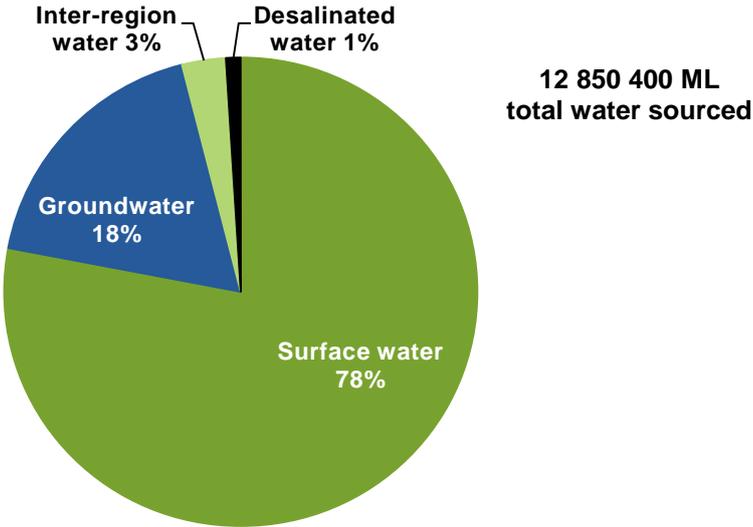
With the exception of Perth and Adelaide, year-to-year surface water availability has been sufficient to meet water demand for consumptive use in major urban centres. In Perth and Adelaide, water for consumptive use is supplemented by other sources, including: groundwater; desalinated water; and transfers from outside the storage catchments (BOM 2016c).

Box 2.1 Water sources: surface water and ground water

Surface water is water that flows over land and in water courses or artificial channels and is able to be captured and stored in dams and reservoirs.

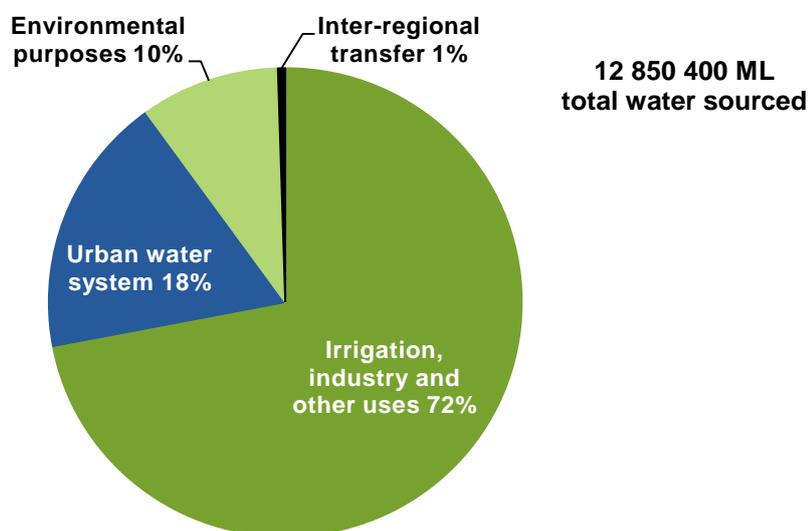
Groundwater is water occurring naturally below ground level (whether in an aquifer or otherwise), or water occurring at a place below ground that has been pumped, diverted or released to that place for the purpose of being stored there, but does not include water held in underground tanks, pipes or other works.

Figure 2.3 Sources of water extracted in Australia: 2015-16



Source: BOM (2017d).

Figure 2.4 **Australia's water uses: 2015-16^a**



^a Representation exceeds 100 per cent due to rounding.

Source: BOM (2017d).

2.2 History of water reform

Up until the 1980s, State and Territory Governments took a primarily development-oriented approach to the management of water resources with a focus on expanding irrigated agriculture and supplying the needs of growing cities and towns. Under this approach, governments invested in dams and other water infrastructure without requiring that user charges recover the associated costs. Also, water rights were issued relatively freely and without always respecting the limits of water resources.

While this approach arguably served Australia reasonably well at the time, by the 1980s a range of pressures and problems were emerging. These included environmental problems (such as salinity, algal blooms and deteriorating river and wetland health) and a growing awareness that traditional approaches to providing water infrastructure services were costly and lacked any incentives to improve operational efficiency over time (Doolan 2016).

In response, some States and Territories began reforming aspects of water policy. The Basin States worked together on issues affecting their shared water resources and in 1994 the Council of Australian Governments (COAG) agreed on a comprehensive national Water Reform Framework (COAG Framework). The COAG Framework set out an ambitious agenda that focused on delivering more sustainable water resource management through:

- clarification of water rights
- provision of water for the environment

-
- development of water trading
 - more efficient provision of water services through pricing and institutional reform.

In 1995, national water reform was brought into the broader National Competition Policy (NCP) reform framework. This occurred in recognition of the importance of water to the Australian economy and the need for microeconomic reform in this area. State and Territory Governments received payments from the Australian Government when reforms under the NCP (including water reform) were successfully implemented in their jurisdiction. Assessment of progress with implementing reforms was undertaken by the National Competition Council. This provided significant incentives for States and Territories to meet their water reform commitments.

Nearly 10 years later, water demand had continued to increase, environmental problems caused by overallocation were becoming increasingly evident and water scarcity issues were arising from the early years of what was later to become known as the Millennium Drought (1997–2009). Against this backdrop, the national water reform agenda was reviewed and it was concluded that although progress had been made in a number of key areas, reform was proving more difficult than originally anticipated (particularly in relation to environmental sustainability) (Doolan 2016).

Informed by the review of the national reform agenda, COAG refreshed and extended the national water reform agenda through a National Water Initiative (NWI) in 2004. Unlike the 1994 COAG Framework, the NWI is not part of a broader set of reforms (such as the NCP) and it does not involve incentive payments.

The NWI aims to increase the productivity and efficiency of Australia's water use while ensuring the health of rivers, groundwater systems and other water assets. To achieve these objectives, the NWI sets out a number of agreed outcomes and actions (box 2.2). COAG subsequently agreed to a range of specific reform measures in 2008, 2009 and 2013 to provide more detailed policy guidance on aspects of the NWI, including in relation to urban water, water markets, and knowledge and capacity building.

With the conclusion of the NCP in 2005-06, the National Water Commission (NWC) was established to take over responsibility for assessing progress with implementing water reform from the National Competition Council (Australian Government nd). The NWC completed four assessments of progress on the implementation of the NWI — three were conducted biennially and the final, in 2014, was a triennial assessment. In 2015, the NWC was abolished and responsibility for assessing progress on water reform transferred to the Productivity Commission.

Box 2.2 Objectives and elements of the National Water Initiative

The NWI aimed to create a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes by achieving the following objectives:

- clear and nationally-compatible characteristics for secure water access entitlements
- transparent, statutory-based water planning
- statutory provision for environmental and other public benefit outcomes, and improved environmental management practices
- complete the return of all currently overallocated or overused systems to environmentally-sustainable levels of extraction
- progressive removal of barriers to trade in water and meeting other requirements to facilitate the broadening and deepening of the water market, with an open trading market to be in place
- clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool
- water accounting which is able to meet the information needs of different water systems in respect to planning, monitoring, trading, environmental management and on-farm management
- policy settings which facilitate water use efficiency and innovation in urban and rural areas
- addressing future adjustment issues that may impact on water users and communities
- recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource.

To fulfil these objectives, the NWI included eight key elements for which there were agreed outcomes and actions:

1. Water access entitlements and planning frameworks
2. Water markets and trading
3. Best practice water pricing and institutional arrangements
4. Integrated management of water for environmental and other public benefit outcomes
5. Water resource accounting
6. Urban water reform
7. Knowledge and capacity building
8. Community partnerships and adjustment.

The Murray-Darling Basin Plan

In 2007, the worst year of the Millennium Drought, the Australian Government announced additional reform to reset the balance between consumptive and environmental use in the MDB. The announcement was a response to the drought and the continuing overallocation of MDB water resources by the Basin States (Australian Government nd). The reform was given effect by the *Water Act 2007* (Cwlth) (the Water Act) and the Murray-Darling Basin

Plan (the Basin Plan) which came into effect in 2012. The NWI was the foundation for both the Water Act and the Basin Plan.

Since 2007-08, the Australian Government has committed \$13 billion toward the objectives of the Water Act and Basin Plan — including the recovery of water for the environment (DAWR 2017b). Part of this process also involved establishing a new authority — the Murray-Darling Basin Authority (MDBA) — to develop the Basin Plan and oversee its implementation.

2.3 Outcomes and benefits of national water reform

Water reform at a national level has been aimed at achieving:

- improved water resource management through water planning, the establishment of secure property rights, development of water markets and improved environmental management
- efficient service delivery to urban and rural (irrigation) water users through better institutional and pricing arrangements
- improvements in water accounting and measurement, community engagement and knowledge and capability building to support reform in the two areas listed above.

While jurisdictions have taken different approaches to some areas of reform (and progress on reform has been at times uneven), the Commission has found that good progress has been made overall in the key areas of reform (appendix B). A summary of that progress, and the benefits it has delivered, are set out below.

Improved water resource management

Water planning has provided the base for good resource management

Water planning arrangements have been established for the majority of areas of intensive water use across Australia and most jurisdictions have more than 80 per cent of their water use managed under water plans (chapter 3). This means that, in these areas, the volume of water for consumption has been identified, provisions of water have been made for the environment and the operating rules for the system have been determined. In overallocated systems, pathways to achieving a more sustainable balance between consumptive and environmental use have been established, although there is more work to do before they are completed. Importantly, water plans are based on best available scientific research and informed by broad consultation with water users, communities and other stakeholders. By identifying the balance between consumptive and environmental water use, and clearly establishing the water available for consumptive use and the rules for its take, these plans provide a firm foundation for sustainable water resource management.

Water entitlements and trade build on the gains from planning

All jurisdictions, except Western Australia and the Northern Territory, have created statutory-based, NWI-consistent water entitlements that provide clear and secure long-term water rights for both consumptive users and the environment. The establishment of secure water rights, separate from land, coupled with capping consumptive use, have been the key building block to enable water trading and the establishment of water markets — the most extensive of which is in the MDB.

There is widespread agreement that these arrangements have produced significant financial and non-financial benefits. Water entitlements are now valuable business assets with the total value of major entitlements types in the southern MDB exceeding \$13 billion in 2016 (Aither 2016b). The value of entitlements, their legal backing and developed markets for those entitlements has allowed financial institutions to accept them as collateral for loans. Based on a 2013 survey of New South Wales irrigators, around 20 per cent of New South Wales' irrigators have used water entitlements to secure finance (Fenton and Department of Trade and Investment (New South Wales) 2015).

Water markets have allowed water to be traded to higher value uses. The ability to trade water has offered irrigators 'more choice and flexibility in managing their businesses in response to drought and seasonal conditions' (Doolan 2016, p. 13) and facilitated longer-term investment planning, including decisions to change production or exit the industry (NWC 2011d).

The removal of trade barriers, quicker and easier trade approval processes, and better market information has enabled rapid growth in water trade, including across state boundaries. As a result, higher-value industries, such as nut growing, have developed rapidly, and established industries have become more productive.

While the value of water traded is largest within the southern MDB, reforms have also opened up trade in other regions, including the northern MDB, cane growing areas of Queensland, groundwater systems in South Australia and in southern Victoria. Trade between the irrigation and urban sector is still restricted in various ways, but it has increased the overall value to the economy when it has occurred.

The capacity to trade water has provided incentives for more efficient water use and infrastructure investment. Based on submissions to this inquiry, and on a range of other sources, there is widespread agreement that trade-enabling reforms in Australia have been beneficial. For example, Alistair Watson (sub. 49, p. 2) argued:

... a key benefit of water sector reform in Australia has been the gradual introduction of water trading between irrigators; not just allowing water to move reasonably freely between farms, commodities and regions but also contributing to better management of climatic risks, as most strikingly manifested in the Millennium Drought.

While Murray Irrigation's (sub. 16. p. 6) view was:

The water market – and the value of water – has led to the improved efficiencies and diversity of commodities now being grown across the Basin [MDB]. This has had far more of an impact on efficiency than any other Government policy or water reform.

While there has been only a small number of studies that attempt to quantify the benefits of trading, they indicate the benefits from water trading have been significant:

- economic modelling has been used to estimate the increase in the value of agricultural production facilitated by water trading. Water trading was estimated to have facilitated a \$220 million increase in Australia's gross domestic product in 2008-09 (NWC 2010b), while regional gross domestic product in the southern MDB was estimated to be \$4.3 billion higher over the five years to 2010-11 than it would have been without water trading (NWC 2012c)
- water trading is also believed to have contributed to maintaining the gross value of production even as water availability fell:
 - the NWC (2010b) reported that between 2001 and 2006, the value of agricultural production in the southern MDB (including dryland and irrigated agriculture) increased by nearly 2 per cent despite a 14 per cent reduction in water use.
 - between 2005-06 and 2008-09 the gross value of irrigated agricultural production fell by 29 per cent (from \$5.5 to \$4.3 billion) while water availability dropped by 53 per cent (NWC 2011e).

Some of the results reported above do not control for factors such as price movements, the substitution of water for other inputs (such as fodder bought by dairy farmers) or, where they relate to regional production values, the overall effect on Australia's GDP. As such, there are limits on the inferences on the benefits of water trading that can be drawn from these results. However, it is evidence that water trading has brought a net benefit to the nation (chapter 4).

Water trading has become a vital tool for irrigators, giving them increased flexibility to respond to fluctuating climatic and market conditions. A survey of 564 irrigators in the southern MDB by the NWC (2012c) found that nearly all of them agreed that both allocation and entitlement trading were beneficial to their farm businesses. The benefits have been most pronounced during drought — trade has allowed water to move from producers with flexible irrigation demands (such as rice and cotton growers planting crops annually) to those with inflexible demands (such as horticulturalists with perennial crops).

Water markets have also provided a means through which governments can purchase water entitlements to recover water for the environment. The purchase of water entitlements has proven to be a more cost-effective means of recovering water for the environment compared to government infrastructure modernisation and water efficiency initiatives (chapter 7). The purchase of water entitlements is also usually the more equitable approach to recovering water for the environment (and dealing with the resultant structural change impacting entitlement holders) compared with water efficiency programs (appendix B, section B.8).

Improved environmental management

Entitlement and planning reforms have provided a significant advance in improving environmental management. First, they have established the environment as a legitimate user of the resource — there are clear statutory provisions for water for the environment in all States except Western Australia. Second, water planning processes have identified the volume available for consumptive use, thereby protecting environmental values from further degradation. Third, in overallocated systems, there has been a reallocation of water from the consumptive pool to the environment with the aim of stabilising and improving environmental outcomes (for example, a target of 2750 gigalitres has been set for water to be re-directed from agricultural use to the environment within the MDB). Finally, environmental water managers have been established with direct responsibility for managing environmental water entitlements to achieve environmental outcomes, and where possible other community and cultural benefits.

While remediation is a long-term process, the benefits of having more water available for the environment are starting to show. Environmental flows have contributed to improved local ecological outcomes such as the breeding of native fish, frogs and waterbirds, improved native vegetation condition, and better water quality (Argent 2017; CEWH 2016). Also, there would have been greater environmental degradation in the MDB during the Millennium Drought without environmental flows (MDBA 2011).

Best practice water service delivery

There have been many reforms undertaken within the water services sector. Two of most significant have been the move to cost-reflective pricing and the separation of service delivery from the broader role of government.

Cost-reflective pricing reduces subsidisation and improves outcomes

Urban and irrigation water services were heavily subsidised by governments prior to pricing reform commencing in the 1980s and 1990s. Since then, moves toward cost-reflective pricing have seen government subsidies reduced to the point where most current service providers (in both the irrigation and urban sector) generate enough revenue from user charges to operate without a government subsidy.

Where subsidies remain in place, price paths have usually been established to reduce the subsidy over time. For example, there was a decrease in the subsidies paid by the Queensland Government to SunWater from \$6.0 million in 2014-15 to \$4.7 million in 2015-16 as prices continued to transition toward full cost recovery (DNRM (Qld), pers. comm., 1 June 2017).

In the urban sector, the move to cost-reflective pricing was accompanied by the introduction of consumption-based pricing. This, along with restrictions and awareness campaigns during droughts and regulatory changes, resulted in changed consumer behaviour and more efficient

water use. For example, between 2000 and 2016 residential water consumption (median annual residential water supplied) in cities and towns decreased from 280 kilolitres to 182 kilolitres per property (BOM 2015, 2017b).

Independent economic regulation has been key to cost-reflective pricing

The NWI requires that independent economic regulators have a role in the review or setting of prices for water services. Independent economic regulation encourages efficient service delivery by applying rigorous scrutiny to operational and investment decisions. It facilitates consistent and improved planning, increases the transparency of decision making and reduces the risk of political interference in price-setting processes.

The advantages of economic regulation are evident in New South Wales and Victoria, where an economic regulator is responsible for setting prices for bulk water services supplying agriculture. New South Wales and Victoria are the only jurisdictions achieving the NWI's aspirational goal of upper bound pricing for these services (appendix B, section B.3).

Separating service delivery from government has been beneficial

The 1994 COAG Framework and 1995 NCP provided the impetus to separate the provision of water services from the policy-making functions of government. The separation of functions has been achieved in different ways depending on the nature of the service. For example:

- urban water services and irrigation bulk water services provided by State and Territory Governments were corporatised
- government-owned corporations were established in Victoria, Tasmania and parts of Queensland to supply irrigation distribution services
- irrigation distribution services in New South Wales, South Australia, Western Australia and parts of Queensland were transferred to irrigators to own and manage.

Corporatisation has delivered more efficient water services and a stronger commercial focus within service providers that has benefited water users. Separating service delivery from the broader role of government has allowed more focused policy making to occur which has benefited water users and the broader community. Corporatisation has also meant that government-owned urban water utilities now compete with private entities on a level playing field which brings the benefits of competition (or potential competition) to urban water users.

Local ownership and management of distribution services (and, to a lesser degree, the establishment of government-owned corporations) has improved productivity, accountability, long-term planning and responsiveness to irrigators within irrigation distribution services. For example, Coleambally Irrigation's user charges fell by 5 per cent

in real terms between 2008-09 and 2016-17 (Coleambally Irrigation Cooperative Limited, sub. 46).⁴

Gains have been underpinned by improved water accounting and knowledge generation

Over the years, governments have invested substantially in water accounting systems, including state water registers, water monitoring, water metering and the national water accounts. These investments have underpinned the integrity of the water entitlement frameworks and water markets through transparent reporting and compliance regimes and the accessible provision of information.

There has also been substantial investment in research and capacity building to deliver evidence-based water planning and management decisions. The advances in technology, innovation and knowledge of water resources that resulted from that research were critical to Australia's response to the Millennium Drought (chapter 8).

2.4 Informing future reform priorities

As outlined above, significant water reforms have been undertaken and those reforms have achieved valuable outcomes. However, there remains further work to do. Establishing the priorities for the next phase of Australian water reform needs to take into account:

- unfinished business from the NWI
- lessons learnt during the 13 years of implementation (which included the most severe period of the Millennium Drought)
- current and future challenges facing the water sector.

Appendix B sets out the unfinished business from the NWI. Chapters 3–8 supplement those conclusions with details of the gaps and limitations in the NWI that were identified during its implementation. In each chapter, the Commission examines the case for further reform as a result of unfinished business and current and future challenges facing the water sector. This section sets out the broad details of some of the key current and future challenges.

⁴ These productivity gains were driven by a number of factors including (but not limited to) management actions and investment by Coleambally Irrigation (and government) to improve the operating efficiency of their distribution infrastructure.

DRAFT FINDING 2.1

Water reform has brought about significant benefits to communities and stakeholders; however, there is further work to do. There is unfinished business in some areas of the National Water Initiative, and in some jurisdictions, that should be progressed. There is also a range of future challenges facing the water sector that will require further water reform.

Current and future challenges

The Commission has identified a number of current and future challenges that are likely to influence the direction of future water reforms in Australia — particularly in the urban sector. These challenges include population growth, climate change and evolving community expectations. To manage these challenges well, the water sector will need to be adaptive, responsive and innovative.

Planning for population growth in cities

Australia has a growing and increasingly urbanised population. Australia's estimated population in 2016 was about 24 million people with approximately 57 per cent of these people living in New South Wales and Victoria (and the majority of them living in metropolitan areas) (ABS 2017a). Population projections show that Australia's population is expected to be 34.3–41.9 million people by 2050 (ABS 2013a). Also, there is expected to be an additional 8.3 to 13.3 million people living in Australia's capital cities by 2050 (ABS 2013b).

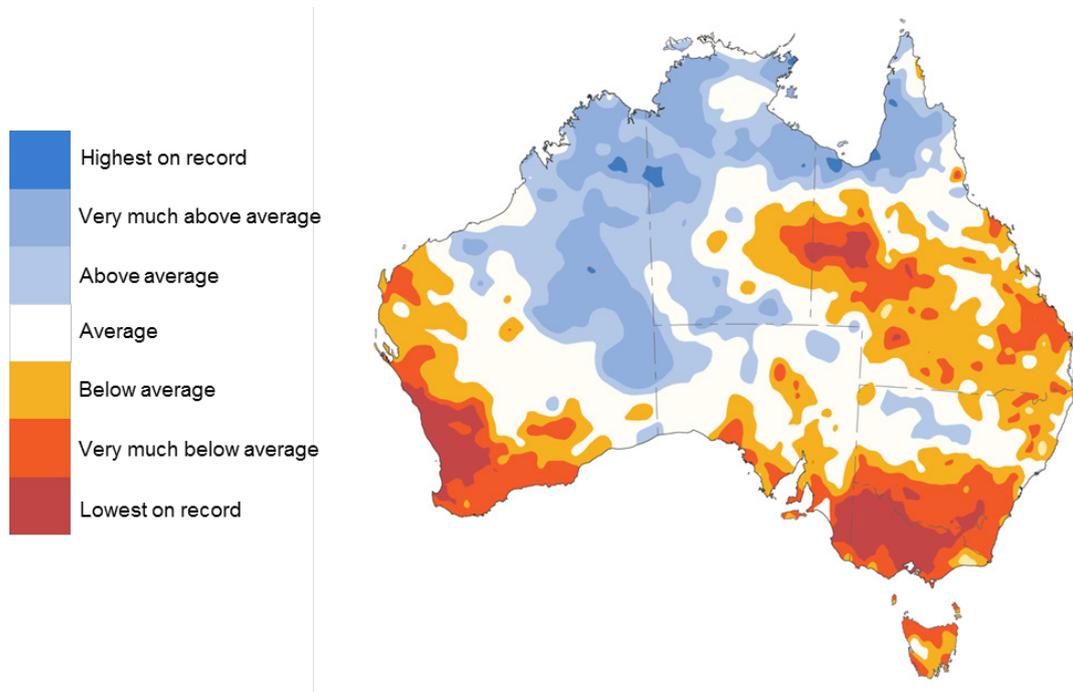
The increased population will challenge the ability of urban water providers to supply affordable, secure drinking water and reliable sanitation. In addition, it threatens green infrastructure — such as rivers, lakes and wetlands — that contribute to liveability.

Taking climate change into account

The Bureau of Meteorology's *State of the Climate* report (BOM 2016a) shows that the duration, frequency and intensity of extreme heat events has increased across large parts of Australia. Moreover, over the last three decades, rainfall has declined in the southern part of Australia (figure 2.5) — in the south-west by 19 per cent and in the south-east by 11 per cent (BOM 2016a, p. 2). This has resulted streamflow in the south-west reducing by more than 50 per cent. Streamflows in the south-east of the country are now half of their long-term average (BOM 2016a, p. 11).

Figure 2.5 Australia's rainfall

Rainfall for 1996–2015 compared with the entire rainfall record from 1900



Source: BOM (2016a).

Looking ahead, CSIRO predicts that winter and spring rainfall is likely to further decrease across southern continental Australia, with more time spent in drought.

Early in the century (2030) and under all emission scenarios, winter and spring rainfall is projected to decrease by up to around 15 per cent [in Southern Australia] ... Changes in autumn and summer are less clear, although statistical downscaling results suggest a continuation of the observed autumn declines. (CSIRO nd)

The effects of lower rainfall are amplified through reduced streamflow and water levels in lakes and dams. CSIRO predicts that streamflows will substantially reduce in much of south-eastern Australia and there is expected to be an increased frequency and intensity of extreme weather events. The latest projections indicate a reduction of 10 per cent in mean annual runoff by 2030 for each one degree increase in average annual temperature. This will have significant impacts on all water users: urban users; irrigators; and the environment.

Current climate trends, future predictions and the experience of the Millennium Drought (below) indicate that there will be a greater need for water managers to be adaptive and creative. Decisions made today about how we adapt and respond to climate change — the sharing of water between consumption and environment, and investments in infrastructure — are likely to have lasting effects for future generations.

The lessons from the Millennium Drought

The NWI was developed and signed before the severity of the Millennium Drought was realised. While some jurisdictions were well placed to adapt to the challenge posed by that drought (and to take advantage of opportunities where they presented), others were not. Overall, the Millennium Drought highlighted shortcomings in the collective ability of the water sector to adapt to the type of severe challenges that may arise in a changed climate.

A number of lessons were learnt from the Millennium Drought and the experience has since led to a number of changes in the management of Australia's water resources. For example, the Millennium Drought:

- confirmed that Australia's climate can be unpredictable and that past events and conditions on their own are not enough to predict the future. This has led to jurisdictions developing more comprehensive drought scenarios and response strategies
- highlighted the importance of community and stakeholder engagement and transparent decision making. This has prompted increased engagement of communities and stakeholders to ascertain preferences and values in relation to future strategies
- encouraged water utilities to be more creative in their practices
- shifted utilities' focus and goals to include resilience and adaptability to climate change (Hart and Doolan 2017).

Adapting to evolving community expectations

The 1994 COAG Framework and 2004 NWI emphasise the importance of community engagement and transparent decision making. Until recently, water users' expectations of water utility providers centred on clean, reliable and affordable water and wastewater services.

However, the social dependence of both urban and rural communities on water and water environments became apparent during the Millennium Drought as local lakes and streams dried up (particularly in regional communities) and urban communities had limited water use due to restrictions. Since then, both regional and urban communities have developed a greater appreciation of the contribution that water management and water environments can make to amenity, liveability, recreation and regional tourism. Several inquiry participants highlighted the importance of engaging water users in the development of urban water policies.

Priority areas for urban water reform include ... Improving the relationships between urban planning and water policy, and driving community and stakeholder involvement in the development of local water plans. (Australian Academy of Technology and Engineering, sub. 20, p. 5)

There is a need for policy direction and potential changes in regulatory frameworks to encourage and facilitate greater customer centricity in water and wastewater services, to ensure the industry is delivering the outcomes customers want. (Sydney Water, sub. 36, p. 2)

Community engagement is required to agree the services standards expected by customers and communities, considering factors such as changes in climate, supply/demand balance, and community expectations on amenity levels and environmental quality. (Australian Water Association, sub. 66, p. 17)

Stakeholder engagement will be important for ensuring that community expectations are properly understood and considered in future water management decisions and further water reform.

The water sector will need to be adaptive, responsive and innovative

The challenges outlined above mean that water managers in the future will likely have to manage reducing water resources in key parts of Australia while trying to meet demands from an increasing population for a wider range of water services. Those demands, coupled with scarce water resources, will require water managers to employ innovative practices to provide water for all needs — amenity, liveability, recreation and tourism — while at the same time ensuring that the provision of these services remains affordable. Or, as put by the Water Services Association of Australia (sub. 35, p. 13):

Overcoming the challenges in the urban water sector will require much more than business as usual. It requires action to, meet customer and environmental needs, achieve more efficient regulation that facilitates competition and innovation, better understand liveability and customer value, and improve adaptive planning, skills, culture, and risk management. Without change, these drivers will translate into higher than necessary water bills for customers, an erosion of taxpayer value in public utilities, and missed opportunities for innovation and efficiency.

3 Water entitlements and planning

Key points

- Water access entitlements and planning arrangements are the basis for allocating water resources among consumptive water uses (such as irrigation, industry, urban, stock and domestic) and the environment. They aim to promote water supply security, investment confidence and sustainable and efficient water use.
- Under the National Water Initiative (NWI) Agreement, States and Territories committed to establish water access entitlement and planning frameworks that adhere to specific principles on the basis this would optimise economic, social and environmental outcomes.
- The fundamental elements of the NWI framework are largely in place.
 - All jurisdictions (apart from Western Australia and the Northern Territory) have enacted legislation required to create secure, NWI-consistent water access entitlements.
 - Broadly NWI-consistent water planning arrangements have been put in place for the main areas of intensive water use across Australia and most jurisdictions have more than 80 per cent of water use managed under water plans.
- Entitlement and planning reforms have provided significant economic benefits and promoted more transparent and inclusive decision making.
 - These reforms have created legally-defined assets, which have offered individuals more choice and flexibility in managing their businesses, facilitated long-term investments, enabled structural adjustment and promoted environmental sustainability.
 - Clear and secure water access entitlements have also enabled water trading that can generate hundreds of millions of dollars in economic benefits each year.
- Water access entitlement and planning reforms should be maintained and improved. Key areas that warrant further attention include:
 - legislative reform in Western Australia and the Northern Territory to support statutory water access entitlement and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable
 - ensuring water entitlement and planning arrangements incorporate extractive industries
 - establishing contemporary water plan review processes that account for climate change
 - ensuring entitlement frameworks do not present a barrier to efficient investment in the development of alternative water sources and supply options
 - more work to recognise water requirements of Indigenous people for cultural purposes
 - establishing appropriate supporting arrangements where State and Territory Governments provide preferential water access to support Indigenous economic development.

Effective water resources planning and management is vital. It supports national economic prosperity, safe water supplies, and healthy river and groundwater systems. Governments play an important and extensive role in water resources planning and management ranging from administering laws governing how individuals may access and use water to providing water management services (such as information, research, on-ground works and operating water infrastructure). This chapter focuses on government involvement in establishing water access entitlements and planning frameworks.

While the precise approach in each State and Territory varies, the main function of water access entitlements and planning arrangements is to allocate water resources among consumptive water uses (such as irrigation, industry, urban, stock and domestic) and between consumptive uses and the environment. Water access entitlements provide water users with a right to extract water from a specific water resource. Water planning establishes and documents the management arrangements for specific water resources, including how much water will be available for extraction (consumptive use) and the rights and obligations of entitlement holders. These arrangements aim to promote water supply security, investment confidence and sustainable and efficient water use.

Under the National Water Initiative (NWI) Agreement, States and Territories committed to establish water access entitlement and planning frameworks that adhere to specific principles on the basis this would optimise economic, social and environmental outcomes. This chapter considers jurisdictions' progress in adopting NWI principles relating to water access entitlements and planning, and the realised benefits from implementing reforms, set in the context of water market reforms more broadly (section 3.1).⁵ It then considers areas that warrant further attention (sections 3.2 to 3.6).

3.1 Progress, benefits and where to next

Water entitlement, planning and market reforms have occurred over several decades

Before the 1980s, State and Territory Governments generally used administrative approaches to allocate water. Under these arrangements, governments handed out often ill-defined water rights based on land area and type of water use. This approach provided little incentive for efficient water use and had little regard for the adverse effects of water extraction and use on the environment.

Over the past three decades, rising demands on water resources, water scarcity in many parts of Australia and environmental degradation have raised awareness about the importance of managing water resources efficiently and sustainably. The first steps towards a more sustainable water management regime began in the 1980s when New South Wales, Victoria

⁵ Appendix B provides more detail on jurisdictions' progress in achieving the specific outcomes and objectives for water access entitlements and planning under the NWI.

and South Australia initiated state-based reforms (NWC 2011e). These involved the establishment of secure water access entitlements and the development of a market-based system of water allocation.

In 1994, the Council of Australian Governments (COAG) recognised water trading as a means of ‘maximising the contribution of water use to national income and welfare’ and agreed to establish a system of tradeable entitlements to allow water ‘to flow to higher value uses subject to social, physical and environmental constraints’ (COAG 1994, p. 2). Prolonged drought and extreme water scarcity in many parts of Australia in the 2000s reinforced the need to manage water resources efficiently and sustainably.

The move towards a market-based approach to allocating water (particularly in the Murray-Darling Basin (MDB)) has involved several actions, including:

- *establishing water planning processes* — developing processes for water managers, key stakeholders representing competing water uses and their communities to work together at the river valley scale to negotiate outcomes for each system
- *limiting total extractions and defining the consumptive pool* — through water planning, setting diversion limits for surface and groundwater systems to protect the environment and the rights of existing users, and creating a driver for water trading
- *clearly specifying water rights* — converting existing, ill-defined water rights into secure, long-term, tradeable entitlements, separate from land and providing a share of water for the environment (via the water planning processes)
- *facilitating water markets* — developing the rules for water trading and establishing water markets (including public entitlement registers and trading exchanges).

By the time jurisdictions agreed to the NWI in 2004, many had already made progress in reforming their water management regimes, including separating water access entitlements from land titles and making explicit provision for environmental water.

The NWI built on and extended previous reforms

The NWI built on earlier water reforms by adding more detailed commitments about water access entitlements (box 3.1) and water planning (box 3.2). The NWI also highlighted the need to manage groundwater and water-intercepting land use change (NWC 2014b). These issues had emerged as risks to the integrity of the entitlement system, which if not managed could undermine the value of nationally compatible arrangements in underpinning investment confidence (particularly in shared water systems).

Box 3.1 National Water Initiative: Water access entitlements

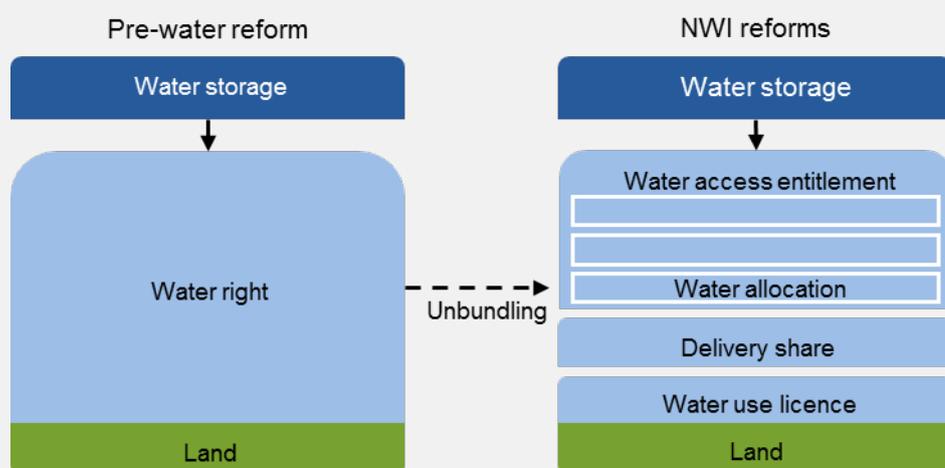
Water rights can be thought of as comprising several components including:

- *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.

In the past, many of these components tended to be bundled together within one licence, creating an impediment to water access entitlement trading and slowing down approval of trades.

The NWI requires water access entitlements for consumptive purposes to be separate from land and defined as a perpetual or open-ended share of the consumptive pool of a specified water resource, as determined by the relevant water plan (paragraph 28). It also requires that 'regulatory approvals enabling water use at a particular site for a particular purpose will be specified separately to the water access entitlement' (paragraph 30). However, the NWI includes provision for parties to the agreement to retain fixed-term or other types of entitlements such as annual licences under particular circumstances, including, for example, where the status of water resources is poorly understood, less developed, or both (paragraph 33). NWI signatories agreed to establish an ongoing process to assess the risks of expected development and demand on resources in poorly understood or undeveloped areas, with a view to moving these areas to a full entitlement framework when this becomes appropriate for their efficient management (paragraph 33).

'Unbundling' water access entitlements from ownership of land and other types of water rights (such as rights to use water at a particular site) can help facilitate water trading by allowing water users outside irrigation districts (for example, urban water users, environmental water managers and private diverters) to purchase water access entitlements independently of land. It can also allow irrigators to sell entitlements while maintaining access to infrastructure so they can opportunistically purchase seasonal allocations when that suits their water requirements (in addition to trading the entitlement itself, entitlement holders can trade the seasonal allocations).



Sources: NWC (2011b, 2011e).

Box 3.2 National Water Initiative: Water plans and water planning

Under the NWI, parties agreed to prepare statutory water plans for surface water and groundwater management units in which entitlements are issued. They agreed that it is up to each state to determine the need for water plans for specific areas based on an assessment of the level of development of water systems, projected future consumptive demand and the risks of not having a detailed plan. Parties also agreed on specific characteristics and components that would guide states in preparing water plans. For example, the NWI notes plans should include (among other things) consideration of environmental and other public benefit outcomes, Indigenous water use, water interception activities and the level of connectivity between surface and groundwater systems. It notes water planning processes are to include consultation, the application of the best available scientific knowledge, socioeconomic analyses and transparent consideration of use, environmental, cultural, and other public benefit issues.

The statutory nature of water access entitlements and water plans, which underpin extraction limits and water access entitlements, promotes supply security by providing legislative protection against arbitrary removal or attenuation of rights.

The fundamental elements of the NWI framework are largely in place

Overall, jurisdictions have made good progress implementing NWI reforms related to water access entitlements and planning frameworks.

- All jurisdictions (apart from Western Australia and the Northern Territory) have enacted legislation required to create secure, NWI-consistent water access entitlements.
- Broadly NWI-consistent water planning arrangements are in place for the main areas of intensive water use across Australia and most jurisdictions have more than 80 per cent of water use managed under water plans. Since 2014, the coverage of water plans has increased in several jurisdictions. For example, water sharing plans now cover 99 per cent of water extractions in New South Wales.
- In systems identified as overallocated or overused, pathways are being established and implemented and there is evidence of extraction returning to more sustainable levels. The most significant progress has been in the MDB where sustainable diversion limits have been set for the surface and groundwater systems within the MDB and governments are recovering water to meet these.

Most jurisdictions have largely achieved or, in the case of ongoing requirements, are largely meeting most of their NWI commitments relating to water entitlements and planning. However, there are still areas where further effort is required to meet the intent of the NWI. Table 3.1 provides a summary of the assessment of progress against outcomes and objectives of the NWI related to water access entitlement and planning frameworks as presented in appendix B.

Table 3.1 Assessment summary: Water access entitlements and planning

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Water access entitlements		
Legally defined (statutory) long-term share of the consumptive pool	Largely achieved	All jurisdictions (apart from Western Australia and the Northern Territory) have enacted legislation required to create secure, NWI-consistent water access entitlements.
Unbundled (into access, use, and delivery) where cost-effective	Largely achieved	Apart from Western Australia and the Northern Territory.
Apply to all major consumptive water uses (to the extent practical)	Largely achieved	Important exceptions include entitlement exemptions for extractive industries in the Northern Territory and Queensland.
Water plans^b		
Statutory	Largely achieved	Western Australia water allocation plans are not statutory.
Articulate trade-off decisions between economic, social and environmental considerations	Partially achieved	Areas for attention include balancing environmental and consumptive use in a changing climate.
Provide for adaptive management of surface and groundwater systems	Partially achieved	Fit-for-purpose monitoring, reporting and review of plans are needed to support adaptive management.
Water for environmental and other public benefit outcomes		
Statutory recognition and afforded the same level of security as consumptive uses	Largely achieved	Apart from Western Australia.
Tradeable (where held as an entitlement)	Achieved	Environmental entitlements are limited to the MDB and southern Victoria.
Addressing overallocation and overuse		
All overallocated and overused systems returned to sustainable levels of extraction	Partially achieved	There are still a number of systems identified as overallocated and / or overused. Some high use areas do not have finalised plans. Areas for improvement include establishing clearer timelines for returning systems to sustainable levels of extraction and implementing water plans and / or management arrangements in areas subject to high use or acknowledged as being under stress.
Assigning risks for changes in allocation		
Clearly established (through statutory instruments)	Partially achieved	Victoria has not clearly established a specific risk assignment framework. Tasmania and Western Australia are contemplating risk assignment frameworks, but are yet to undertake required legislative reforms.
Implementable and effective in providing certainty to entitlement holders	Partially achieved	There are still areas where risk assignment policies could improve understanding of changes in future water allocations.

(continued next page)

Table 3.1 continued

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Indigenous access		
Indigenous representation in water planning processes	Largely achieved	Most States and Territories — apart from Tasmania and Western Australia — have established and / or committed to specific mechanisms for engaging Indigenous people in water planning.
Identification of objectives for Indigenous people and strategies for achieving them	Partially achieved	Areas for attention include explicitly identifying Indigenous objectives, and how they will be achieved, in water plans as a matter of course, supported by monitoring and reporting arrangements.
Interception		
Significance of water intercepting activities assessed and effectively managed	Largely achieved	Important exceptions include extractive industries.
Integrating surface water and groundwater management		
Physical connectivity between groundwater and surface water assessed and managed	Largely achieved	While the number of water plans that fully integrate groundwater and surface water resource management remains small, the number of water plans that recognise connectivity between groundwater and surface water (including through linked groundwater and surface water plans) has increased substantially since 2004. Requires jurisdictions' continued commitment to building knowledge, funding and implementing appropriate monitoring, and adaptively managing systems where new information indicates that management is necessary.

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met. ^b In some jurisdictions (such as Victoria) the entitlement system provides the main statutory basis for how water is shared rather than plans.

The extent to which jurisdictions have implemented NWI-consistent entitlements and planning varies across states, regions and types of water source. This in part reflects the level of water resource development and level of knowledge of water systems (for example, limited knowledge about the effects of extraction on some groundwater systems presents significant challenges for implementing fully NWI-consistent entitlements). The Australian, State and Territory Governments (2017c) have developed the *National Groundwater Strategic Framework (2016–2026)*, which sets out a number of priorities relating to groundwater management, including improving understanding of groundwater resources to support optimal use, and improving access to information for decision making.

The reforms to water access entitlements and planning arrangements to date have contributed to Australia being recognised as a world leader in water management (OECD 2012).

Entitlement and planning reforms have provided economic benefits

The creation of secure property rights to water has been the cornerstone of improved water management in Australia. At the individual level, entitlement and planning reforms have created legally-defined assets, which irrigators and other water users can borrow against or trade. (In 2016, the total value of major entitlements types in the southern MDB was over \$13 billion (ABARES 2017)). The ability to borrow against and trade entitlements has offered irrigators ‘more choice and flexibility in managing their businesses in response to drought and seasonal conditions’ (Doolan 2016, p. 13) and facilitated longer-term investment planning, including decisions to change production or exit the industry (NWC 2011d). For example, a 2013 survey of New South Wales irrigators found 20 per cent of irrigators were using their water title as security over loans, suggesting lenders view entitlements as a secure financial asset (Fenton and Department of Trade and Investment (New South Wales) 2015).

At the community-wide level, clear and secure water access entitlements have enabled water trading that can generate hundreds of millions of dollars in economic benefits each year. Economic modelling undertaken in 2010 indicates that water trading in the southern MDB increased Australia’s gross domestic product by \$220 million in 2008-09 (NWC 2010b, p. v). The Australian Bureau of Statistics estimated that, during the drought between 2005-06 and 2008-09, gross value of irrigated agricultural production dropped by only 29 per cent, from \$5.5 to \$4.3 billion, while water availability dropped by 53 per cent (NWC 2011e).

The majority of participants to this inquiry agreed that water access entitlement and planning reforms have realised benefits for water users, including improvements in water use efficiency and productivity (particularly in the MDB where water markets have emerged) (box 3.3).

.... promoted more transparent and inclusive decision making

A central role of water planning is to articulate trade-offs that have been made between economic, social and environmental considerations in defining and sharing the consumptive pool (NWC 2012d). Water planning is a values-based process and, as such, there will be ongoing debate about whether decisions result in optimal allocation arrangements that balance present and future needs for all stakeholders. Nonetheless, robust and transparent planning processes have been vital in promoting public confidence in planning decisions.

Transparency is important in demonstrating that decisions draw on and use the best available science and socioeconomic analysis and that community values, including Indigenous social, spiritual and customary objectives, have been incorporated into the agreed objectives for the plan. (NWC 2012d, p. 5)

Box 3.3 Participant views on the benefits of entitlement and planning reforms

For irrigated agriculture, the establishment of secure property rights, particularly in the Murray-Darling Basin, has been a cornerstone that has underpinned much of the progress achieved as a result of the National Water Initiative. (National Farmers' Federation, sub. 55, p. 1)

A key piece of reform was the recognition of water entitlements as a property right (National Water Initiative). This recognition placed a value on water which has led to significant improvements in water use efficiency and productivity. (Murray Irrigation, sub. 16, p. 5)

Market reforms (including separate water title, cost-reflective pricing and trading) ... has driven water efficiency and allowed water to drive economic growth through going to its highest value use. (WWF Australia, sub. 15, p. 2)

The Murrumbidgee Regulated River Water Sharing Plan (WSP) is now in its second iteration and the development of the catchment's Water Resource Plan is underway. The WSP has supported continued investment in irrigated agriculture in the Murrumbidgee. (Coleambally Irrigation Cooperative Limited, sub. 46, p. 6)

The integration of environmental priorities into water management, primarily through explicit decision-making criteria, surety of allocations for environmental flows and the use of ecologically sustainable development as an underpinning paradigm, has been beneficial. Key institutional and policy innovations, such as environmental water regimes and water-holders, have assisted in ensuring that minimum ecological needs can be met. (National Environmental Law Association, sub. 69, p. 2)

A commitment to strong market reform principles, in particular through development of the NWI and the Murray Darling Basin Plan, has delivered strong efficiency, productivity and environmental benefits to Australia's agricultural sector. ... reforms initiated and delivered through the NWI have delivered significant benefits across water resource management, trading and environmental management outcomes. (Infrastructure Australia, sub. 50, pp. 1- 2)

Achievements relating to water planning and water plans over the past decade include:

- there are now over 150 water plans in place across Australia, covering the majority of water use across most jurisdictions
- in most cases, legislation governing water planning requires community engagement, the transparent development of water management arrangements and water plans that incorporate the best available information
- water plans now draw on community input, socioeconomic analysis and scientific information to establish the size of the consumptive pool and rules for extractive and environmental use
- hydrological, environmental, social and economic assessments are now undertaken routinely at the plan development stage to inform water planning arrangements
- engagement processes ensure stakeholders have the opportunity to provide informed input to planning arrangements, and this is considered in the development and review of planning objectives and arrangements to meet those objectives
- more recent water plans generally contain clearer and more measurable objectives and there has been a marked improvement in our knowledge of water system function and response (Appendix B; NWC 2014c).

... and contributed to improved environmental outcomes

Addressing concerns about the degradation of natural water systems due to water extractions was a key consideration when governments agreed to national water reforms in the 1990s. Estimating the extent to which entitlement and planning reforms have improved environmental and ecological outcomes (and how the community values these improvements) is complex. Much of these reforms have been about establishing the environment as a legitimate user of the resource and capping consumptive use, thereby protecting environmental values from further degradation. In overallocated systems, there has been a reallocation of water from the consumptive pool to the environment with the aim of stabilising and improving environmental outcomes. In such cases, measuring the effects of water reforms by comparing current environmental outcomes with those observed 30 years ago will lead to underestimates.

Despite this, it is generally considered that entitlement and planning reforms have contributed to reducing both current and future stress on systems as a result of water extraction and promoted a more sustainable approach to water management (box 3.3). Chapter 5 discusses environmental water management in detail.

DRAFT FINDING 3.1

Entitlement and planning reforms have provided economic benefits and promoted certainty through more transparent and inclusive decision making. They have also enabled a significant move towards improved environmental outcomes.

However, there are still areas where further reform and / or ongoing effort is required to meet the outcomes and objectives of the National Water Initiative. These include the failure of Western Australia and the Northern Territory to enact the legislation required to create secure, National Water Initiative-consistent water access entitlements.

Where to next?

Based on the areas of unfinished business from the NWI, and issues identified through consultations and research, the Commission has identified the following areas as warranting further attention:

- legislative reform in Western Australia and the Northern Territory to support statutory water access entitlement and planning arrangements, which provide for water access entitlements that are long-term, not tied to land, and tradeable
- ensuring water entitlements and planning arrangements incorporate extractive industries
- establishing contemporary water plan review processes that account for climate change
- ensuring entitlement frameworks do not present a barrier to efficient investment in the development of alternative water sources and supply options, such as stormwater, wastewater, and managed aquifer recharge

-
- more work to recognise water requirements of Indigenous people for cultural purposes
 - establishing appropriate supporting arrangements where State and Territory Governments provide preferential water access to support Indigenous economic development.

A number of participants to this inquiry highlighted the need to better integrate water planning and management with natural resource management planning processes. The Commission considers the integration of natural resource management with water planning is an important issue because the management of land within catchments can impact on both the quality and quantity of surface and groundwater resources. However, the Commission notes that significant work has been undertaken to revise the strategic directions of National Water Quality Management Strategy (including a focus on the integration of water quality and quantity in planning).

The Commission understands that this work is near completion and will culminate in the publishing of a new website (www.waterquality.gov.au) in 2017 which is expected to be released in the near future. The Commission intends to consider this issue further once this material has been released, but has examined one aspect of it — integrating the management of environmental water with waterway management — in chapter 5.

3.2 Progressing legislative reform in Western Australia and the Northern Territory

Statutory-based entitlements and planning arrangements that provide clear rights to water and facilitate water trade (where possible) have been fundamental to realising the benefits of water reforms in most jurisdictions. Despite it being well over a decade since Western Australia and the Northern Territory signed the NWI, neither has enacted legislation to enable NWI-consistent entitlement and planning arrangements.

Participants to this inquiry have raised concerns that delays in adopting and implementing legislative reforms in Western Australia and the Northern Territory are constraining economic activity in these jurisdictions and potentially undermining environmental outcomes. Several participants stressed that legislation to enable robust entitlements and planning in Western Australia and the Northern Territory is particularly important should plans to invest in major water infrastructure in Northern Australia go ahead.

While in many cases the supply of water in the north is currently meeting demand, long-term investments in many businesses requires long-term certainty over water supply. As development increases, statutory water planning arrangements provide users with a secure, legally-defined entitlement and transparency for everyone as to how water will be allocated.

Infrastructure Australia supports the Australian Government's Northern Australia *White Paper on Developing Northern Australia* commitment to providing new investments in water infrastructure to those projects where there is a commitment to accelerate water reform through the creation of secure water rights and statutory water plans.

For these reasons, governments should commit to ... Establish NWI-consistent entitlements underpinned by water resource assessments in priority catchments in northern Australia as quickly as possible. (Infrastructure Australia, sub. 50, attachment 1, p. 114)

The Commission concurs with these views and considers that the establishment of legislative frameworks to support NWI-consistent water access entitlement and planning arrangements should be a key ‘hurdle’ requirement in the processes for the consideration of Commonwealth funding for new infrastructure (chapter 7).

Western Australia should develop new legislation to enable statutory-based entitlements and planning

Western Australia’s current legislation does not meet several NWI requirements relating to water access entitlements and planning frameworks. Water access entitlements are not perpetual and usually have a life of 10 years. A single licence combines the approval of a user’s water volume, works to take water, and use of water.⁶ Water management rules (water allocation limits, water allocation plans and water trading rules) are non-statutory (DOF (WA) 2013).

There is growing recognition that Western Australia’s current water laws and management practices need to change. The Pastoralists and Graziers Association of Western Australia recently noted that the lack of long-term licences affects the owners’ ability to undertake investments:

Licensing regimes in Western Australia do not follow the provisions of the National Water Initiative as no perpetual licenses have been issued in this state. This water allocation is a property right and the fact that there is no continuity of access affects the owner’s ability to forward plan or borrow funds for expansion. (2016, p. 6)

The current water laws, some of which are over 100 years old, are difficult and expensive to administer and unnecessarily slow down licensing and water trading (DOF (WA) 2013; DOW (WA) 2017). Further, there is a range of growing pressures on water resources in Western Australia, such as greater competition for water and declines in water availability due to a changing climate, that require more sophisticated water management practices.

In recent years, Western Australia has developed and consulted on a proposed water reform framework (including draft legislation) that provides for statutory water plans and allocation limits. The framework also provides for the introduction of perpetual and tradeable water access entitlements in areas covered by statutory water plans, and reduced trading and licence processing costs. There was a change of government in Western Australia in March 2017; the new Government is currently considering progressing new water resources legislation, of which statutory plans are a component (appendix B).

⁶ Licences must be amended whenever there is a trade. Every application for a new licence or trade must be fully assessed against all assessment criteria, irrespective of risk and the relevance of criteria.

Western Australian Government analysis suggests that reforms to establish more robust entitlement and planning arrangements would likely have significant benefits, for comparatively little cost (box 3.4). For example, it found even minor improvement in the economic value of water resources in Western Australia from better management would justify action, even taking into account the likely costs of this action.

Box 3.4 Prospective benefits of legislative reform in Western Australia

Western Australian Government analysis (undertaken in 2013) and subsequent policy development work have identified a range of potential benefits from establishing more robust entitlement and planning arrangements, including statutory allocation plans. These included: improved definition and exclusivity of entitlements, reduced transaction costs (making licence and trade processing more efficient); and, reduced regulatory risk (statutory water allocation plans, allocation limits and trading rules provide greater legal certainty that decisions will be made in accordance with agreed rules).

It also identified an opportunity to implement efficient assignment of risk, noting an ‘unintended and inefficient consequence of existing regulation is that government may be liable for compensation if climate change results in water shortage’ (DOF (WA) 2013, p. 9).

With respect to the scale of net benefits associated with reforms, the analysis noted:

While the low cost of the reforms means that their net benefits are positive and are likely to be significant, the actual size of benefits will vary substantially between each individual water resource, depending on future economic and climate circumstances, the investment decisions of water users, future emerging water demands and other factors.

MJA [Marsden Jacob Associates] (2012a) estimated the present value of the groundwater resources of the Gngangara Mound to be \$6.7 billion. Using a similar methodology to that used in MJA (2012a), the present value of all water resources in Western Australia allocated for consumption could be estimated as being greater than \$35 billion. These figures should be treated as indicative, but suggest that reform would only need to produce a minor improvement in the economic value of water resources to justify action. (DOF (WA) 2013, p. 10)

With respect to the cost of introducing a new water access entitlements regime, the analysis noted:

Approximately 15,000 users would face costs of installing meters (about \$4,000 each), phased in over the next five to ten years.

The Department of Water is already developing new information systems to better administer water management and licensing at a total cost of \$13.6 million. These systems are being designed to accommodate future potential reforms. (DOF (WA) 2013, p. 10)

While this quantitative analysis was preliminary and based on a specific reform option, it provides some insight into the scope for improvements in water management.

In the Commission's view, the Western Australia Government should progress legislative reforms as a matter of priority. There is a clear need for more robust water management arrangements to protect water supply security for the environment and consumptive users, particularly in high use areas of Western Australia.

The Northern Territory should also progress legislative reforms

In the Northern Territory, the *Water Act 1992* (NT) provides for statutory water licences and the development of water allocation plans in declared water control districts, but does not address several NWI requirements. Water licences are issued at the point of extraction (bore or river pump) and commonly only issued for 10 years at time (but can be renewed).⁷

Historically, legislative reforms to facilitate NWI-consistent entitlements in the Northern Territory (such as allowing for unbundled and / or perpetual entitlements) have been seen as a low priority. This reflects a view that many water resources in the Northern Territory are relatively undeveloped and water users therefore consider there is little risk to their historical levels of water extraction due to increased competition for the resource (National Farmers' Federation, sub. 55). Another explanation is that the Northern Territory agencies have had to focus their efforts on improving understanding of resources and developing and implementing water allocation plans.

The National Water Commission (NWC) and participants to this inquiry have countered these arguments against entitlement reform in the Northern Territory. For example, the NWC (2011d) observed that unbundling has wider benefits beyond facilitating trade that may justify reform (such as increasing legal security of title for users and promoting transparency). It also argued that establishing robust water access entitlement frameworks may itself increase demand for water trading. The National Farmers' Federation (sub. 55) similarly argued that establishing robust water access entitlement and planning frameworks will allow water markets to emerge as demand grows.

There are signs that demand for trade is increasing. The Northern Territory Department of Environment and Natural Resources advised that demand for trade is 'anticipated to change in the next 6 to 12 months as systems become fully allocated ... and as the focus on resource development to support the developing economy gains further momentum' (DENR (NT), pers. com., 13 June 2017).

Like Western Australia, the Northern Territory has developed and consulted on possible reform options in recent years. In 2014-15, the (former) Northern Territory Government commenced public consultation on the development of a strategic water policy through the

⁷ The Northern Territory Department of Environment and Natural Resources advised that, in May 2016, it revised its Water Allocation Plan template to provide for a uniform approach to planning content and presentation and stakeholder input to ensure compliance with the National Water Initiative (DENR (NT), pers. com., 13 June 2017).

release of the *Our Water Future* discussion paper.⁸ However, this was not endorsed before a change in government in August 2016. Currently, the Northern Territory Government's positions on some legislative and policy options remain under consideration.

The Commission considers that the Northern Territory should progress legislative reforms to support statutory-based entitlements and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable. A broad legislative review to better align the *Water Act 1992* (NT) with the principles of the NWI would help facilitate such reforms as it would enable a more holistic view of how different aspects of the Act would work together. For example, a change in policy and legislation has also been flagged as necessary in the Northern Territory if water is to be allocated through market mechanisms (Northern Territory Government 2015).

Further, establishing clear and secure entitlement and planning regimes that support trading in fully allocated systems in the Northern Territory (and Western Australia) would eliminate the need for 'use it or lose it' policies, which require entitlement holders to use their water allocation over a specified period, or the entitlement can be reduced or forfeited (appendix B). As the market value of entitlements or allocations increases, people with previously unused entitlements will have a strong financial incentive to either use the water or sell (NWC 2011c).

3.3 Incorporating extractive industries into entitlement and planning arrangements

Under the NWI, parties agreed that entitlement and planning frameworks would provide for statutory-based entitlements to create secure property rights to water. The NWI requires that water access entitlements be separate ('unbundled') from land, exclusive, mortgageable, tradeable, and defined as a perpetual or long-term right to a share of the water available for consumption in a given system. However, under paragraph 34 of the NWI parties agreed that:

there *may* be special circumstances facing the minerals and petroleum sectors that will need to be addressed by policies and measures beyond the scope of this Agreement. In this context, the Parties note that specific project proposals will be assessed according to environmental, economic and social considerations, and that factors specific to resource development projects, such as isolation, relatively short project duration, water quality issues, and obligations to remediate and offset impacts, may require specific management arrangements outside the scope of this Agreement. [emphasis added]

⁸ The discussion paper was accompanied by regional public consultation sessions, and targeted consultations across advocates and representative groups including those representing industry, environment and Aboriginal interests and Northern Territory and Australian government agencies. Sixty-one written submissions were received (DENR (NT), pers. com., 13 June 2017).

The intent of special provisions for extractive industries under paragraph 34 in the NWI was to provide flexibility in entitlement and planning arrangements to recognise the nature of those industries' water extraction requirements. For example, mine dewatering can sometimes lead to difficulties in predicting takes and managing impacts (NWC 2014c).

Since 2004, the growth of extractive industries, such as the mining, petroleum, and unconventional gas⁹ industries, has increased competition for water resources with other consumptive users in many parts of Australia (box 3.5) (NWC 2014c). This growth has increased community interest in the effects of these industries on water resource security and the measures in place to manage any adverse effects (NWC 2014c, 2014f).

There have also been concerns that — in attempting to recognise the special circumstances that may arise in extractive industries — paragraph 34 has provided too much scope for interpretation and resulted in alternative water rights arrangements that run counter to the intent of the NWI. In 2014, the NWC noted:

... [in] some areas, alternative policies and measures have led to preferential arrangements over other water users and the environment. This has reduced confidence in the water planning system to safeguard other users' access to water and the long-term sustainability of the resource (2014f, p. 1)

While jurisdictions have taken steps to incorporate extractive industries into entitlement and planning arrangements, alternative water rights arrangements still apply to extractive industries in some cases (box 3.6). For example:

- mining and petroleum operations in the Northern Territory are exempt from entitlement requirements under the *Water Act 1992* (NT)
- in Queensland, limited statutory water rights apply to incidental water take or 'associated water' for petroleum, gas and mining production, which operate outside of the state's water access entitlement and planning framework
- in Western Australia, state agreements for major mining projects can override some legislation such as the *Rights in Water and Irrigation Act 1914* (WA)
- in South Australia, permits may be used to manage some aspects of water interception and extraction but permits do not directly control volume.

Participants to this inquiry raised concerns about the use of alternative water management arrangements for extractive industries. For example, the Wentworth Group (sub. 40, p. 4) argued:

Exemptions granted in the 2004 National Water Initiative, particularly for the mining and petroleum sectors, depart from principles underlying the national framework and compromise the ability to address cumulative impacts of water extraction, placing entire groundwater and interconnected surface water systems at risk.

⁹ Includes coal seam gas, shale gas and tight gas.

Box 3.5 Water use by extractive industries

While mining industries only account for approximately 4 per cent of water consumption nationally, this figure is higher in jurisdictions such as Western Australia (30 per cent in 2014-15) and the Northern Territory (14 per cent in 2014-15), and specific regions (though data at the regional scale are patchy). Within the mining industry, iron ore and other mining was the biggest user of water in 2014-15 (see table below).

Water consumption by mining industries, 2014-15

<i>Mining industries</i>	<i>Volume (GL)</i>	<i>Per cent</i>
Coal mining	129	17
Oil and gas extraction	46	6
Iron ore and other mining	533	69
Exploration and other mining support services	60	8
Total mining	768	100

Compared with conventional gas operations, coal seam gas (CSG) production requires the extraction of large amounts of water. In Queensland's Surat Basin, water extraction for CSG production increased from 12 gigalitres (GL) per year in July 2013 to 59 GL per year in July 2015, while conventional gas production decreased from 1.8 GL per year in 2012 to about 1 GL per year in late 2014 (DNRM (Qld) 2016h). Some of the extracted water is treated and reused. Water use for CSG production is expected to increase — there were 4600 production wells in the Surat Basin in January 2015 and about 13 500 expected by 2030 (DNRM (Qld) 2016h).

Sources: ABS (*Water Account Australia, 2014-15*, Cat. no. 4610.0); (DNRM (Qld) 2016h).

The Department of Agriculture and Water Resources (sub. 73, pp. 2–3) noted the potential for special provisions provided for under paragraph 34 of the NWI to inhibit trading:

... although the NWI allows parties to have different arrangements for the minerals and petroleum sectors (para. 34), we encourage the Commission to consider the resulting missed trading potential. For example, mines are typically a net user of water in their early years, but after this have the potential to become net providers of treated mine water. If statutory-based water planning is able to be implemented nationally, taking full account of all industries that use water as an input, then there is the potential for greater long-term investor confidence in the water sector.

The National Farmers' Federation (sub. 55, p. 5) argued:

For community 'social license' and other water user confidence in entitlements, clearer trigger points for a cessation of resource sector activity is required where unacceptable impacts on other water users are occurring. This is most transparently achieved when these uses are fully integrated into the water planning process. Evidence needs to be provided by the administering state that the alternative policies and measures under s34 of the NWI are delivering better water management outcomes than including such uses directly in the water planning framework.

Box 3.6 **Jurisdiction arrangements for extractive industries**

New South Wales: under section 60I of the *Water Management Act 2000* (NSW), mining activities require a licence for any water taken as part of those activities.

Victoria: extractive industries are required to obtain a take and use licence to secure water access, either from the market or via a new entitlement in areas where unallocated water exists.

Queensland: Limited statutory water rights apply to incidental water take or ‘associated water’ for petroleum, gas and mining production. These rights operate outside of Queensland’s water access entitlement and planning framework. Exercising these rights is conditional on underground water obligations, which include preparation of an underground water impact report and the requirement to enter ‘make good’ agreements with landholders whose water bores are affected. Water access entitlements are required for non-incidental take or ‘non-associated water’ use. Water rights for some mining companies are specified in special agreement Acts.

Western Australia: Western Australia’s water licensing framework applies to water taken by extractive industries, with further guidance on licensing requirements and conditions outlined in government guidelines. Although state agreements for major mining projects can override some legislation such as the *Rights in Water and Irrigation Act 1914* (WA), most agreements specify that requirements of this Act must be met. The *Collie Coal (Western Collieries) Agreement Act 1979* (WA) is one exception (Gardner 2013).

South Australia: Mining and petroleum operations require a water licence where they take water from a prescribed water resource (many mines are outside of prescribed resource areas). In areas outside of prescribed areas, the *Natural Resources Management (NRM) Act 2004* (SA) (s. 127) allows for control of water take through regional NRM policies which can manage some aspects of water interception and extraction through water affecting permits, but normally do not directly control volume. The exception is the Alinytjara Wilurara NRM Plan which does directly control the actual take of water. Licences are not required for water used to drill petroleum and gas wells for exploration purposes; instead these activities are authorised by the Minister for Sustainability, Environment and Conservation under section 128 of the NRM Act.

Tasmania: Mines are required to have a licence under the *Water Management Act 1999* (Tas) to take water from for a watercourse or lake but groundwater does not require a licence unless specified under a water management plan or a Groundwater Area.

Northern Territory: Mining and petroleum operations are exempt from water licence and permit provisions under section seven of the *Water Act 1992* (NT). Currently, a memorandum of understanding seeks to clarify the relationship between relevant agencies with the aim of ensuring water resource use for mining purposes does not impinge on existing allocations for other uses and vice versa. The Northern Territory Government has announced amendments to the *Water Act 1992* (NT) which will require all new and increased water use by mining and petroleum activities to be subject to the same water licensing requirements as other water users from 2018 onwards. The amendments have not yet been passed.

Sources: Gardner (2013); NWC (2014f, 2014c); Queensland DNRM (2016a), Responses to State and Territory information requests.

Jurisdictions should re-examine the need for alternative water rights arrangements for extractive industries

Incorporating extractive industries into entitlement systems — where this has not occurred already — presents a number of benefits, including:

- promoting transparent accounting for water use by extractive industries (and confidence in the integrity of the entitlement system)
- providing incentives for water to be allocated to higher values user by enabling water trading to occur.

In the Commission’s view, the growth of extractive industries has substantially increased the size of these potential benefits. On this basis, jurisdictions should re-examine the rationale and ongoing need for entitlement exemptions or other special arrangements for extractive industries. The Northern Territory Government has announced amendments to the *Water Act 1992* (NT) to remove current entitlement exemptions for mining and petroleum industries. The Commission considers this is promising but notes the amendment has not yet been passed, and further information is required about implementation and the costs to form a more definitive conclusion (box 3.7).

As recognised by the NWI, applying blanket rules that extractive industries must always obtain an entitlement may not be practical in all cases. For example, the Minerals Council of Australia (2013) has noted that incidental water take by mining is not necessarily within the control of the mining operations (in contrast to water used by other water users). Hence, it may be difficult for industries to comply with their entitlement obligations that specify a volumetric limit. In these circumstances, the key issue is whether the alternative water management arrangements are consistent with ensuring the security of entitlements of other water users in shared water resources and promoting investor confidence.

This issue is demonstrated in Queensland where extractive industries (petroleum, gas and mining operations) access water through statutory water rights for incidental take or ‘associated water’, which the Queensland Department of Nature Resources and Mines defines as ‘water removed as an unavoidable consequence of resource extraction’ (DNRM (Qld) 2017a, p. 1) (box 3.8). On the one hand, the NWC and others have expressed concern that (statutory) underground water rights lack transparency, limit the capacity of water planning to sustainably and transparently manage all water use, and potentially compromise access to water for other users and the environment. On the other, the challenges associated with incidental take or associated water are arguably part of the reason why paragraph 34 was included in the NWI in the first place.

Box 3.7 Exemptions for extractive industries in the Northern Territory

The Northern Territory Government has indicated that it intends to amend the *Water Act 1992* (NT) to remove current entitlement exemptions for mining and petroleum industries.

Removing current entitlement exemptions for mining and petroleum activities in the Northern Territory would promote more transparent management and accounting of water use by such activities. For example, the 2013 water planning report card noted ‘while allocations for mining and petroleum take may be considered and accounted for under the NT water allocation planning process, the arrangements for doing this and regulating mining take to safeguard existing users and the environment is not transparent’ (NWC 2014d, p. 512). The Northern Territory Department of Environment and Natural Resources (DENR (NT) 2017c, p. 7) recently acknowledged there is ‘limited public visibility on water allocations and use by the mining and petroleum industry compared to other water users’. Transparent management and accounting for shared water resources is becoming increasingly important to ensure public confidence in the integrity of water access entitlement and planning arrangements. While there has been limited competition between extractive industries and other water users in the past, the likelihood of conflicts appear to be increasing (NWC 2014c).

While there is currently limited information on the costs of proposed changes on industry, the Australian Petroleum Production and Exploration Association recently noted:

The industry fully supports the removal of the Water Act 1992 (NT) exemption, provided that this does not lead to a duplication of regulation by both the DPIR [Department of Primary Industry and Resources] and Department of Environment and Natural Resources. (2017, p. 43)

Based on available information the Commission considers that the Northern Territory Government’s plans to amend the *Water Act 1992* (NT) to remove current entitlement exemptions for mining and petroleum industries are promising. However, further information is required about implementation and the costs to form a more definitive conclusion.

Where governments deem that it is not cost-effective to require extractive industries to obtain a water access entitlement (on the same basis as other water users), it is important that water users have confidence that alternative water rights arrangements are robust and that there are measures in place to address any risks to their entitlements and to the environment. In the Commission’s view, considering the management of water use by extractive industries through transparent water planning processes provides a more effective means of doing this than relying on separate, and in some cases non-transparent, management arrangements.

As noted by the NWC, the intent of the NWI has always been for entitlement and planning arrangements to address the needs of all water users; however, the NWI initially focused on high volume users in agricultural, industrial and urban sectors (NWC 2014f). To reflect the increased significance of water management issues associated with extractive industries since 2004, the Australian, State and Territory Governments should amend relevant provisions in the NWI to explicitly deal with these issues and outline guiding principles that ensure ongoing confidence in entitlement and planning arrangements.

Box 3.8 Statutory rights to ‘associated water’ in Queensland

In Queensland, limited statutory water rights apply to incidental water take or ‘associated water’ for petroleum, gas and mining production. These rights operate outside of Queensland’s water access entitlement and planning framework. Exercising these rights is conditional on underground water obligations, which include preparation of an underground water impact report and the requirement to enter ‘make good’ agreements with landholders whose water bores are affected. While these arrangements have applied to the petroleum and gas sector for some time, they were only extended to mining in December 2016 — thereby removing the requirement for mining operations to hold a water entitlement for ‘associated water’.

A common concern about statutory rights for associated water take is that planners may be less able to manage the resource as a whole because the rights do not have volumetric controls and sit outside of entitlement and planning arrangements. The National Farmers Federation noted that:

Under recent state reforms, non-associated water takes for the petroleum and gas sector in Queensland are required to be measured and licensed, however further integration of associated water takes into the planning framework are needed. This is challenging as associated water use (including end of mine life evaporative losses) is subject to a statutory right to take those volumes necessary to safely access the resource (sub. 55, p. 5).

The EDOs of Australia (sub. 64, p. 4) noted failure to fully account for water take, including incidental groundwater take in mining activities, ‘is a significant threat to the sustainability of water use and the environment and industries that rely on it’.

Foreshadowing statutory rights to water for miners in Queensland, the NWC noted in 2014:

... there is a risk that the water planning process may not adequately identify the magnitude of the impact of these intercepting activities on the water resource, other licenced users or on environmental assets. Further the proposed changes to mining water rights outlined in the Regulatory Impact Statement would be a move away from the principles of the NWI. (2014f, p. 9)

Past NWI assessments have noted that ‘Queensland is of the view that NWI paragraph 34 is applicable to “associated water” use for the resources sector’ (NWC 2014c, p. 249). More recently the Queensland Government advised that there are measures in place to address potential impacts on other users:

The Water Reform and Other Legislation Amendment Act 2014 [WROLA] underground water management framework commenced on 6 December 2016. [The Queensland] government strengthened this framework through the Environmental Protection and Other Legislation Amendment Act 2016 (EPOLA). EPOLA clarifies that in future, a mine’s impacts on groundwater will be thoroughly assessed when assessing an environmental authority (EA). The limited right to take associated groundwater by mines (established by WROLA) will apply only once a mine has obtained its EA and mining tenure. ... The take of associated water although not volumetrically limited, it is limited by the purpose. Additionally, mining tenure holders are required by law to measure and report the take of associated water on an annual basis. (DNRM (Qld). pers. comm., 1 June 2017).

The Queensland Government commissioned a cost-benefit analysis of reforms to extend statutory water rights to ‘associated water’ (and related obligations) to mining, which was released in 2014. The analysis found the proposals to give mining operations a statutory right to take associated water would have a net loss of \$4.2 million over 10 years (MJA 2014, p. 16). However, the report cited a range of key costs and benefits that had not been quantified. Key unquantified costs included ‘industry concerns over the potential impact on their “social licence to operate”’ (MJA 2014, p. 16). Key unquantified benefits included ‘greater certainty of access to water for industry’ and ‘greater certainty about Make Good Arrangements for the community, including statutory dispute resolution processes’.

3.4 Balancing environmental and consumptive use in a changing climate

Water planning is the process where trade-offs are made by communities and stakeholders between economic, social and environmental considerations in sharing the available water resources. How much water is extracted for consumptive use and how much is left in the environment greatly influences the benefits that the community derive from water resources. Water allocated for consumption provides for towns, industry and irrigation. Irrigators, miners and other industries obtain value from water by using it to produce food and other goods and services. On the other side, water plays an important role in maintaining healthy rivers, wetlands and floodplains, and sustainable populations of the fish, birds and other wildlife that depend on them. People value these outcomes for a range of reasons — because they think it is important that these ecosystems continue to exist, they enjoy spending time in natural environments and also because their consumptive use of water could be threatened by deteriorating environmental health.

For these reasons, difficult trade-offs are unavoidable when setting the balance between environmental and consumptive use of water. As argued in previous reports, it is the Commission's view that the balance should reflect the relative values that the Australian community places on environmental, social and economic outcomes (PC 2010, p. xxxi). To achieve this it is necessary to take a long-term view that ensures the sustainability of high value environmental assets and ecological processes.

The NWI commits governments to achieving an appropriate balance between environmental and consumptive use through water planning, and through recovering water in overallocated systems (that is, systems where it was decided that the balance should be altered). The progressive implementation of NWI-consistent water planning and entitlement arrangements has resulted in sharing of water between the environment and consumptive use being:

- more transparent — water plans generally set environmental and consumptive use objectives and allocate water to meet them, including specifying how water will be shared under wet and dry conditions
- better informed — scientific assessments (for example, of the watering requirements of ecosystems), socioeconomic assessments and community consultations inform the process
- more secure — in the past the amount of environmental water could be highly uncertain, depending on rainfall and the extent to which users exercised their water rights.¹⁰ Under current arrangements water use is capped and the security of both environmental and consumptive use water is explicitly considered and legally protected.

¹⁰ Where water users take less water than they are entitled to, a water system could be overallocated without there being overuse. In such a situation the level of consumptive use might not be putting undue stress on the environment, but this is an unstable outcome that could easily change in an uncontrolled way.

These arrangements should ensure that, provided water planning frameworks are maintained (and extended where necessary), relatively undeveloped water systems should not become overallocated and overused in the future. For highly developed systems, capping water use has generally prevented overallocation from becoming worse and, in some cases, governments have recovered water for environment so as to set a new balance. Within the MDB, the Australian Government has taken responsibility for funding water recovery. In many cases, the recovery of water in overallocated systems has proven to be highly contentious, but despite this a considerable amount of progress has been made.

Jurisdictions have been undertaking water planning processes for at least 20 years and as a result, most jurisdictions now have more than 80 per cent of water use managed under water plans. Water plans are subject to review processes — often every 10 years — and many are due for review in the near future. A key question that has arisen is how should climate change be taken into account in the process and when should the balance between consumptive and environmental use be revisited. It is important that there is clarity so that water users are able to plan and invest without facing unnecessary uncertainty about how much water will be available to them.

As outlined in chapter 2, parts of southern Australia have already experienced a decline in rainfall and run-off, and further declines are projected due to climate change. There is greater uncertainty about future trends in rainfall for other regions, with shifts to a drier or wetter climate being possibilities.

Many submissions discussed the implications of climate change for water planning. For example, WWF Australia argued:

As it will potentially reduce the availability of water for consumptive purposes, the effect of climate change on the reliability of the nation's water resources must be fully considered under state and national water resource planning frameworks. (sub. 15, p. 3)

The National Irrigators' Council view was that the impact of climate change was too poorly defined at a local or catchment level to be incorporated into specific local planning, but that:

It must be clear that the risk of climate change is shared by all those impacted and not borne only by the agricultural sector. Irrigators, in many systems already bear this risk through the annual allocation process. (sub. 13, p. 12)

In discussing climate variability and climate change, Horne et al pointed out that:

... in many systems where existing environmental allocation mechanisms are in place (i.e., caps or conditions on license holders), if there is a step shift in the overall water available in the system, the reduction in water availability will not be evenly shared between the environment and consumptive water users. (sub. 23, p. 3)

One recent development is that Australian, State and Territory Governments have developed a module to the NWI policy guidelines for water planning and management titled *Considering climate change and extreme events in water planning and management*. This module contains useful information on regional climate projections, tools that can assist

planners to understand the associated risks, and approaches to incorporating climate change into water planning (such as making sure that planning cycles are short enough for new knowledge to be incorporated effectively and supporting an active trading market to enable water users to manage their own risks). As well as water resource planning, the module also covers water supply planning, for example, through material on diversifying towards water sources that are less climate dependent, such as stormwater reuse and desalination (Australian, State and Territory Governments 2017a).

The module only briefly considers setting the balance between environmental and consumptive use of water in the presence of climate change — in the Commission’s view this should be taken further. There are three important aspects to this as discussed below.

First, it should be recognised that an ongoing reduction in water availability changes the trade-offs between environmental and consumptive use of water, meaning that the balance may need to be reconsidered. Failure to do this would risk the balance becoming out of step with what is in the best interests of the community overall. In making these trade-offs it should not be assumed that the environmental objectives that were originally set in water plans remain appropriate for a drier climate (as might be assumed under some interpretations of environmental sustainability). This is because the feasibility of achieving those objectives could be significantly reduced under a drier climate and the cost of addressing this, if possible at all, will be high as increasingly scarce water would have to be reallocated from the consumptive pool.

Accordingly, setting the balance that is in the best interests of the community overall might entail revising environmental objectives, for example, by accepting that some wetlands and streams will transition to a different flow regime under a drier climate. Of course other things may have changed in the interval between plan reviews that also need to be taken into account. For example, there might be better scientific information available on the watering needs of ecosystems or the importance that the community places on environmental outcomes might have changed (over recent decades it has undoubtedly gone up). Furthermore, an ongoing reduction in water availability will have consequences for consumptive uses as well, with some potentially no longer being able to be met. The key issue is that under a drier climate, at some point, the current agreed balance may no longer meet the objectives set for either the environment or consumptive users.

Second, any process for reviewing the balance could reopen contentious debates and reduce confidence in the security of the entitlement system for both consumptive users and environmental managers. Given this, any substantial rebalancing due to climate change should only occur when there is clear, robust evidence to show that there has been a permanent reduction or change in the available resource. This means there needs to be a clear process for gauging whether there has been a change in water availability that warrants the balance being revisited. One possible approach would be to simply rely on scheduled water plan reviews. That is, to consider recent and projected hydrological trends, along with other relevant information during the review. However, these are often scheduled to occur every

10 years, which is potentially too short a period to make such an assessment and could create a high degree of uncertainty every time a plan was reviewed.

An alternative would be to have a separate process that assesses water resources on a regular basis and identifies when predefined triggers for reconsidering the balance have been reached. The advantages of this are that it allows the issue to be considered at the appropriate scale (likely broader than an individual water plan area) and on a purely technical basis using objective criteria. Information could be provided regularly to water users on short, medium and long-term probability of water availability. Once the trigger was reached, the appropriate new balance would be decided upon through an open consultative process, such as the next water plan review. Victoria has a process of this type and there would be merit in other jurisdictions considering introducing something similar.

Such a system would enable water plan reviews to be undertaken in a context where the scope of the review is clear. If the trigger has not been met, then the current set of environmental and consumptive objectives are used as the basis for the review. In this case, the Commission considers the review should aim to improve optimisation of water use and system operation across all uses to meet these objectives, including through explicit consideration of Indigenous cultural values and adequate community and stakeholder engagement. Where the trigger is met, then the water plan review is about fundamentally resetting objectives and the balance between consumptive and environmental use to suit a drier climate. This level of clarity will reduce uncertainty for stakeholders and investors and water managers.

Finally, there needs to be clarity on who bears the risks for any future declines in the availability of water for consumptive use due to any change in the balance set in water plans. Approaches to risk assignment vary across jurisdictions as outlined in appendix B. In some cases there may be a need for jurisdictions to provide additional information for entitlement holders that clearly sets out how their approach to risk assignment will apply to any changes in the balance between environmental and consumptive use.

3.5 Property right arrangements for alternative water sources

Entitlement frameworks in Australia have focused predominately on surface water and groundwater. Property right arrangements for wastewater and stormwater have been given much less attention because this water has traditionally been seen as a problem to be managed, rather than as a potentially valuable resource. However, this situation is starting to change as interest in water recycling and integrated water cycle management increases.

To be effective and efficient, property right arrangements for alternative water sources need to:

- provide an appropriate degree of certainty to support investment in facilities that use alternative water sources

-
- protect other water users from being adversely affected by the activities of those utilising alternative water sources
 - not be unnecessarily costly to introduce and administer.

In some cases, these criteria can be met through relatively simple arrangements because there is little competition for the resource or potential for adverse third-party effects from it being accessed. For example, the Queensland Farmers' Federation reported:

There are case examples in many parts of the state where alternative sources of water have been made available for irrigation as separate water products. These cases include treated CSG [coal seam gas] water, recycled water and plant waste water recovery. These projects appear to be working well under contractual arrangements without the need for a water entitlement process. (sub. 61, p. 3)

Similarly, simple arrangements may also be appropriate to support investments in wastewater recycling facilities in areas where the proportion of urban wastewater being recycled is low. However, to ensure that project proponents are able to negotiate reasonable access arrangements, there may be merit in introducing a legislated access regime, for example, as the New South Wales Government has done through the *Water Industry Competition Act 2006* (NSW) (chapter 6).

In other cases, competition for the resource and / or potential third-party effects will be more important, and a solution that involves bringing the alternative water resource within entitlement frameworks might be worth considering. This is most likely to occur where the water from an alternative source is mixed with water sources that are covered by existing entitlements, as can occur with managed aquifer recharge.

Managed aquifer recharge is the process of deliberately injecting water into a groundwater aquifer for recovery at a later time, often at another location that has access to the same aquifer. Sources of supply for managed aquifer recharge projects include stormwater and treated wastewater. Central NSW Councils argued:

MAR [Managed aquifer recharge] currently does not fall into the water entitlement process and needs to if Government wants it to be considered by Water Authorities as a viable alternate water source for the future. (sub. 70, p. 7)

For managed aquifer recharge projects to proceed there is a need for:

- rights to inject water into the aquifer that protect other water users from the water becoming polluted
- rights to store water in the aquifer that ensure that the storage capacity limit of the aquifer is not breached
- rights to extract water from the aquifer that are fair to both the project proponent and other water users (Frontier Economics 2008).

It is this latter right that most clearly intersects with entitlement frameworks. The key issue is that without arrangements in place to allow for extraction, any water injected into the

aquifer would add to the pool available for all groundwater users. This would undermine the incentive for any party to invest in a managed aquifer recharge project.

In some situations a suitable arrangement would be to allow the managed aquifer recharge proponent to extract the same volume as they inject. However, where injection and storage increases flows out of the aquifer there may be a need to apply a loss factor, such that the extraction limit is less than the injected volume.

DRAFT RECOMMENDATION 3.1

State and Territory Governments should ensure that entitlement and planning reforms are maintained and improved.

Priorities are:

- a. Western Australia and the Northern Territory should establish statutory-based entitlement and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable
- b. State and Territory Governments should ensure that water entitlement and planning arrangements explicitly incorporate extractive industries, such as by ensuring entitlements for extractive industries are issued under the same framework that applies to other consumptive users unless there is a compelling reason otherwise
- c. State and Territory Governments should develop a process to regularly assess the impact of climate change on water resources. Where this is considered to have been significant and detrimental, they should ensure that the next water plan review fundamentally reassesses the objectives of the plan (including environmental and consumptive) and the consequent balance between environmental and consumptive use of water, to ensure it is suited to a drier climate
- d. State and Territory Governments should ensure that, as water plans reach the end of their planning cycle, suitable review processes are undertaken that allow optimisation of water use and system operation across all users, include explicit consideration of Indigenous cultural values and involve adequate community and stakeholder engagement
- e. State and Territory Governments should ensure that their entitlement frameworks can incorporate alternative water sources, such as stormwater, wastewater, and managed aquifer recharge, so they do not present a barrier to efficient investment in these supply options.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 3.1(b) to 3.1(e).

3.6 Recognising the requirements of Indigenous people in water planning and management

Accommodating the distinctive water requirements of Indigenous communities is a key feature of the NWI. Specifically, parties agreed that water access entitlements and planning frameworks should recognise the needs of Indigenous Australians in relation to water access and management through:

- the inclusion of Indigenous representation in water planning processes wherever possible
- the identification of Indigenous social, spiritual and customary objectives — and strategies for achieving them — in water plans, wherever they can be developed
- provision for the possible existence of native title rights to water.

Most jurisdictions have established specific processes for engaging with Indigenous communities on water planning and management issues — the exceptions are Western Australia and Tasmania where the Commission has not been able to identify any dedicated mechanisms for engaging Indigenous people in water planning (appendix B). However, despite this improved engagement, most jurisdictions have routinely failed to identify and provide for Indigenous cultural, social, spiritual and customary (collectively referred to as ‘cultural’ in this report) values and objectives in water plans (box 3.9).

Box 3.9 Understanding Indigenous water values and objectives

Indigenous cultural values, uses, objectives and outcomes are complex and diverse

Environmental assets (rivers, wetlands, aquifers and so on) can have cultural, social, spiritual and customary (cultural) significance to Indigenous people. For example:

- some rivers support traditional hunting, gathering and ritual / ceremonial responsibilities
- many waterways are considered dreaming tracks and song lines, or are important for harvesting medicinal plants and herbs
- fish traps are an important historical inter-tribal meeting place for Aboriginal groups
- the symbolic value of water can evoke a sense of belonging and identity.

Water provided to the environment to increase fish populations or support bird breeding often also supports cultural objectives.

Indigenous people also value the economic benefits of water

Access to water is critical for a range of commercial activities undertaken by Indigenous people, including aquaculture, horticulture, and tourism.

Sources: AHRC (2008); Australian, State and Territory Governments (2017b); DELWP (Vic) (2016a); National Cultural Flows Research Project (2017).

Ensuring that cultural values are recognised and provided for in water plans has been a concern for Indigenous communities for a number of years. This concern led to the NWI including provisions relating to Indigenous water. However, many Indigenous communities also want access to water for commercial purposes to promote economic development within communities and generate employment and income benefits. This issue is separate from the provision of water for cultural purposes and is not addressed in the NWI.

There is scope to better incorporate Indigenous cultural objectives in water plans

The NWI includes a provision that requires jurisdictions to identify Indigenous social, spiritual and customary objectives in water plans, make provision for those objectives (through water allocations or cultural flows, for example), and monitor and report on outcomes.¹¹

States and Territories have been slow to act on these commitments. In 2014, the NWC found that:

most jurisdictions have ... generally failed to incorporate effective strategies for achieving Indigenous objectives in water planning arrangements. While recognition of Indigenous cultural values and associated water requirements has progressed, implementation of practical change remains variable, with most jurisdictions as yet not making specific provision for water access for Indigenous people. (NWC 2014c, p. 31)

New South Wales was considered to be relatively more advanced at the time of the NWC's assessment due to:

- the availability of cultural access licences (capped at 10 megalitres (ML) per year per application and unable to be traded), and community development licenses (to support commercial enterprises owned by Indigenous people in coastal unregulated water or groundwater areas)
- the work undertaken by the Aboriginal Water Initiative (part of the New South Wales Office of Water), including the development and maintenance of a database of Aboriginal water values (NWC 2014c).

Since 2014, some positive signs have emerged in other States and Territories. This is particularly the case in MDB jurisdictions, given the Basin Plan requirement that water resource plans identify Indigenous objectives and outcomes¹² (appendix B). For example, Victoria and South Australia have established programs aimed at better understanding Indigenous values and uses of water, with a view to ultimately using this information in water planning (box 3.10).

¹¹ Monitoring and reporting arrangements for environmental and other public benefit outcomes are discussed in chapter 5.

¹² Part 14, chapter 10 of the Basin Plan sets out that a water resource plan must identify Indigenous objectives and outcomes, having regard to the social, spiritual and cultural values of Indigenous people.

Box 3.10 Examples of Indigenous water initiatives since 2014

Victoria

Water for Victoria includes a number of commitments aimed at better recognising and providing for Indigenous values in water plans, including:

- \$4.7 million to establish a state-wide Aboriginal Water Program to better understand Aboriginal water values, uses, objectives and outcomes, including intangible cultural heritage such as stories, art, ceremonies and innovations
- amendment of the legislated objectives of the Victorian Environmental Water Holder (VEWH) to consider identified Aboriginal water-related environmental outcomes, and the appointment of a Victorian Aboriginal Commissioner to the VEWH (DELWP (Vic) 2016).

South Australia

- The Aboriginal Partnerships Program aims to improve awareness and understanding of Aboriginal culture, increase the participation of Aboriginal people in managing natural resources, and protect Aboriginal heritage.
- A recent focus for the Aboriginal Partnerships Program has been engaging Aboriginal community members, groups and project teams in a large project focusing on River Murray turtles which includes community turtle mapping.
- The Ngarrindjeri Partnerships Project (based in the Coorong / Lower Lakes / Murray Mouth area) seeks to identify the cultural values of sites, and strategies to manage and protect them (South Australian Government 2017a).

National Cultural Flows Research Project

- The National Cultural Flows Research Project, hosted by the National Native Title Council, aims to:
 - provide a greater understanding of Indigenous values relating to natural resources, including water
 - equip Aboriginal people with information to ensure that Aboriginal water requirements and preferences are reflected in water policy
 - inform the development of new governance approaches to water management that incorporate aspects of Aboriginal governance and capacity building.
- The focus is on the MDB, however the project framework, principles and evidence base will inform the recognition of Aboriginal water rights in other locations. The project is expected to be completed by late 2017 (Australian, State and Territory Governments 2017b; National Cultural Flows Research Project 2017).

While promising, it is too early to know whether these commitments will achieve cultural outcomes identified in water plans. Indeed, a number of participants expressed frustration with the lack of progress in this area, and skepticism as to the impact recent policy changes will have. The Nature Conservation Council of NSW said:

Despite many commitments by the NSW Government and its water agencies over the past twenty years to ensuring that indigenous cultural and heritage flows are recognised in water plans – no

genuine progress has been made in reflecting these needs in the suite of Water Resource Plans currently being developed. (sub. 31. p. 3)

And the Federation of Victorian Traditional Owner Corporation argued that:

The planning processes have a significant impact on the Indigenous interests, in part due to the balancing of many different objectives across the system, and in part because the objectives and the values are not articulated, or only partially identified. While some effort has been afforded to understanding of ‘cultural flows’ and Indigenous issues this has not been well connected to planning processes. (sub. 37, p. 15)

Progress in this area has probably been impeded by the complex, time-consuming and contentious nature of the tasks involved. As the Cairns Regional Council (sub. 52, p. 2) observed, ‘genuine appreciation and recognition of water-dependent values of relevance to Indigenous peoples and culture’ is needed, but ‘story places and mythical beings may not necessarily be tied to measurable or quantifiable indicators that ‘fit’ in the traditional management framework concept’.

Likewise, the Murray Lower Darling Rivers Indigenous Nations considered that (sub. 60, p. 5):

Developing and implementing methodologies that allow for translation of Aboriginal values and priorities into specific water planning inputs remains a challenge. Defining flow volume and timing that achieve Aboriginal objectives is a complex exercise.

While these challenges are real, initiatives such as the Aboriginal Water Initiative database in New South Wales, and the Ngarrindjeri Partnerships Project in South Australia, demonstrate that meaningful progress can be made where there is sufficient will and commitment by governments. Moreover, recently released COAG guidance, *Engaging Indigenous peoples in water planning and management* (box 3.11), provides States and Territories with practical advice and strategies for assessing Indigenous cultural values, and setting associated objectives and water requirements.

In the Commission’s view, most State and Territory Governments have taken steps towards better providing for Indigenous cultural water needs in water planning processes — particularly since 2014 (appendix B). However, there is more work to do to achieve clear, measureable and well-informed Indigenous cultural objectives in water plans, tangible actions in support of the achievement of those objectives, and monitoring and reporting arrangements that promote accountability and foster learning about what does (and does not) work. There may be value in State and Territory Governments actively sharing lessons from experiences in this area to date, to inform and inspire developments elsewhere.

Box 3.11 COAG guidance: Engaging Indigenous peoples in water planning and management

A module, *Engaging Indigenous peoples in water planning and management* (the module), was developed by all Australian governments through COAG in 2017. The module is a supporting document to the National Water Initiative Policy Guidelines for Water Planning and Management 2010. The module:

- provides guidance on recognising Indigenous cultural values and needs in relation to water resource planning and management
- highlights innovative ways to facilitate effective representation and engagement of Indigenous people in water planning
- provides examples of the incorporation of Indigenous cultural values, objectives and needs in water planning and management activities.

For example, with regard to identifying Indigenous objectives and strategies for achieving them, the module suggests that governments consider methods such as:

- interviews, surveys, cultural and spatial mapping, and analysis of artwork and historical documentation
- a 'replacement cost method', to quantify the consumptive value of aquatic species and sites for Indigenous subsistence
- independent assessment of Indigenous cultural values which can then be integrated into Environmental Flow Assessments.

Source: Australian, State and Territory Governments (2017b).

Environmental water can support Indigenous cultural objectives, but not always

In many cases, planned and held environmental water can be used to support Indigenous cultural values and objectives without compromising environmental outcomes. Indeed, as many Indigenous cultural objectives are supported by a healthy environment, there will often be occasions where environmental and cultural objectives align. To ensure these opportunities are taken up, it is important that environmental water managers are aware of these values and have an incentive to manage flows in a way that supports environmental *and* Indigenous objectives, where possible.

There have been some positive developments in this area. For example, the Commonwealth Environmental Water Holder (CEWH) is working with Indigenous communities to get a better understanding of the Indigenous values that could be supported through its environmental watering activities (box 3.12).

Box 3.12 Maximising the benefits of environmental flows

The CEWH has engaged with a number of Indigenous communities across the Basin to further [its] understanding of Indigenous values in environmental watering, including:

Starting the conversation - Organised a journey along the Macquarie River with Ngilyampaa-Wayilwan elders and community members and representatives of the CEWH and NSW Government to build a stronger understanding of Indigenous cultural values in the Macquarie Marshes.

Sharing knowledge - Provide funding and participation in the National Cultural Flows Research Project. The project aims to provide rigorous and defensible knowledge on Indigenous water interests for the benefit of Indigenous people. We are also exploring opportunities for the development of watering seasonal calendars

Working Together - Working with a number of Aboriginal Nation representative groups to provide water for Aboriginal environmental outcomes (e.g. Nari Nari Tribal Council at Toogimbie IPA; Tar-Ru Lands Board of Management; the Ngarrindjeri Regional Authority).

Source: Commonwealth Environmental Water Holder (sub. 63, p. 5).

The CEWH also noted that the Basin Plan explicitly ‘encourages environmental water managers to have regard to Indigenous values to maximise the benefits and effectiveness of environmental watering’ (sub. 63, p. 5). Evidence of this is apparent in some of the more recent State Government water plans — for example, the Queensland Government’s long-term environmental watering plan for the Warrego, Paroo and Nebine Catchments stipulates that environmental water should be used ‘to maximise environmental benefits whilst supporting and optimising social and economic needs of the local communities, including the needs of Indigenous water users’ (DNRM (Qld) 2016c, p. 22).

In a similar vein, the Victorian Government has committed to amending the objectives of the VEWH, such that it is required to consider Aboriginal water-related environmental outcomes. A Victorian Aboriginal Commissioner was also appointed to the VEWH.

Reflecting these developments, instances of environmental water being used to support Indigenous cultural objectives are becoming more common. For example:

- several environmental watering sites in New South Wales were chosen because of their important Aboriginal cultural heritage values (such as the Tuckerbil Swamp in the Murrumbidgee Valley, which contains an ancestral burial ground significant to the Wiradjuri people) (New South Wales Government 2015a)
- in March 2017, the Premier of Victoria announced an environmental flow release from Rocklands Reservoir into the Glenelg River supported both environmental outcomes (improved river health and reduced salinity) and Aboriginal cultural values (by sustaining the health of country for Traditional Owners) (Premier of Victoria 2017).

While encouraging, it is unlikely that the potential benefits in this area will be fully realised until the Indigenous cultural values and objectives associated with water systems are better understood and articulated in water plans (previous section).

Moreover, despite the potential for environmental and Indigenous benefits to be coincident, in some circumstances, it is important that water planners do not assume this to be the case. The NWC highlighted this as an issue in 2014:

For many Indigenous communities, cultural and social aspirations are closely linked with riparian sites of cultural significance and also with aquatic resources and species for subsistence and customary purposes. While some advances have been made in understanding these requirements, most water plans still make the assumption that water for the environment will deliver non-consumptive cultural and social outcomes for Indigenous communities. Species of importance scientifically or to peak groups such as recreational fishers or tourism, may not align with those required by traditional owners for food or ceremonial purposes. (NWC 2014c, p. 422)

And in 2015 the NSW Office of Environment and Heritage made a similar observation about its own activities:

In some cases, water managers have assumed that the objectives of most environmental flows are likely to be consistent with certain cultural flow objectives. Such assumptions need to be confirmed both as a courtesy to Aboriginal people and to further emphasise that multiple objectives can be achieved by single deliveries. (OEH (NSW) 2015b, p. 46)

Protection of Indigenous cultural values should be regarded as a distinct objective of water planning in its own right. Where it is not possible to use environmental flows to support some or all Indigenous cultural objectives, explicit provisions should be made in water plans to address the shortfall.

As for all types of outcomes associated with water systems, monitoring and reporting arrangements are critical to hold water managers accountable for the achievement of Indigenous objectives. This should include reporting on where and when water managers are — or are not — able to reconcile environmental and Indigenous cultural objectives.

Water for economic purposes

The NWI does not explicitly cover the provision of water to Indigenous communities for commercial purposes to support economic development. Indigenous people access water for a wide range of economic purposes, from ensuring that culturally significant species are sustained at a rate that allows for a viable subsistence economy, to developing commercially viable agriculture or aquaculture enterprises (Australian, State and Territory Governments 2017b). These latter endeavours can create jobs and business opportunities for Indigenous people, and ultimately improve the financial security and living standards (including health outcomes) of beneficiaries (Australian, State and Territory Governments 2017b).

‘Standard’ access pathways are available to Indigenous Australians seeking access to water for economic purposes (for example, buying water or tendering for unallocated water) as they are for other water users. However, governments are increasingly recognising that Indigenous people face unique barriers to water access (such as economic disadvantage, or

limited understanding of water market mechanisms) and may need assistance in both gaining access to water for commercial purposes and exploiting the opportunities it provides.

In this context, a number of States and Territories have established specific provisions for Indigenous people wishing to access water for economic purposes. For example:

- in New South Wales, Indigenous people can seek access to an Aboriginal Community Development Licence, to be used for economic purposes such as irrigated cropping, aquaculture or manufacturing. These licences can be issued up to a maximum of 500 ML per year per water source, and can be traded under some circumstances (for example, permanently to other Aboriginal groups or individuals, or temporarily without this restriction) (Australian, State and Territory Governments 2017b)
- in the Northern Territory, the Government has committed to the reintroduction of Strategic Aboriginal Reserves under its Sustainable Water Use policy paper. A Strategic Aboriginal Reserve is a reserved volume of water from the consumptive pool within a water allocation plan area, which is set aside for exclusive access by Aboriginal landowners to use or trade for their economic benefit. Public consultation on the policy parameters of the Strategic Aboriginal Reserve is underway, with the policy subject to Government consideration in 2017
- in Queensland, unallocated water reserves (for the purposes of supporting economic opportunities for Aboriginal people and Torres Strait Islanders) are now located in the water plans for the Burnett, Fitzroy and Wet Tropics
- in Victoria, the Government has allocated \$5 million to develop a roadmap for Aboriginal access to water for economic development, working in partnership with Traditional Owners and Aboriginal Victorians.

In South Australia, the Government is developing a broad capacity building and information process on water rights and water markets, which will include mechanisms to build capacity with Indigenous stakeholders to participate in the water market (appendix B).

The Murray Lower Darling Rivers Indigenous Nations argued that special water access arrangements for Indigenous people should be more prevalent:

Even if objectives for Aboriginal water access are clearly defined, the financial cost, infrastructure requirements and technical complexity of accessing the water market are an effective barrier to Aboriginal participation. ... Aboriginal people have been marginalised from water planning until recent decades and significant work is required to build expertise and confidence to participate on a level playing field with other stakeholders. ...

and

Practical examples of steps required to ensure that Aboriginal needs and interests and better accommodated and represented include: ... Providing special dispensation for Aboriginal access to unallocated water in relevant systems (including creation of Strategic Indigenous Reserves to support future access and use) ... [and] Providing adequate funding for Aboriginal people and organisations to acquire water for economic development purposes, in fully allocated systems (sub. 60, pp. 6, 9-10)

Providing water for economic purposes for Indigenous people can have material benefits. Most notably, these arrangements can facilitate commercial pursuits in Indigenous communities, thereby supporting employment, income and economic development.

However, these arrangements can also have costs, including in some circumstances, an opportunity cost of the water that is provided to Indigenous users. Depending on how the policies are designed, these costs could be significant, and not transparent. There may also be indirect — but material — costs arising from a loss of confidence (among investors and access seekers more generally) in water planning frameworks, if governments intervene to change existing arrangements to favour a particular group.

The Commission considers that, where access to water *is* regarded as the best way to support Indigenous economic development objectives, governments should facilitate access to that water as efficiently and transparently as possible within existing entitlement and planning frameworks:

- in fully allocated water systems, this means buying water from entitlement holders on the water market, such that the integrity of the entitlement system is maintained
- in water systems where the consumptive pool is not fully allocated, governments may choose to allocate or reserve a volume of unallocated water for exclusive use by Indigenous people, but should do so transparently.

With regard to the latter, the NWI policy guidelines note a typical rationale for water reserve policies is that Indigenous people may not yet have the capacity or infrastructure to use water for economic purposes, and by the time they do, it will be more expensive for them (or governments) to acquire (Australian, State and Territory Governments 2017b).

Finally, access to water is far from the only issue that needs to be resolved in order for Indigenous people to take advantage of economic development opportunities. Other factors, such as access to specialist skills and knowledge, experience of water-related businesses, and the infrastructure and financial capital needed to make best use of water, are just as important. Preferential water access arrangements for Indigenous people are therefore only likely to generate positive and sustainable economic benefits where:

- they are part of a broader, multifaceted economic development strategy (that includes good program governance arrangements; clear accountabilities and conditions for use; and investment in education, training and capacity building)
- policy makers engage and consult directly with the community in designing and implementing these initiatives.

The chances of success will be maximised if programs providing water for economic purposes are carried out using ‘good’ policy design principles, namely, setting a clear and measurable policy objective, identifying the range of ways the objective could be met (including via the provision of resources other than water), transparently weighing up — quantitatively or qualitatively — the benefits and costs of each option, and reviewing and evaluating the policy.

DRAFT FINDING 3.2

Indigenous access to water resources to achieve cultural values is increasingly addressed by using specific mechanisms for engaging with Indigenous groups in the development of water plans – the exceptions are Western Australia and Tasmania.

The Northern Territory Government is also taking steps to provide Aboriginal landowners with increased opportunity to access water resources for economic development.

There has been evidence of environmental water managers using held environmental water to achieve Indigenous cultural objectives, without forgoing environmental benefits.

DRAFT RECOMMENDATION 3.2

State and Territory Governments should ensure that:

- a. Indigenous cultural objectives are explicitly identified and provided for in water plans, and progress in achieving Indigenous cultural objectives is regularly monitored and publicly reported on
- b. there is public reporting of how Indigenous cultural objectives have been considered in the management of environmental water — both held and planned.

DRAFT RECOMMENDATION 3.3

Where State and Territory Governments provide access to water for Indigenous economic development they should:

- a. source water within existing water entitlement frameworks, such as by purchasing water on the market or as part of transparent processes for releasing unallocated water
- b. ensure adequate supporting arrangements (such as training and business development) are in place to enable Indigenous communities to maximise the value of the resource
- c. involve Indigenous communities in program design
- d. ensure future governance arrangements are specified and implemented.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 3.3 (a) to 3.3 (d).

Accounting for native title rights and interests

The Commission recognises that several commentators have previously noted concerns about implementation of the provision in the NWI relating to taking account of native title rights and interests (Tan and Jackson 2013). While the NWC's 2014 assessment made some references to native title, it did not assess the extent to which individual water plans take account of the possible existence of native title rights to access water resources. Since 2014, the Australian, State and Territory Governments have released guidelines on *Engaging Indigenous Peoples In Water Planning And Management*, which include case studies and guidance on native title and other Indigenous land rights. Among other things the guidelines noted that:

Native title should not be solely relied upon to deliver Indigenous peoples the access and rights to their traditional waters. Water planners should consider other mechanisms for giving access and rights to water to Indigenous peoples (Australian, State and Territory Governments 2017b, p. 20).

The Commission's preliminary analysis has not identified specific examples of water planning processes that do not adequately accommodate native title rights to access water resources, where they are found to exist. However, we encourage interested stakeholders to comment on jurisdictions' progress — or lack thereof — against the native title provisions of the NWI ahead of the final report.

4 Water trading

Key points

- Trading benefits the community by allowing water to move to higher value uses, creating incentives for water to be used more efficiently and enabling irrigators (and other water users) to better manage drought and other risks.
- Trade in water allocations and entitlements has increased enormously from small beginnings over 30 years ago. Water reforms, including those under the National Water Initiative (NWI), have been essential to establishing markets, increasingly opening up trade and making water markets more efficient.
- Water trading is one of the major successes of national water reform. Water markets have delivered large benefits to the community and made irrigators more prosperous and resilient. While water trading can have mixed effects on regional economies as production moves, this has to be considered against the counterfactual of no water trading and is influenced by industry issues, such as depressed commodity prices.
- There has been good progress in implementing trade-enabling reforms under the NWI. While much of the hard work has been done, there are further steps that should be taken to improve the functioning of established water markets in the Murray-Darling Basin.
 - There is a need to review trade rules that are designed to manage hydrological constraints (such as inter-valley trade restrictions) with a view to improving their efficiency and transparency.
 - There is scope to further reduce transaction costs associated with trading water by speeding up approvals and reducing charges on trade applications.
- For water markets to operate efficiently traders need access to reliable and timely information, including about prices. Governments should not seek to meet all of these needs, but rather should focus on improving the quality and accessibility of basic water resource and trade data, and allow the private sector to provide more tailored information services.
- While there have been some concerns about the conduct of water brokers, overall they play a valuable role by adding to the depth of water markets and improving the availability of information. Increased regulation of water brokers and exchanges is not justified at this time.
- Enabling unencumbered trade between irrigators and urban water utilities would provide large benefits to households and irrigators. But such trade is currently encumbered, mainly by governments directing utilities to use more costly supply options.
- Although the Commonwealth Environmental Water Holder (CEWH) manages a large quantity of water rights (about 2500 GL of entitlements), to date it has only engaged in a small amount of allocation trade. Should the CEWH become a more active trader, as is desirable, there are adequate arrangements in place to guard against this having negative consequences for water markets.

The establishment of water markets, separate from land, has allowed for the one-off trade of water within a season (allocation trade) and the permanent transfer of water rights (entitlement trade). In both cases water trading benefits the community by allowing water to move to higher value uses and by creating an incentive for irrigators (and others) to use water more efficiently. Water trading gives irrigators greater flexibility to respond to changes in commodity prices and water availability, and to grow or adapt their businesses to suit their own circumstances. For water markets to fulfil their potential, trade must be managed in a way that respects hydrological constraints, and does not affect the reliability of access for other water users (third parties) or damage the environment.

The key prerequisites for efficient water markets are established through water entitlements and planning frameworks. Water planning caps water use, meaning that those wanting extra water generally need to obtain it from someone else, with trade being the obvious mechanism. Water entitlements that are separate from land can create well-defined and tradeable property rights that allow people to understand exactly what is being bought and sold. For these reasons this chapter builds on the previous one. For example, the previous chapter introduced the topic of trade rules contained in water plans, while this one considers which rules are warranted and which impose inefficient restrictions on trade. In addition, this chapter examines other barriers to trade, trade approval processes, water registers, market information and other factors that influence the functioning of water markets.

4.1 Water trading in Australia

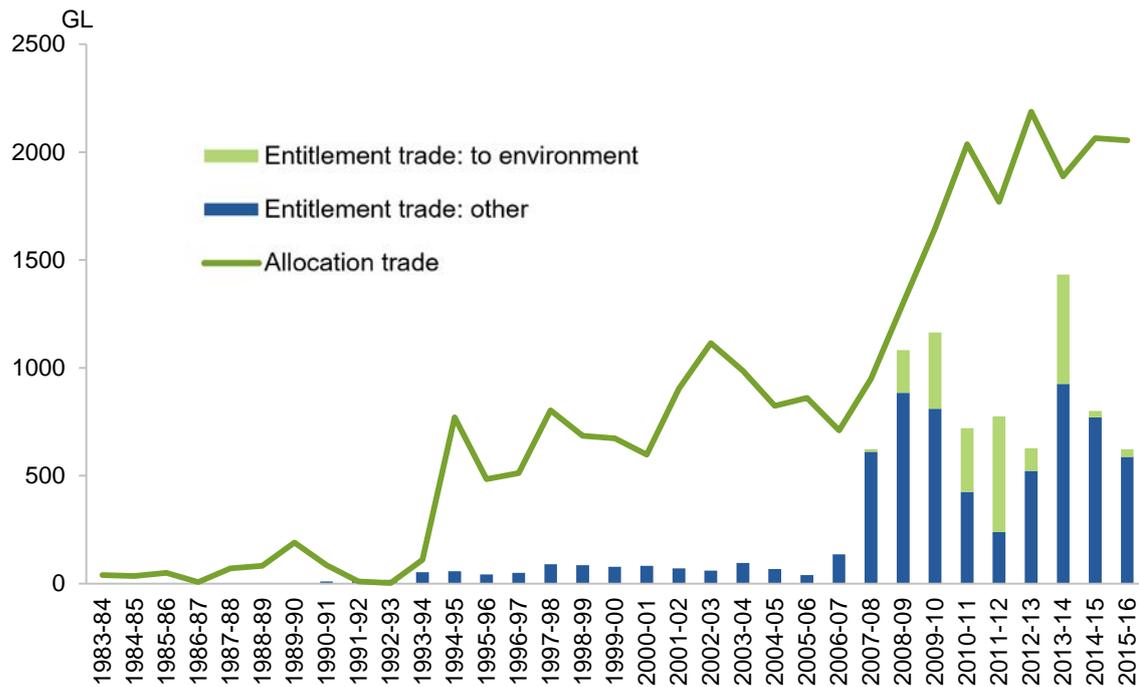
Australia is widely regarded as a world leader in the establishment and management of water markets (Hughes, Gupta and Rathakumar 2016). This section briefly considers the rise of water markets and the geographic extent of their development across the country.

Up until the 1980s, increasing demand for water was met primarily through building water infrastructure (such as dams) and issuing new entitlements. Trade was restricted as water rights were attached to a particular parcel of land. Some temporary transfers of water rights were permitted in some States during droughts in the 1960s and 1970s, but these were very limited. By the 1980s the situation was changing, due to the limits of water availability being reached, a reduced willingness of governments to fund large-scale rural infrastructure projects and growing awareness of the impacts of dams and water use on the environment (NWC 2011e). These pressures led to caps on water use, a new focus on managing limited water resources and, as part of this, the development of water markets.

Water markets were developed first in irrigation systems in the Murray-Darling Basin (MDB) and were gradually expanded to become an interstate water market, with the southern MDB being the main focus. Figure 4.1 shows how trade in water allocations and entitlements in the southern MDB has increased over time, from very small beginnings more than thirty years ago. Trade has increased to the extent that in some recent years over 50 per cent of irrigators in the MDB have participated in water markets (ABARES 2016, p. 17). As the southern MDB has consistently accounted for a high proportion of water trades in Australia

(at least for allocations), figure 4.1 gives a sense of the overall rise in water trading in Australia.

Figure 4.1 Volume of trade in the southern Murray–Darling Basin^{a,b}
1983-84 to 2015-16



^a Entitlement trade to the environment reflects entitlements acquired by the Australian Government for environmental water recovery through investments in infrastructure and purchases from other water users. Entitlement volumes represent nominal volumes — long-term average annual yields may be significantly lower. ^b Allocation trade excludes environmental transfers and trades made by irrigation infrastructure operators (IIOs). IIO allocation trade was about 583 GL in 2015-16.

Data sources: ABARES (2017, figs. 1-12 and 2-10, and tables 1-2 and 2-1); ABARES, pers. comm., 21 August 2017; Hughes, Gupta and Rathakumar (2016, p. 7).

Beyond the overall increase in trade, some other important trends and influences can be drawn out from figure 4.1, including:

- allocation trade increased greatly once a cap was placed on surface water extractions in 1995 (Grafton and Horne 2014)
- trade has been particularly important during droughts — there is some indication of this in figure 4.1, with increases in allocation trade from 2001-02 and again from 2007-08, but what is not shown is that the proportion of annual water allocations traded, and the value of water trade, have increased greatly during drought (Hughes, Gupta and Rathakumar 2016)

- the Australian Government made extensive use of water markets to purchase water entitlements for the environment from 2008-09 to 2013-14, which accounts for a considerable proportion of the steep increase in entitlement trade shown.

Table 4.1 Trade summary by region and resource type, 2015-16

<i>Region</i>	<i>Resource type</i>	<i>Allocation trade^a</i> <i>(GL)</i>	<i>% overall</i> <i>total</i>	<i>Entitlement trade^b</i> <i>(GL)</i>	<i>% overall</i> <i>total</i>
Southern MDB					
	Regulated surface water	2513		521	
	Unregulated surface water	0		27	
	Groundwater	123		75	
	Totals	2637	79	623	38
Northern MDB					
	Regulated surface water	280		425	
	Unregulated surface water	88		204	
	Groundwater	94		75	
	Totals	462	14	703	43
Rest of Australia					
	Regulated surface water	234		119	
	Unregulated surface water	2		37	
	Groundwater	16		161	
	Totals	252	8	317	19
Australia					
	Regulated surface water	3028		1065	
	Unregulated surface water	90		268	
	Groundwater	234		311	
	Totals	3351		1643	

^a Allocation trade includes trade by irrigation infrastructure operators but excludes environmental transfers of surface water in the southern MDB. ^b Entitlement trade includes entitlements secured by the Australian Government for environmental water recovery — 35 GL in the southern MDB and 20 GL in the northern MDB. Entitlement volumes are nominal — long-term average annual yields may be significantly lower.

Source: ABARES (2017, figs. 1–12, 1-6 and 2-10, and tables 1-1 and 1-2).

Water markets are now sizable in dollar terms. In 2015-16, the value of entitlements on issue in the southern MDB was at least \$13 billion, and turnover value for entitlement trade was \$985 million (or 7.6 per cent of the total value of entitlements). Turnover for allocation trade was \$558 million in 2015-16 (ABARES 2017). The market price for water allocations varies greatly in response to water availability. For example, allocation prices often exceeded \$400 per ML during the latter years of the Millennium Drought, but declined to near zero during the floods of 2011 and 2012 (Hughes, Gupta and Rathakumar 2016, p. 9). Entitlement prices are more stable, but are also influenced by water availability.

While the southern MDB is Australia’s most important water market, trade has also expanded in other parts of Australia. In the northern MDB, the volume of allocation trade

increased by 419 per cent and entitlement trade by 359 per cent between 2007-08 and 2015-16. Outside the MDB, allocation trade increased by 124 per cent and entitlement trade by 119 per cent over the same period (ABARES 2016, 2017). The regions outside the MDB with significant quantities of trade include the Fitzroy, Burdekin and Burnett (all in Queensland), South East South Australia, Thomson-Macalister (Victoria), Hunter (New South Wales), Harvey (Western Australia) and Tasmania.

In 2015-16, areas outside the MDB accounted for only 8 per cent of allocation trade and 19 per cent of entitlement trade (table 4.1), but were responsible for about 43 per cent of water used in agriculture in Australia (ABS 2017c). While this might appear to suggest that there is potential to greatly expand trade outside the MDB, it should be appreciated that there are factors that make the MDB (and particularly the southern MDB) especially suited to trade. These include, hydrological connections that allow water to be traded over thousands of kilometres, the existence of several very large water storages and land that is suited to growing a diverse range of crops.

4.2 Progress, benefits and where to next

The development of water markets has relied fundamentally on the progressive introduction of trade-enabling reforms. Initially water rights were tied to land and even temporary transfers of these rights were either not permitted, or administratively cumbersome to arrange. The introduction of trade was gradual, with initial steps taken in the 1980s allowing trade only by some users (such as private diverters), for some water products (such as annual allocations) and within confined areas (NWC 2011e). More comprehensive reforms commenced with COAG's 1994 *Water Reform Framework*, and were strengthened and extended through the National Water Initiative (NWI), as discussed below.

Progress

Under the NWI, reforms to water entitlement and planning frameworks have opened up new trading possibilities and made trades quicker and less costly to execute (noting that further progress is needed in Western Australia and the Northern Territory, as discussed in chapter 3). While some water rights (such as those for stock and domestic use) cannot be separated from land, most water entitlements are now able to be traded. In addition, there has been further separation (or unbundling) of water rights in some systems, which has enabled trade approval times to be reduced and new tradeable water products to emerge (box 4.1). Most notably, New South Wales, Victoria, Queensland, and South Australia have unbundled water rights into water access and delivery components, at least in regulated systems. While there are recent examples of States pursuing further unbundling in groundwater and unregulated systems, there is potential for this to be taken further. However, there are both costs and benefits in doing this, which need to be considered on a case-by-case basis.

Box 4.1 Tradeable water products

Most discussion of water markets in Australia, including in this chapter, concerns trade in water entitlements (perpetual or ongoing rights to a share of a water resource) and allocations (the volume of water allocated to water entitlements in a given season or period). While these are the most important tradeable water products there are others.

Irrigation rights are a type of water product that exists in New South Wales and South Australia as a consequence of their entitlement arrangements. In those states, entitlements are often held by irrigation infrastructure operators and irrigation rights are the rights held by individual irrigators against those entitlements. These irrigators can trade irrigation rights within the district, but to sell them to someone outside the district they need to 'transform' them into a water entitlement.

One group of tradeable products are those made possible by unbundling of water rights that goes further than the separation of water from land. For example, unbundling can separate the right to access water (water access entitlement) from the right to have water delivered by an irrigation infrastructure operator (delivery right or delivery share). Once this has occurred these rights can be traded separately. For example, irrigators can:

- sell their entitlement, but retain their delivery right and make use of it using water allocations purchased on the market
- sell their delivery right in order to avoid paying a termination fee to their irrigation infrastructure operator (the ACCC (2017) reported that there has been an increase in trade in delivery rights in the MDB, suggesting that this market is maturing over time).

Unbundling can also involve the creation of tradeable rights to:

- water storage (sometimes known as capacity shares) — such rights are uncommon in Australia, but do exist in some smaller systems in Queensland
- water use — noting that the potential to trade these rights is usually quite limited.

Another group are secondary water products such as forward contracts (that result in settlement at the time of trade) and entitlement leases. Such products can, and do, emerge without the need for any action by governments.

The section of the NWI that deals with water markets and trading focused mainly on removing barriers to trade, the development of water registers and improving information flows. In 2008, COAG agreed on a further program of actions to enhance water markets, including by speeding up trade approvals.

Under the NWI, jurisdictions agreed to establish compatible institutional and regulatory arrangements to facilitate intra and interstate trade. In line with this, considerable progress has been made in removing trade restrictions. For example, the Victorian Government removed a 10 per cent limit on the proportion of water entitlements that could be held by non-landholders in 2009, and a 4 per cent limit on the annual entitlement trade out of irrigation districts in 2014.

Positive steps have also been taken to facilitate interstate trade, including by adopting a system of tagged entitlement trading (under which entitlements retain their original characteristics). However, this system is rarely used, with many purchasers finding it simpler to keep the entitlement in its source zone and transfer the allocations out of the zone each

year (ABARES 2016; NWC 2011e). Even though these arrangements are not working as intended, water is still able to be traded to higher value uses across state borders.¹³

The NWI commits jurisdictions to implement compatible, publicly-accessible and reliable water registers of all entitlements and trades. This has mostly been achieved, with the qualifications that:

- the information on trades recorded in registers has some deficiencies, including a high proportion of trades with a zero price
- registers vary greatly in the access they provide to market information (table B.6, appendix B)
- full interoperability has not been attained.

There have also been some missteps, with more than \$30 million being invested in a National Water Market System that was meant to increase the transparency of market information, reduce transaction costs and improve interoperability of state water registers. This project was terminated in 2014, with the National Water Commission (NWC) reporting that ‘it is unclear which actions have been implemented and what, if any, objectives have been achieved’ (2014c, p. 41).

Table 4.2 summarises progress against the NWI commitments — further detail is included in appendix B and some issues are discussed later in this chapter.

It is also important to appreciate that initiatives subsequent to the NWI, such as the *Water Act 2007* (Cwlth) and the Basin Plan, have also influenced the functioning of water markets. There is now a more consistent regulatory environment across the MDB due to the Australian Competition and Consumer Commission’s (ACCC’s) roles in enforcement, price setting, monitoring and reporting on water markets. Regulation by the ACCC has reduced barriers to trade, including by:

- making it easier for irrigators in New South Wales and South Australia to sell water entitlement outside their district (a process that requires them to obtain an entitlement that is separate from their irrigation infrastructure operator’s entitlement)
- limiting the maximum fee that can be applied when an irrigator terminates their water delivery right.

In addition, the Bureau of Meteorology (BOM) has been tasked with gathering and disseminating water data (including market data), which has led to some improvements, both in and outside the MDB. For example, the BOM now provides more comprehensive trade data than is available from water registers, including on internal trades within irrigation districts.

¹³ As discussed in appendix B, arrangements are yet to be put in place to allow water trading between the ACT and New South Wales.

Table 4.2 Assessment summary: water trading

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Removing unwarranted trade barriers	Largely achieved	There has been considerable progress in removing barriers to water trading and this has been an important factor in enabling the large expansion of trade that has occurred since the NWI commenced. There are some remaining policy bans and other barriers to trade between the irrigation, urban and environment sectors. Also, while many trade rules have the legitimate purpose of protecting third parties, it is not always clear that they do this in a way that maximises net benefits.
Publicly-accessible and reliable water registers	Largely achieved	All jurisdictions have introduced water registers, but there is considerable variation in their functionality and the access they provide to information. Further progress is needed, particularly in Queensland.
Reducing transactions costs by improving water market information	Largely achieved	Both governments and the private sector have contributed to reasonably good progress being made on improving market information and thereby reducing transaction costs in water markets. There are some remaining deficiencies in the quality and accessibility of information in water registers.
Compliance with trade approval service standards	Achieved	Basin States have consistently met the standards for processing times for trade approvals (the standards do not apply to non-Basin jurisdictions).

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met.

Overall, much has been achieved. Reforms have mainly been progressed through incremental steps, which has led to a somewhat more complex trading environment than would have been the case if a ‘big bang’ approach had been taken. For example, efforts have been made to make the different arrangements of each MDB jurisdiction work together better, rather than to enforce uniformity. The Commission’s view is that further gains can be achieved through continuing with an incremental approach.

Benefits

There is a strong reason to expect that opening up water trading opportunities, as the NWI has done, will provide benefits to the community. This is because buyers and sellers only enter into trades when they believe it will make them better off. The main qualification is that any costs of trading to third parties (for example, where downstream trade disrupts delivery of water to other irrigators as a result of congestion) need to be considered alongside the benefits to traders.

Based on submissions to this inquiry and on a range of other sources, there is widespread agreement that trade-enabling reforms in Australia have been beneficial. Watson argued:

... a key benefit of water sector reform in Australia has been the gradual introduction of water trading between irrigators; not just allowing water to move reasonably freely between farms, commodities and regions but also contributing to better management of climatic risks, as most strikingly manifested in the Millennium Drought. (sub. 49, p. 2)

The NSW Irrigators' Council contended:

This priority [to enable water to be traded to its highest value use] is ... being well implemented, and we can report that water trading has become a central feature of irrigated agriculture in Inland NSW. (sub. 42, p. 3)

The Wentworth Group stated:

The maturation of water markets in the Murray-Darling Basin is one of the success stories of the National Water Initiative reforms. (sub. 40, p. 3)

Murray Irrigation's view was:

The water market – and the value of water – has led to the improved efficiencies and diversity of commodities now being grown across the Basin. This has had far more of an impact on efficiency than any other Government policy or water reform. (sub. 16. p. 6)

Water trading has become a vital tool for irrigators, giving them increased flexibility to respond to fluctuating climatic and market conditions. A survey of 564 irrigators in the southern MDB found that nearly all of them agreed that both allocation and entitlement trading were beneficial to their farm businesses (NWC 2012c, p. xi). The benefits have been most pronounced during drought, as it has allowed water to move from producers with flexible irrigation demands (such as rice and cotton growers) to those with inflexible demands (such as horticulturalists). Trading has also enabled new industries, such as almond growing, to develop rapidly.

A further benefit of expanding trade is that it has increased the incentive for irrigators to use water more efficiently because surplus water can be sold. In some cases irrigators have increased water use efficiency considerably. For example, it has been reported that whole farm irrigation efficiency (a measure of the amount of irrigation water that was used by the plant as a percentage of total irrigation water inputs to the farm) for Australian cotton growers was 57 per cent in the late 1990s and that 10 years later it had risen to about 70 per cent (Cotton Australia and CRDC 2014, p. 35). While there may have been a range of reasons for this increase, it seems likely that the incentives created by water trading are at least partly responsible.

While there has been only a small number of studies that attempt to quantify the benefits of trading, they suggest that the benefits have been significant.

- Two NWC studies sought to estimate aggregate economic impacts of water trading.
 - A 2010 study used multiple assessment methods in coming to the conclusion that 'water trading has significantly benefited individuals and communities across the southern MDB' (NWC 2010b, p. v). Economic modelling commissioned for the study estimated that water trading in the southern MDB increased Australia's gross domestic product (GDP) by \$220 million in 2008-09.
 - Economic modelling for a 2012 study estimated that regional GDP in the southern MDB was \$4.3 billion higher over the 5 years to 2010-11 than it would have been without water trading (and on-farm reallocation of water between irrigation activities)

(NWC 2012c, p. xii). Enabling water trading across regions accounted for \$845 million of those benefits. The effects were greatest in the most extreme drought years and smallest in 2010-11 when water availability increased. However, it should be noted that the study may overestimate the overall benefits because the effects on regional GDP tends to be higher than for national GDP.

- The ABS estimated that, during the drought between 2005-06 and 2008-09, gross value of irrigated agricultural production (GVIAP) dropped by only 29 per cent, from \$5.5 to \$4.3 billion, while water availability dropped by 53 per cent. The fact that GVIAP fell by so much less than water availability suggests that there were benefits from trade, particularly through the movement of water to high-value horticulture. However, this conclusion is not definite because GVIAP does not consider price movements or the substitution of water for other inputs (such as fodder bought by dairy farmers) (NWC 2011e, p. 102).
- An NWC study looked at the costs and benefits of a particular trade-enabling reform — unbundling of water rights in Victoria to create separate entitlements, delivery shares, extraction shares and water use licences. The main cost was about \$25 million spent on upgrading computer systems and developing policy, guidelines and regulations. While the study did not put a dollar figure on the benefits, it reported that permanent transfers increased from 500 to 5000 per year and allocation trades increased from 6000 to 15 000 per year and that unbundling provided greater flexibility for water users and other benefits. The study also reported that '[i]t is widely accepted that the benefits of unbundling in Victoria have been substantial and outweighed the costs' (NWC 2011c, p. 139). With the main cost being incurred upfront and the benefits ongoing, there would seem to be little doubt about this conclusion.

This last study is a useful reminder that each potential trade-enabling reform should be looked at on its merits, which is the approach that the Commission has taken in this inquiry.

Studies that have examined the social and economic impacts of trading on regions that experience net reductions in water use due to irrigator-to-irrigator trade have generally found only modest effects. It is important to appreciate that where water is traded out of a region there is a transfer of money into the region, which will often be spent or invested locally. One NWC (2010b, p. vii) study found that in most cases reductions in regional water use due to trading comprised less than 10 per cent of total water use and that reductions in the value of agricultural production were smaller again. Both this study and a later one found no discernible link between patterns of water trading in or out of a region and changes in population, employment in agriculture or weekly household income (NWC 2010b, 2012c).

There is some evidence that the impacts on regions that lose water due to buybacks of water for the environment can be more substantial, as the proportion of water leaving a region may be greater. For example, socioeconomic analysis conducted for the Northern MDB Review estimated that past and proposed future water recovery would reduce total employment by

9 per cent in St George and by 18 per cent in Dirranbandi (MDBA 2016b, p. 4).¹⁴ However, such impacts are a consequence of allocating more water to the environment, rather than a result of trade per se. Indeed, recovering water through a voluntary buyback would be likely to reduce social and economic effects on regions compared with other options, such as across the board cuts, because it recovers water from those who value it least.

Overall, the development of water trading in Australia has been a success and has delivered significant net benefits. While the benefits so far have gone mainly to irrigators in the MDB, trade is expanding to other regions and there is potential for this to continue.

Where to next

Based on the areas of unfinished business from the NWI, and issues identified through consultations and research, the Commission has identified the following areas as warranting further attention:

- removing or better targeting some remaining restrictions on trade
- reducing other trade barriers, such as delays in approving trades and excessive trade-related charges
- improving market information
- promoting confidence in water markets — specifically, whether this requires tighter controls on: water market intermediaries; trading by the Commonwealth Environmental Water Holder (CEWH); and foreign ownership of water.

4.3 Removing or better targeting restrictions on trade

While much progress has been made in removing restrictions on water trading, there are potentially some further gains to be made. There are various restrictions on trading water in Australia, some of which are unavoidable and others worthy of investigation to see if they are warranted. Some restrictions simply reflect hydrological realities — the paths of rivers and the extent of aquifers limit where water can be used and traded. For example, Tasmania has many small water systems that are not connected to one another and this restricts trade to being within each system. While it is possible to invest in artificial connections (such as pipelines) to expand trade, this is unlikely to be cost effective in most situations. Two other types of restrictions that require more attention are discussed below.

¹⁴ In part due to the findings of this study it was decided to reduce the quantity of water to be recovered for the environment.

Restrictions to manage hydrological constraints or environmental impacts

There are a range of current restrictions on trade (trade rules) designed to manage hydrological constraints or environmental impacts and minimise adverse effects on third parties. Some examples are:

- trade from above to below a congestion point in a river being restricted so as to protect normal deliveries of water to downstream users
- trade out of a valley being restricted to limit conveyance losses or manage the risk of spills from storages, both of which can reduce the water available to other users
- trade into a particular area not being allowed because increasing irrigation there would exacerbate salinity problems
- trade of groundwater to a particular location not being allowed because it would cause a localised drop in the water table that would hinder other water users or damage groundwater dependent ecosystems.

Some participants in this inquiry, and other commentators, have argued that some trade restrictions designed to manage hydrological constraints or environmental impacts are inefficient, not transparent or in need of review. For example:

- the ACCC (sub. 28) argued that some restrictions in the southern MDB were frustrating the effective and efficient operation of water markets
- the CEWH (sub. 63, p. 3) argued that ‘trade restrictions, put in place to address environmental and socio-economic impacts of consumptive water transfers [such as the Barmah Choke trade limits] are emerging as a limiting factor in the management of environmental water use’ and that there is a need for longer-term policy solutions
- in reviewing water trading in the southern MDB, the Australian Bureau of Agricultural and Resource Economics (ABARES) advocated ‘continuing to review trade limits and river operations, to find ways to alleviate trade restrictions while minimising third-party effects’ (Hughes, Gupta and Rathakumar 2016, p. 3)
- the NSW Irrigators’ Council (sub. 42, p. 3) noted that ‘there has been some aggravation amongst irrigators and water traders over the information on capped volumes of water for Inter Valley Transfer trade’, while also acknowledging that information flows had improved
- the Business Council of Australia (sub. 65) called for a general review of restrictions on water trading.

The main restrictions raised in consultations for this inquiry were the Murrumbidgee inter-valley transfer (IVT) trade limits (box 4.2), the Goulburn IVT trade limits, limits on trade through the Barmah Choke and limits on trade from NSW Murray to Victorian Murray. All of these are in the southern MDB and have at times been binding restrictions on trade in recent years.

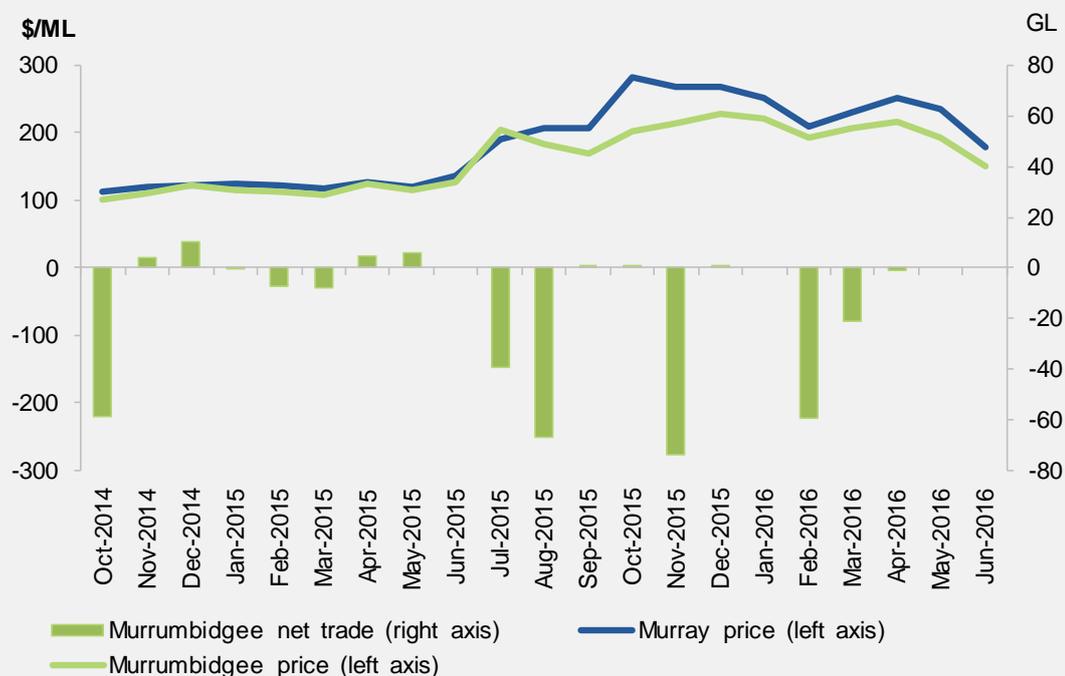
Box 4.2 Murrumbidgee inter-valley transfer trade limits

The States and the Murray-Darling Basin Authority maintain inter-valley transfer (IVT) accounts to keep track of net allocation trade between regions. The IVT accounts record how much water needs to be physically transferred between systems to satisfy regional water demands. As trades occur the account balances are adjusted accordingly. Water is periodically released from storages to reset the balances to, or towards, zero. The timing of these releases depends on a range of river operations objectives (such as minimising evaporation and storage losses). In some cases, a regional IVT account may not be balanced within the water year, in which case it is carried over to the next year.

The Murrumbidgee IVT trade limit specifies that the Murrumbidgee IVT account balance be between 0 GL and -100 GL, meaning that there is to be no net allocation trade into the valley and that net trade out of the valley not exceed 100 GL. These rules are intended to reflect hydrological constraints — water cannot be transferred upstream into the Murrumbidgee and large downstream transfers can result in high conveyance losses. An additional consideration is that the larger a negative balance is, the more water there is in the Murrumbidgee storages that ‘belongs’ to downstream users. This could undermine future allocations to Murrumbidgee entitlements should these storages spill.

The Murrumbidgee IVT trade limit was reached in August 2015, preventing trade out of the region and resulting in a divergence in allocation prices between the Murrumbidgee and Murray trading zones, as shown in the figure below.

Monthly allocation prices, Murrumbidgee and Murray^a



^a Net trade data unavailable after April 2016.

(continued next page)

Box 4.2 (continued)

Some irrigators have raised concerns about the fairness and transparency of the Murrumbidgee IVT trade limit, suggesting that some market participants have a greater chance of getting a trade through than others. New South Wales has recently made some changes to improve transparency, as discussed in appendix B.

The Murrumbidgee IVT trade limit could potentially also reduce the efficiency of the water market. Undoubtedly the limit does prevent trades from occurring that would make buyers and sellers better off. Given the size of the price gap shown above these forgone benefits are substantial. What is not clear is whether forgoing these benefits is simply the price that must be paid to manage the hydrological constraints and prevent adverse impacts of trade on other water users, or whether these objectives could be better met in some other way.

Sources: Productivity Commission analysis; Hughes, Gupta and Rathakumar (2016).

Trade restrictions that are used to manage hydrological constraints and environmental impacts have both costs and benefits. The costs arise because they prevent trades benefitting buyers and sellers from occurring. As illustrated in box 4.2 these costs can be substantial. The benefits result from preventing adverse impacts on other water users or the environment that could arise were the integrity of entitlements undermined. The aim should be to ensure that net benefits are maximised and that the restrictions that are in place operate in a fair and transparent manner. In doing this it is important to consider all options, including making the restriction less (or more) stringent, altering river operation decisions to lessen the need for a restriction and replacing a restriction with a more efficient measure. The latter could involve applying a loss factor on trades to account for conveyance losses or creating tradeable rights to the capacity of a congestion point on a river.

There are processes in place that could lead to some improvements being made to current trade restrictions. One of these processes involves the Basin Plan water trading rules, which were introduced in July 2014. The rules, developed and enforced by the Murray-Darling Basin Authority (MDBA), aim to reduce restrictions on trade and improve transparency (among other things). They operate alongside existing Basin state rules (such as those above) and irrigation infrastructure operator rules. In the event of inconsistencies between the sets of rules, the Basin Plan water trading rules apply. The MDBA is currently working with Basin States to identify and rectify inconsistencies that have the greatest potential to impact on water markets. In addition, the MDBA has established policy and operational working groups with Basin States. One of the purposes of these working groups is to find ways to improve the operation of water markets in the MDB.

It is unclear, however, the extent to which these processes will lead to potential improvements in the efficiency and transparency of trade restrictions being realised. For example, the ACCC argued that:

[the restrictions listed above, plus some others] will not be resolved by the Basin Plan water trading rules, as they are a product of deficiencies in State water sharing arrangements under the Murray-Darling Basin Agreement. (sub. 28, p. 19)

The Commission will be considering these issues further and encourages interested parties to put forward views and evidence in submissions to this draft report on:

- how much potential there is to improve the transparency and efficiency of trade restrictions designed to manage hydrological constraints (such as the IVT trade limits)
- whether current processes, such as those relating to the Basin Plan trade rules, are likely to lead to this potential being realised.

While this discussion has concentrated on the southern MDB, the principle that trade rules should be designed to manage hydrological constraints or environmental impacts in a way that maximises net benefits and operate in a fair and transparent manner applies broadly. In many groundwater system one of the key issues is that limited knowledge about the resource can lead to conservative trade rules being applied. While this is often appropriate, it should be recognised that one of the benefits of improving understanding of the resource is that this can allow more liberal trade rules to be devised.

Restrictions on trade between the irrigation and urban sectors

Trade restrictions designed to protect production, water infrastructure use or employment in particular locations or industries are not permitted under the NWI and considerable progress has been made in removing them. For example, Victoria removed the 4 per cent limit on entitlement trade out of irrigation areas in July 2014 (NWC 2014c, p. 235). Of those that remain, the Commission's assessment is that restrictions on purchasing, or otherwise transferring, water between the irrigation and urban sectors are the most costly to the community.

Allowing trade in water between the irrigation and urban sectors provides benefits for irrigators, urban water users and the community more broadly. As with other trades that are entered into freely, both the buyer and seller are made better off. The community benefits because trade allows water to move from lower to higher value uses. Households are frequently willing to pay between 10 and 100 times more for water than the price irrigators are willing to accept, meaning that the gains from trade for irrigators and households can be large (even after allowing for pumping, water treatment and other marginal costs for urban delivery).¹⁵

For these gains to be realised there must be no trade rules or other barriers preventing urban water utilities from purchasing water or moving it out of the source region. In addition, all urban water supply augmentation options need to be considered on their merits, with no implicit or explicit policy bans on options such as purchasing water entitlements or allocations.

¹⁵ On the basis that urban users frequently pay over \$3000 per ML for water and the price for water allocations is often between \$30 and \$300 per ML.

There are some examples of water utilities purchasing water from irrigators for urban use. Adelaide has for decades obtained a significant proportion of its water from the River Murray, and has used direct on-market purchases from irrigators for this in recent years. In Victoria, Coliban Water and Central Highlands Water bought a mix of entitlements and allocations to address critical supply shortfalls in Bendigo and Ballarat during the Millennium Drought (NWC 2011e). Trade restrictions, however, are in place in several States, which represents a significant breach of the commitments in the NWI. These take different forms, from trade rules, to governments giving implicit or explicit directions to water utilities not to purchase or transfer water for urban use (table 4.3).

Table 4.3 Restrictions on trading/transferring water between the irrigation and urban sectors

Adelaide	The decision by the South Australian Government to build a desalination plant in preference to relying on the cheaper option of purchasing water entitlements from the southern MDB suggests that there was an implicit government policy ban on the purchasing option (PC 2011). The Australian Government's decision to provide funding for the plant on the condition that it be doubled in capacity added significantly to the cost. Now that the desalination plant has been built (commissioning was completed in 2013) it is likely to be cheaper in most cases to purchase water from the MDB than to run the desalination plant (after allowing for pumping and treatment costs). It is unclear whether future decisions about this will be influenced by political considerations.
Perth	Current arrangements for water rights in Western Australia, such as the requirement for trade to be within the same water resource area, the need for Ministerial approval of each trade and the absence of perpetual water entitlements, can restrict trade between the irrigation and urban sectors. In addition, the Water Corporation previously identified accessing the south-west Yarragadee aquifer as a preferred supply augmentation option, but following local opposition to the water being transferred to Perth the Western Australian Government decided to instead use the higher cost option of building a second desalination plant (PC 2011).
Melbourne	The North-South Pipeline is capable of transferring over 100 GL from the Goulburn River to Melbourne's water storages, but it has remained largely unused since 2010 due to a Victorian Government decision that it only be used in times of critical human need (Melbourne Water 2014; PC 2011). Water utilities in Melbourne own 75 GL of water entitlement in northern Victoria (obtained through funding irrigation infrastructure upgrades), but because of the policy ban they are obliged to sell their allocation each year. Using the pipeline more regularly and relying less on other options such as investing in water recycling plants or ordering water from the Wonthaggi desalination plant would provide considerable savings.
Canberra	Despite efforts made by the ACT Government there has been very little progress on establishing interstate water trading between the ACT and New South Wales (EPSDD, pers. comm., 28 June 2017). However, there would seem to be some prospect that this situation will be rectified, with ACT and New South Wales Ministers advising that they have reached in-principle agreement to establish trade (Murray-Darling Basin Ministerial Council 2017). If such trade were enabled it would likely be mainly between the irrigation and urban sectors, given that urban use predominates in the ACT and irrigation use predominates in the Murrumbidgee region of New South Wales.

The cost to the Australian community from restrictions on trade between the irrigation and urban sectors has been high, mainly because they have resulted in higher cost sources of water being developed for urban supply. For example, had Adelaide relied on purchasing water entitlements instead of building a large desalination plant this would have generated a

capital saving of as much as \$1.6 billion and produced substantial savings in operating costs (PC 2011, p. 92). While most jurisdictions (with the exception of Perth) are not considering major supply augmentations at present, such wasteful expenditure could reoccur in the future if water trading and other transfers are ruled out as urban supply options. The more immediate concern is that water could be supplied from existing desalination plants when lower cost water is available.

The main argument against allowing trade is that, while it would benefit those irrigators that participate, it would have a negative effect on communities that rely on irrigation. However, these effects are likely to be fairly modest because:

- urban water use is often small compared with irrigation use and so a small proportion of irrigation water can make a large contribution to urban supplies (for example, if Melbourne's water utilities had used the allocation on their own entitlements to transfer 75 GL of water to Melbourne through the North-South pipeline in 2015-16, this would have been equivalent to about 2.2 per cent of allocation available to holders of northern Victorian entitlements (GMW 2016, p. 14))
- water trade allows water to be sourced from those that value it least, such as irrigators whose production per megalitre of water is relatively low.

Even so, it is appropriate for governments to take the potential for negative effects on regional communities into account. These should, however, be weighed up against the large benefits that can result from allowing trade between the irrigation and urban sectors. In the Commission's view, governments should allow trade and assist individuals and communities to adjust to the resulting change, rather than seek to preserve the status quo.

4.4 Reducing other trade barriers

In addition to the trade restrictions discussed above, excessive delays and costs can be barriers to water trading. In some cases these barriers reduce the gains from trade. For example, a delay in an allocation trade being approved could result in an irrigator watering their crop several days later than would have been ideal. In other cases, barriers can prevent trade from proceeding altogether.

Trade approval processes

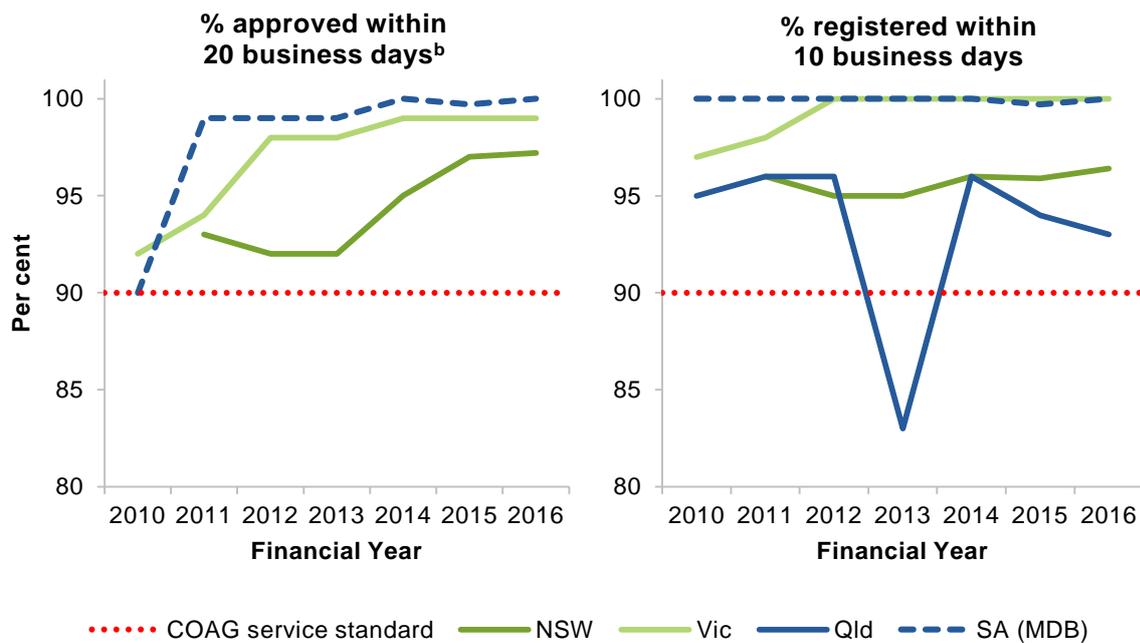
While trade approval processes have generally improved over the years there would appear to be further opportunities to make trading quicker and easier for market participants (appendix B). To promote this, there would be merit in reviewing service standards for trade approval processing times, with a view to tightening them. The current service standards, which apply only to the MDB, have been in place since 2009 (appendix B). As shown in figures 4.2 and 4.3, all Basin States have generally met these standards. In some cases they

meet the target timeframe at, or close to, 100 per cent of the time, meaning that reporting against the standard no longer provides a useful measure of improvement.

In 2010, the ACCC (2010b) recommended that the standards be reviewed at least every two years, including to consider whether they could be further tightened. To the Commission’s knowledge this has not been done, and certainly the standards have not been altered since 2009.

The National Water Reform Committee decided in 2014 not to develop service standards for non-MDB jurisdictions (NWC 2014c). Given the much lower trade volumes and more complex and variable approval issues that often apply outside the MDB (particularly in unregulated and groundwater systems), this may well have been an appropriate decision.

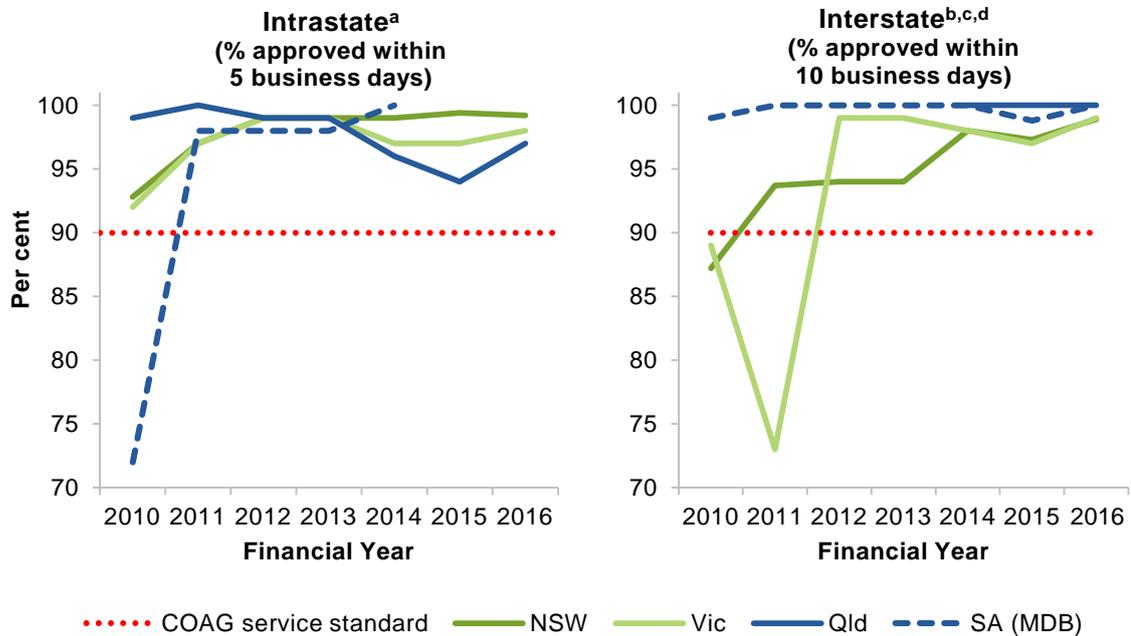
Figure 4.2 Processing entitlement trades^a
Performance of jurisdictions against COAG standards, 2009-10 to 2015-16



^a Data are not included for New South Wales in 2009-10 because ‘stop the clock’ provisions for processing times were not included in calculations for that year. ^b No approval is required for entitlement trades in Queensland.

Data sources: ABARES (2016, 2017); Morey et al. (2015); NWC (2010a, 2011a, 2012b, 2013a).

Figure 4.3 Processing allocation trades
Performance of jurisdictions against COAG standards, 2009-10 to 2015-16



^a Prior to 2014-15, Queensland intrastate data are for supplemented water trades only. ^b For South Australia, intrastate trade performance benchmarks are set for 10 business days, and interstate trade performance benchmarks are set for 20 business days. Interstate trade benchmark performance of New South Wales and Victoria with South Australia has been excluded for brevity. ^c Prior to 2013-14, Queensland processed no interstate trades (these trades appear on the New South Wales Water Register). ^d Victoria's interstate trade performance in 2010-11 may be underestimated because the reported figure did not account for 'stop the clock' provisions.

Data sources: ABARES (2016, 2017); Morey et al. (2015); NWC (2010a, 2011a, 2012b, 2013a).

Trade application charges

Approval authorities impose charges on trade applications so as to recover the cost of processing. Ideally, processing of trades would be done as efficiently as possible, and trade application charges would reflect the full cost of this efficient service. If this were the case, charges across jurisdictions would be expected to vary to some extent, due to differences in the number of trades and the complexity of approval issues.

For example, a jurisdiction with a high volume of trade might find that it was efficient to invest in a highly automated system, and then be able to recoup the capital and other costs for this through a relatively low charge. By contrast, a jurisdiction with few trades might find it more efficient to use a somewhat more labour-intensive system and, therefore, need to have higher charges to recover their costs.

Actual trade application charges, shown in table 4.4, however, show large variations across jurisdictions that do not appear to be consistent with what would be expected. For example,

the charge for an allocation trade in South Australia is more than five times higher than for an online allocation trade in Victoria, despite both these jurisdictions having a relatively high number of trades (albeit that the number of trades is higher in Victoria than South Australia). To put this in context, the median value of an intrastate allocation trade in South Australia in 2015-16 was roughly \$8000. With a charge per trade of \$244, this means half of all allocation trades would involve a charge equivalent to 3 per cent or more of the transaction value (with the equivalent proportion for Victoria being under 1 per cent).

Accordingly, there would appear to be scope for some jurisdictions with high trade application charges, in particular South Australia, to move to more efficient systems and lower their charges over time.

Table 4.4 Water trade application charges^{a,b}
Applicable in 2015-16

Type of trade	NSW	Vic online/ paper	Qld regulated/ unregulated	WA	SA	Tas ^c	ACT	NT
Water entitlement trade (\$)								
Intrastate	497	303	286	200	415	66	160	na
Interstate	497	303	286	..	415
Water allocation trade (\$)								
Intrastate	64	44/82	0/157	200	244	0	160	na
Interstate	64 ^d	44/82	157	..	244

^a Assumes a water allocation trade of 50 ML. ^b Charges rounded to the nearest dollar. ^c 2016-17 price.

^d Where the buyer licence is not linked to a New South Wales Works Approval, a variable use charge also applies. **na** Not available. **..** Not applicable.

Sources: ACCC (2017); DWER (WA) (2017a); Tasmanian Irrigation (2016c).

4.5 Improving market information

For water markets to operate efficiently and equitably market participants need to be able to access reliable and timely information. A wide range of information can be relevant, including on things such as long-range weather forecasts. However, market information, particularly on prices, has received the most attention due to its critical importance and some current shortcomings in accuracy, timeliness and accessibility. Both governments and the private sector can play a role in improving such information.

The NWC explained the importance of price information as follows:

Price information is one of the more critical pieces of information, because changing market prices signal the prevailing value of a commodity. Markets are described as ‘efficient’ when prices reflect all available information and adjust swiftly as new information arrives. If buyers

and sellers do not know what prices are, then some mutually agreeable trades will fail to occur, thus creating inefficiencies. ...

Accurate price information also promotes market accountability and transparency because price aberrations will be queried and scrutinised by the market, possibly revealing issues such as insider trading or other market biases. It is vital for market participants' confidence in market operations and underlying market systems. Thus, in addition to supporting water traders and their brokers, information on prices is also useful for regulators and relevant government agencies as they seek to assess water market developments and develop policies relating to water management and conservation. (2011c, p. 26)

In addition, even where deficiencies in information do not deter trade, it can increase transaction costs for market participants. Appendix B discusses the availability and quality of water market information across Australia, the key points being:

- information on water prices is available from a wide range of sources, both public (including state government water registers and trading reports, the BOM website and ABARES and ACCC reports) and private (including water brokers, consulting firms and irrigation infrastructure operators)
- the quality and availability of price and other market information has generally improved over time, but there are some remaining deficiencies, including:
 - water registers:
 - ... containing many transactions with unrealistic prices, including a high proportion of zero price trades (zero price trades can result from misreporting by traders, environmental transfers¹⁶ or the trade being between related parties)
 - ... having entitlement prices that are not up to date because of the time taken to approve and register them
 - ... failing to capture and report the contract date as well as the registration date
 - ... varying greatly in how accessible they make information
 - prices for allocation trades not being recorded in Queensland's water register
 - information products that are based on 'cleaned' data (that is, data that are filtered to exclude trades with clearly inaccurate prices) either not being available in a timely way or employing sub-optimal or inconsistent cleaning practices
 - information being fragmented across multiple sources, making it harder for market participants to find the information they need
 - very little market information being available for some smaller water markets.

Some State and Territory Governments are undertaking work to improve the quality and accessibility of price information. For example, the New South Wales Government has

¹⁶ Environmental transfers occur where an environmental water holder transfers water from one region to another. These transfers appear as allocation trades in registry data, but there is no change of ownership or commercial transaction involved.

developed a work program for improving water markets, including by further developing trade information products to meet stakeholder needs. In addition, there are several Australian Government initiatives on water market information.

First, the Department of Industry, Innovation and Science has awarded grants of up to \$100 000 each to several firms to complete a feasibility study relating to the challenge to ‘Improve transparency and reliability of water market information’ (under a program called Business Research and Innovation Initiative). These firms may be eligible to apply for a further grant of up to \$1 million to develop a proof of concept for their proposed solution (Australian Government 2017). The Australian Government is seeking to improve the transparency and reliability of water market information through a solution that enables users to access and be readily aware of the range of water market information.

Second, ABARES is preparing a report on cleaning water market data (for example, to filter out reported trade prices that are clearly unrealistic, so that more accurate average prices can be calculated). The aims of this work are to:

- achieve a greater consensus among the organisations that are currently involved in cleaning water data (including ABARES, BOM and various consulting firms) on the best procedures to use
- make ABARES data cleaning algorithms available to other organisations so that they can be used in providing data that are as accurate as possible, given the deficiencies in the source data (ABARES, pers. comm., 21 August 2017).

Third, the MDBA’s work program includes activities designed to achieve better price reporting within the MDB. For example, in seeking to achieve compliance with the Basin Plan water trading rules the MDBA has flagged that it will work with Basin States to improve knowledge of price reporting practices, and that they may intervene where individual traders regularly fail to fulfil their reporting obligations. The MDBA also intends to:

... pursue work on better price reporting through wider parts of our work program. This will include education activities for water market participants. (MDBA 2016d, p. 7)

Some stakeholders who might be expected to gain from improved water market information are less than enthusiastic about some of these types of initiatives. For example, the NSW Irrigators’ Council argued:

Government agencies – Federal and State – have displayed an obsession with water market information, analysis and regulation, often based on the misconception of there being some level of ‘market failure’ in water trading within the Murray Darling Basin. ...

The large range of water broking services aids in information flow to irrigators and others, and there is no evidence of any lack of timely information on water available for trade or the prevailing prices in Inland valleys. (sub. 42, p. 3)

In a similar vein, Coleambally Irrigation Co-operative Limited (CICL) stated:

some of the Government enthusiasm for improving market information needs to be re-channelled into improving back-end processes [e.g. the administrative processes undertaken by States to approve trades and adjust registers]. (sub. 46, p. 4)

The National Irrigators' Council perspective was somewhat different in that they saw deficiencies in government-provided information as contributing to an over-reliance on brokers:

It is impossible to get trade data which clearly reveals historical market prices because ... There is a considerable lag between contract date (which is not captured) and registration date. To make matters worse the lag is not uniform in any way (two trades next to each other on a register could have been contracted months apart). Therefore, brokers can use their trade flow to be more informed than other market participants.¹⁷ (sub. 13, p. 15)

The Department of Agriculture and Water Resources also referred to information deficiencies:

We continue to observe issues arising from the lack of transparent and timely data including: the price and volume of individual trades; the type of trade (for example, spot, environmental, bundled and in-kind transfers); and, details of alternative products (such as multiple year leases of allocation water, carryover and other forms of storage). (sub. 73, p. 3)

The National Farmers' Federation (NFF) pointed out that the private sector also has a role:

In NFF's view, the core role for Government is to ensure that base trade data is made freely available in a timely manner. This can either be accessed by individual water users, or by commercial service providers that transform base data into useful knowledge products. (sub. 55, p. 7)

The Commission's view is that the market information that is currently available is generally adequate to support the operation of reasonably efficient water markets. While governments can play a worthwhile role in improving information, it should be borne in mind that the costs of doing so need to be taken into account and that the private sector is often better placed to provide information that is tailored to water users' needs.

The main role for governments should be to ensure that basic trade data (such as that recorded on each transaction in water registers) are not compromised by unnecessary errors and are freely available in a timely manner. (Governments also need to consider their own need for information in fulfilling their regulatory, policy and environmental watering functions.) State and Territory Governments can help achieve this by:

- improving approval processes to make sure that all important information is captured, including the contract date, whether trades are between related parties, distinguishing environmental transfers from other transactions and distinguishing between multiple year leases of allocation from other trades
- upgrading the reporting capabilities of registries where necessary, such as in Queensland (appendix B).

¹⁷ The National Irrigators' Council also nominated the length of the process as a barrier to trade.

The Australian Government has taken on a greater role with market information over recent years. There have been some positive outcomes from this, such as availability of more comprehensive trade data through the BOM website, although whether this has been worth the cost is unclear. However, some of its initiatives, such as the Business Research and Innovation Initiative challenge to improve transparency and reliability of water market information, in the Commission's view, go beyond the role that governments should be playing.

DRAFT RECOMMENDATION 4.1

Australian, State and Territory Governments should maintain trade reforms to date and improve arrangements to facilitate open and efficient water markets.

Priorities are:

- a. State and Territory Governments should remove those residual trading rules, policies (whether or not explicitly stated) and other barriers that prevent water being traded, or otherwise transferred, between the irrigation and urban sectors
- b. the Australian Government should commission an independent review of the effectiveness and efficiency of service standards for trade approvals. The review should consider whether the standards should require shorter approval times
- c. the role of governments in providing water market information should be focused on ensuring the quality and accessibility of basic trading data. In fulfilling this role, State and Territory Governments should improve the quality and accessibility of trade data in water registers.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendation 4.1 (a).

4.6 Promoting confidence in water markets

This section considers some regulatory and governance issues that can influence confidence in water markets.

Conduct of market intermediaries

Water market participants often use the services of an intermediary — either a water broker or water exchange — when trading water. Brokers investigate trading options, provide advice, and manage approval and registration processes on behalf of their clients. Water exchanges match buyers and sellers through an automated process or bulletin board, and also organise and submit information to approval authorities.

While many people recognise that intermediaries play a valuable role by adding to the depth of water markets, improving information availability and otherwise reducing transaction

costs, there have been concerns about the conduct of some service providers over the years. For example, an ACCC study (2010a) found there were ongoing stakeholder concerns about issues such as potential fraud, lack of professional indemnity insurance, conflicts of interest and inadequate arrangements for protecting client's deposits.

Such concerns have led to some stakeholders calling for market intermediaries, particularly water brokers, to be subject to increased regulation. Water brokers and water exchanges are subject to general laws, such as the *Competition and Consumer Act 2010* (Cwlth), criminal law and contract law. Additional regulation could take a variety of forms, with one option being an industry-specific licensing scheme that imposes obligations regarding competency and conduct.

The question of whether market intermediaries should be more tightly regulated was examined in depth by the NWC (2011c). It found that the risk of losses stemming from negligence or incompetency were minor, and that risks were likely to have decreased over recent years as water traders had become more familiar with the water market and more able to judge the capabilities of different service providers. It also found that misconduct of water market intermediaries could be addressed under existing legislation and that introducing a licensing scheme would be costly. The NWC concluded:

On balance, licensing for water brokers ... is not warranted at this stage. Ongoing monitoring is recommended, in conjunction with a number of government initiatives to support self-regulation by the industry. The emphasis is on information disclosure and harnessing the competitive pressures in the market for intermediary services to allow traders to make more informed decisions about their choice of broker, as opposed to 'heavy-handed' industry-specific regulation. (2011c, p. 134)

The former Department of Sustainability, Environment, Water, Population and Communities also investigated the regulation of water market intermediaries. In 2013 it published a draft regulation impact statement that found that the costs of a licensing scheme were likely to exceed the benefits and could potentially cause many intermediaries to cease operating. It also investigated the options of a voluntary accreditation scheme and the government publishing guidance material on best practice for intermediaries. It found that it was unclear whether either of these options would produce net benefits relative to the status quo (DSEWPC 2013).

The Expert Panel that reviewed the *Water Act 2007* (Cwlth) recommended that:

industry develop, in consultation with the Australian Government, an industry-led scheme of regulation for water market intermediaries. The scheme could include voluntary accreditation, a code of conduct and a defalcation fund. If a scheme is not developed, the Australian Government should regulate water market intermediaries. State referrals would be necessary to give effect to Basin-wide or national regulation. (Australian Government 2014b, p. 54).

The Australian Government's response to the review stated that it would encourage water market industry representative bodies to establish such arrangements (DAWR 2015).

During consultations for the current inquiry very few stakeholders raised concerns about the conduct of water market intermediaries. The only submission that expressed a view about increased regulation of water brokers was against the idea:

NSW Irrigators' Council believes there has not been sufficient instance of maladministration in water broking to justify a significant tightening of regulation on water brokers. The Council is concerned that the introduction of stricter and more costly financial administration measures on brokers will tend to make small trades unviable and disadvantage smaller water brokers, and will add significantly to the cost of water trades to sellers and buyers. (NSW Irrigators' Council, sub. 42, p. 3)

The Commission is also of the view that increased regulation of water market intermediaries is not justified at this time. Since the NWC's assessment in 2011, competitive pressures are likely to have further reduced risks associated with the conduct of water intermediaries. In addition, a number of the measures called for by the NWC are now in place, including:

- water brokers that join the Australian Water Brokers Association are required to operate under a code of conduct that, among other things, requires them to have professional indemnity insurance and hold clients' deposits in accounts that are regularly audited
- the ACCC has published guides on fair trading obligations for water brokers and exchanges and on users' rights when participating in water markets.

Concerns about trading by the Commonwealth Environmental Water Holder

Since the Australian Government commenced recovering large quantities of water for the environment within the MDB about eight years ago, its holdings have grown to 2562 GL of entitlements with a long-term average annual yield of about 1781 GL (as at 31 July 2017) (DEE 2017a). These entitlements, which represent 14 per cent of entitlements within the MDB, are managed by the CEWH (ABARES 2017). Given the scale of these holdings there is some concern among stakeholders about impacts on water markets.

Recovery of water for the environment reduces the amount of water available for consumptive uses, which tends to push prices up. Analysis conducted by Aither (2016a) suggested that about a quarter of the increase in water allocation prices in the southern MDB between 2010-11 and 2014-15 was attributable to Commonwealth environmental water purchases. Increases in the value of water entitlements that are driven by recovery of water for the environment increase the wealth of entitlement holders generally. For those that participate in allocation markets, price increases are obviously favourable for sellers and unfavourable for buyers.

Now that the CEWH is managing a large portfolio of water entitlements, its own trading activity has the potential to influence water markets. For example, the CEWH might sell allocations in one year and use the proceeds to buy allocations in the following year, and this could affect prices. To date the CEWH has participated in only three trades, each involving

the sale of allocations (CEWH, sub. 63, p. 3), but its trading activities may become more substantial in the future.¹⁸

The *Water Act 2007* (Cwlth) provides authority for the trade of Commonwealth environmental water and imposes requirements that must be met for this trade to proceed. CEWH trading activities must also comply with the Basin Plan water trading rules and relevant state trading rules. In addition, the Commonwealth Environmental Water Office (CEWO) has developed a trading framework that is intended to inform interested parties and ensure that the CEWH's trading activities:

- support enhanced environmental outcomes
- have regard to social and economic outcomes
- consider impacts on the market, including any third-party impacts
- are undertaken in a manner which meets legislative requirements
- are financially responsible, fair, equitable, transparent and accountable; and that
- the CEWH and CEWO staff act with integrity and high ethical standards. (CEWO 2014, p. 1)

The framework also specifies that there will be an independent assessment of the impacts of the CEWH's trading on the water market, including consideration of third-party and socioeconomic impacts.

When the CEWO was developing this framework it consulted with stakeholders and industry and the majority of submissions they received were in general agreement with the CEWH's plans to trade environmental water (ANAO 2013). However, some stakeholders did express some concerns, for example, the NSW Irrigators' Council (2012) argued that the involvement of the CEWH in the water market will likely have far reaching impacts on other water licence holders, and it raised potential distortions of water market prices as one area of concern.

It is important to appreciate that market prices being influenced by the CEWH's water trading is not in itself a problem. Just as water trading by any agricultural sector, such as rice growers, will influence prices, it is to be expected, and entirely appropriate, that trading by environmental water holders will also affect prices. What would be detrimental is if the CEWH:

- made use of market-sensitive information that was not publicly available, but which it had access to because it operates from within a government department
- was able to exercise market power and use this to manipulate the market — given the characteristics of water markets (such as, the existence of many buyers and sellers, and

¹⁸ When the CEWH (and other environmental water holders) transfers water between regions this is recorded as allocation trade in water registers, even though it does not constitute trade in the usual sense as it is not a transaction between a buyer and seller. These transfers can influence markets because they can contribute towards trade restrictions, such as IVT limits, being triggered. This adds to the importance of reviewing trade restrictions, as discussed earlier in the chapter.

low barriers to entry) it seems unlikely that the CEWH (or any other market participant) would be able to do this, but it could be possible in smaller water systems.

The Commission's view is that there are adequate arrangements in place to guard against these outcomes occurring. Indeed, the more salient concern is not that the CEWH will cause detrimental effects by trading too much, but that it will fail to maximise environmental and community benefits by trading too little. It is reasonable that the CEWH has started out with a cautious approach to trading as this avoids it causing large and unpredictable effects on water markets. However, it is desirable that over time the CEWH and other environmental water holders will more fully exploit opportunities for trade and come to be regarded as legitimate market participants.

Foreign ownership of water

Concerns about foreign ownership of water have been raised in various forums. For example, when the ACCC (2010b) was developing advice on water trading rules it heard from a number of stakeholders that felt that there was potential for foreign ownership of water to have detrimental effects on commodity markets. More recently, the Senate Select Committee on the MDB Plan 'heard concerns from witnesses regarding the potential for foreign ownership of water and the implications this may have for the water market' (2016, p. 94).

The ACCC (2010b) considered that in light of existing restrictions on foreign investment in Australian assets (in particular, Foreign Investment Review Board provisions under the *Foreign Acquisitions and Takeovers Act 1975* (Cwlth)) there was not sufficient justification for additional restrictions on foreign ownership of water. The ACCC pointed out that there was little benefit in simply holding water, and that the benefit largely derives from use, which must occur in Australia. It also argued that it was not clear that foreign owners of water would be more likely than local owners to try to control production, and that there were general laws that addressed anticompetitive behaviour. The Commission agrees with the ACCC's analysis and considers that it remains relevant.

In the past the ABS has published survey data on foreign ownership of water entitlements, finding that 14 per cent of all reported water entitlements were owned by businesses with some level of foreign ownership in June 2013 (ABS 2014). In 2016, the Australian Government announced that it would establish a national register of foreign ownership of water entitlements. This has occurred, and from 1 July 2017 foreigners were required to register their entitlement holdings with the Australian Taxation Office. This register should provide a fact base that can be used to inform any future debates about foreign ownership of water.

5 Environmental management

Key points

- The development of water resources to service cities, agriculture and industry following European settlement led to the degradation of many of Australia's rivers, wetlands and floodplains.
- Recognising the environmental, cultural, social and economic benefits of sustainable water resource use, Australian, State and Territory Governments undertook a range of initiatives to improve water quality and the balance between environmental and consumptive uses of water.
- The 1994 COAG reforms, together with the National Water Initiative, sought to legitimise the environment as a water user. They required governments to identify the environment's share of water, address overallocation and overuse, and establish the management and institutional arrangements needed to achieve good outcomes for the environment and the community.
- There has been major progress in recent decades.
 - All jurisdictions except Western Australia have legally recognised the environment's share of water through planning arrangements. Provisions of water for the environment are made in all water plans.
 - In many areas, particularly in the highly-regulated parts of the Murray-Darling Basin, governments also provide environmental flows by way of entitlements with the same rights and conditions as those of consumptive users. This is often done as a means to address overallocation and overuse. Substantial entitlements are now actively managed for environmental benefit.
 - All governments have agencies responsible for environmental flow management, whether provided for through water plans or entitlements. Some arrangements are in place to coordinate the use of environmental water in shared resources, and entitlement-based environmental water has been traded.
- While ecological restoration is a long-term process, the benefits of having more water available for the environment are already being realised.
- The focus for the next phase of reform must be to ensure that all environmental water is managed efficiently and effectively to get the best outcomes possible. Key areas include:
 - increasing the focus on outcomes through the integrated management of environmental water and waterways, as water is only one of many things that affect ecosystem health
 - establishing fit-for-purpose governance arrangements for entitlement-based environmental water, particularly where managers are responsible for the use, financial management and trade of significant entitlement holdings
 - strengthening arrangements for monitoring, evaluation, reporting and adaptive management to build community confidence, ensure accountability, inform water planning and improve environmental water management over time.

Governments have sought to set an appropriate balance between environmental and consumptive uses of water through water planning and recovering water in overallocated and overused systems. However, providing a share of water for the environment may not be sufficient in itself to achieve environmental sustainability and the benefits this provides to the community. To get the best possible outcomes, it is critical that the water allocated to the environment is managed efficiently and effectively.

Efficient management includes integrating water provision with other waterway management activities at the local level to ensure outcomes are not undermined by factors such as poor water quality, lack of habitat and the presence of invasive species. Given the complex systems, multiple agencies and level of resources dedicated to managing entitlements for environmental and community benefit, institutional and governance settings must be clear and robust, while allowing operational flexibility. It is also essential that arrangements for monitoring, evaluating and reporting on environmental outcomes are appropriate to build public confidence and ensure environmental water management can continue to mature over time. This chapter considers the progress made by jurisdictions in these areas as well as opportunities for improvement.

5.1 The road to reform

Poor environmental health was a legacy of development

Recognition of the need for environmental management began to grow in Australia from the late 1960s, as the environmental degradation caused by the development of the nation's land and water resources drew more attention (Dovers 2013). The growth of cities, agriculture and industry led to the clearing of floodplains and riverbanks, river regulation, and water extraction for consumptive use. This reduced and changed natural flow regimes and increased the sediment and nutrient load in many of Australia's waterways, leading to water quality problems such as salinity, sedimentation and erosion (Argent 2017). In 1981, low flows caused a buildup of sand that closed the mouth of the River Murray for the first time in recorded history (MDBA 2011; Walker 2002). In 1991, a toxic algal bloom along 1200 km of the Darling River caused the New South Wales Government to declare a state of emergency (MDBA 2017c).

In light of the poor health of many rivers and wetlands, and the resulting social and economic impacts, the Australian, State and Territory Governments — acting both separately and together — undertook a range of initiatives to improve environmental condition, and in particular, water quality. The River Murray Salinity and Drainage Strategy was agreed in 1989 and the National Water Quality Management Strategy followed in 1992 (DAWR 2016d; MDBC 1999). Addressing the reduction in flows was more challenging due to the potential impact on consumptive users. Early efforts included the delivery (in 1980) of an 18 500 ML flow allocation to support the ecological health of the Macquarie Marshes in New South Wales, and an allocation of 25 000 ML from the capacity of Dartmouth Dam (built in 1979) to provide for the environment in northern Victoria (DCE (Vic) 1992;

NWC 2012a). More significant change was heralded in the mid-1990s, when all jurisdictions came together to develop a national water reform agenda, coupled with national principles for the provision of water for ecosystems (ARMCANZ and ANZECC 1996; COAG 1994).

Environmental management was included in a national approach to water reform

Environmental management was a key component of the 1994 COAG Water Reform Agreement. Through this agreement, governments sought to establish the environment as a legitimate water user, achieve a better balance between consumptive and environmental needs in overallocated systems, and make legally-recognised provisions of water for the environment.

Ten years on, the National Water Initiative (NWI) continued and extended the COAG framework by requiring governments to:

- identify the share of water for the environment in water plans
- return overallocated and overused surface and groundwater systems to environmentally-sustainable levels of extraction
- establish effective and efficient management and institutional arrangements to ensure the achievement of environmental and other public benefit outcomes.¹⁹

These key national policies paved the way for the substantial progress that followed.

5.2 Progress, benefits and where to next

There has been significant progress in recent decades

The Commission's assessment of progress against the relevant NWI commitments is discussed in appendix B and summarised in table 5.1 (environmental water provided through water plans is also discussed in chapter 3).

Most jurisdictions have identified and legally recognised a share of water for the environment in areas where water resources have been used to support development. All jurisdictions, other than Western Australia, have passed legislation enabling statutory provision of water for the environment. Water planning in most jurisdictions covers more than 80 per cent of water use, meaning that statutory environmental water provisions have generally been set in these areas. Areas that do not have plans tend to have fairly low extraction levels relative to the available water resources, which means that risks to the environment from extraction are generally low.

¹⁹ The NWI (schedule B(i)) defines 'other public benefits' as: 'mitigating pollution, public health (eg. limiting noxious algal blooms), indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values'.

Table 5.1 Assessment summary: Integrated management of water for environmental and other public benefit outcomes

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Well-defined environmental and other public benefit outcomes	Partially achieved	Environmental outcomes are increasingly well defined, but remain broad in many cases. Other public benefit outcomes are generally poorly specified.
Accountable environmental water managers	Largely achieved	All jurisdictions have environmental water managers, but the limits to their arrangements for independent auditing, review and reporting on outcomes mean they are not always fully accountable.
Joint arrangements for shared resources	Achieved	Key arrangements include those for the MDB, Great Artesian Basin and Lake Eyre Basin.
Common arrangements for connected surface and groundwater systems	Largely achieved	While the number of water plans that fully integrate groundwater and surface water resource management remains small, the number of water plans that recognise connectivity between groundwater and surface water (including through linked groundwater and surface water plans) has increased substantially since 2004.
Independent audit, review and reporting of environmental and other public benefit outcomes, and supporting management arrangements	Partially achieved	Progress has been made, but jurisdictions should increase their focus on monitoring outcomes, provide more balanced reporting, and provide for independent auditing (this function was largely lost with the abolition of the NWC).
Environmental water holders able to trade	Achieved	Environmental entitlements are limited to the MDB and southern Victoria.
Special requirements for high conservation value assets	Achieved	Special requirements are in place for Ramsar wetlands and other high ecological value sites.
Water recovery options selected primarily on the basis of cost-effectiveness	Not achieved	Recent decisions to prioritise infrastructure projects over water purchases in the MDB have prevented this action from being met.

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met.

The mechanisms to provide water for the environment in water plans vary by jurisdiction. However, water plans usually provide ‘planned environmental water’ where constraints or obligations are placed on consumptive users leaving a residual flow in the river or stream. These can include cease-to-pump rules, flow sharing arrangements, passing-flow releases from water storages and environmental water allowances (NWC 2014b).

In a number of Australian systems (particularly in the Murray-Darling Basin (MDB)), governments have supplemented planned environmental water with entitlements managed for environmental benefit. Known as ‘held environmental water’, these entitlements usually have the same rights and conditions as those held by irrigators and other consumptive users. Where these have been provided for environmental purposes, they have to be actively

managed, and environmental water managers have considerable discretion in how, where and when they can use this water.

As outlined in appendix B, there has been considerable progress in addressing overallocated or overused systems, although there is still further work to be done in a number of jurisdictions. Key initiatives to address overallocation and overuse have included:

- efforts in Western Australia to bring entitlement levels closer to actual use levels (such as for the Gnamptanga groundwater system and Lower Gascoyne) (NWC 2014c)
- the 2002 agreement between the Victorian, New South Wales and Australian Governments to return 21 per cent of the Snowy River's average natural flow (DPI (NSW) 2017d)
- the 2003 agreement between MDB jurisdictions (except Queensland) to acquire 500 GL of entitlements as a 'first step' to restoring the River Murray as part of The Living Murray (TLM) initiative (MDBA 2011)
- the Australian Government's \$13 billion initiative to rebalance water use and make water extraction sustainable across the MDB. This led to the Murray-Darling Basin Plan (the Basin Plan) and the expected recovery of a long-term annual average of 2750 GL of water for the environment by 2024 (MDBA 2017a).

In addition to these major initiatives, all MDB jurisdictions have put in place initiatives — which in some cases are funded by the Australian Government — to address overallocation and overuse in specific river systems and aquifers.

With the recovery of water in overallocated and overused systems, substantial entitlements are now held for environmental use. The Australian Government has the largest environmental water holdings — as of 31 July 2017, its entitlements amount to 2562 GL, with a long-term average annual yield of 1781 GL (DEE 2017b). The New South Wales and Victorian Governments also hold significant environmental water portfolios, while the South Australian Government manages a small number of entitlements for environmental purposes.

Whether the water is planned or held, all governments have identified agencies responsible for achieving environmental outcomes through water management. These agencies have established policy and planning frameworks for making decisions on the use of the water. Some arrangements are in place to coordinate the use of environmental water in shared resources (box 5.1 describes the general process for coordinating held environmental water use in the MDB), and held environmental water has been traded on the temporary market.

Box 5.1 **Held environmental water use in practice**

Providing water for the environment through the use of held entitlements requires collaboration by government agencies at all levels, their delivery partners and the community more broadly. There are four key stages in managing held environmental water.

1. Identifying and prioritising watering needs

Each year, local organisations submit watering proposals to environmental water holders (often through catchment-based consultation forums). These proposals are based on the short- and longer-term environmental needs of rivers, wetlands and floodplains — which are identified in consultation with local communities — and build on the planned water available for those systems. Where possible, proposals also identify opportunities to deliver water in ways that provide additional benefits to the community, such as for recreation or to support Indigenous values. State and Territory Governments (and in the case of the Murray-Darling Basin, the Murray-Darling Basin Authority) use the local information to identify priorities at the regional and basin scales.

2. Planning the use of the holdings

State environmental water holders then coordinate with the Commonwealth Environmental Water Holder to make decisions to use environmental water taking into account the priority watering needs, water availability, likely benefits and risks of different proposals (including risks to private property), and options to trade the water or keep it for the following year. They also coordinate the delivery of their water with planned environmental water, irrigation water and natural flows to maximise outcomes.

3. Delivering the water

The water is delivered in close collaboration with partners such as river operators, waterway managers, non-government organisations, landholders and communities.

4. Monitoring, evaluating and reporting on outcomes

Water holders work with scientists and local groups to monitor whether flows reach their target and determine whether any risks have materialised. They also monitor ecological responses to flows to evaluate whether the water is achieving the desired outcomes over the longer-term. Evaluation is used to help improve future water deliveries, and environmental water holders publish reports to keep the community informed about the outcomes of their activities.

The benefits of water reform are starting to be realised

While ecological restoration is a long-term process, the benefits of having more water available for the environment are being realised. Environmental flows have contributed to better outcomes for native fish, frogs and waterbirds, while also improving native vegetation condition and helping to maintain water quality (Argent 2017; Watts et al. 2016). Without the provision of water for the environment, there would have been greater environmental degradation in the MDB during the Millennium Drought (MDBA 2011).

The active management of environmental water is also yielding economic, social and cultural benefits. For example, in addition to a major flowering of native trees and the breeding of cormorants, the delivery of 74 GL to Hattah Lakes in 2014-15 led to a bigger honey crop and healthy bees that were then used to pollinate crops in other parts of Victoria

(Mallee CMA 2015; VEWH 2015). Environmental water delivery has benefited recreational fishers by supporting native fish breeding and has improved riverbank vegetation that contributes to the visual appeal of holiday spots (CEWH, sub. 63).

Where to next?

In assessing the progress of reform in 2014, the NWC highlighted the need to improve monitoring and reporting on environmental outcomes and noted inadequacies in the standard of environmental water accounting²⁰, particularly in relation to planned environmental flows. The NWC (2014c, p. 5) recommended that ‘Independent oversight and public reporting of the progress of water reform in achieving economic, social and environmental outcomes should continue’. The NWC also noted that the non-statutory nature of Western Australia’s water plans risked the longer-term security of environmental water provisions (NWC 2014b).

The Commission’s view is that these areas are unfinished business. The need for legislative reform in Western Australia is discussed in chapter 3. The need to improve monitoring and reporting is discussed below, along with other key issues associated with the growth and increasing maturity of environmental water management.

By recognising the environment as a legitimate water user and requiring statutory provision for environmental flows, the COAG and NWI reforms began a major ‘establishment’ phase of environmental water planning and recovery, which (while not yet complete) is well on its way. However, the discipline of environmental water management is still in its infancy. Jurisdictions have planned environmental flow provisions and environmental water holders have policies and processes to govern the use of their entitlements. But environmental water management remains a relatively new undertaking — the needs, practices and interactions with other parties of the sector will evolve over time.

The focus for the next phase of reform must be to ensure that environmental water assets (both planned and held) are managed efficiently and effectively to maximise environmental outcomes. They should also seek to provide additional community outcomes relating to water quality, Indigenous values, recreation and economic benefits, where possible. This is critical to get the greatest return on the considerable investment the community has made in allocating water for the environment.

²⁰ NWI paragraph 80 requires adequate measurement, monitoring and reporting to support public and investor confidence in the amount of water being recovered and managed for environmental and other public benefit outcomes. NWI paragraph 85 requires jurisdictions to develop a compatible register of environmental water, as well as reporting annually on environmental water rules and the overall effectiveness of the use of resources.

DRAFT RECOMMENDATION 5.1

Australian, State and Territory Governments should ensure that their policy frameworks provide for the efficient and effective use of environmental water to maximise environmental outcomes, and where possible, provide additional community outcomes relating to water quality, Indigenous values, recreation and economic benefits.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

Based on the areas of unfinished business and issues identified through consultations and research, the Commission has identified a range of areas that warrant further attention as part of an increased focus on the management of environmental water.

Some of these issues may be considered further as part of the Commission's subsequent inquiry into the implementation of the Basin Plan. For example, the Commission notes that existing regulatory and operational arrangements sometimes restrict the ability of environmental water managers to deliver water in a way that is efficient and effective.

However, in this chapter, the Commission focuses on three key areas where new policies, planning approaches or institutional arrangements could improve environmental outcomes.

1. Increasing the focus on outcomes by integrating the management of environmental water with waterway management.
2. Establishing fit-for-purpose governance arrangements to maintain the independence of decision makers, streamline decision-making processes and ensure decisions are made at the right level.
3. Improving monitoring, evaluation and reporting to build community confidence, ensure accountability and inform adaptive management.

5.3 Integrating the management of environmental water with waterway management

Providing water is, in itself, not generally enough to secure environmental outcomes. Environmental water can help achieve flow regimes that better reflect ecological need, but rivers, wetlands and floodplains also face threats such as nutrient pollution, salinity, increased sedimentation, habitat degradation and invasive species. The Commission considers there is significant scope to improve environmental outcomes through a focus on integrating the management of environmental water and waterways.

'Integration' can mean many things, but in this case it means that environmental water and waterway managers, at a minimum, align and coordinate their objectives and activities to improve environmental outcomes. For example, environmental watering may be more effective in increasing native fish populations if waterway managers can install fish ladders

to facilitate upstream movement. Waterway managers are generally responsible for managing such issues under State and Territory natural resource management (NRM) frameworks.

In 2014, the NWC (2014c) found that better integration of objectives for managing environmental water and waterways could lead to more cost-effective outcomes. Participants to this inquiry expressed a strong view that the integration of water and waterway management still needs to improve. In particular, participants have argued that:

- there is ‘too much reliance on flow only as the method and measure of improving the health of water systems’ (National Irrigators’ Council, sub. 13, p. 22)
- environmental watering actions ‘aimed at improving the health of native fish species but that also promote ... increased numbers of non native species, like the European carp, are less efficient and less effective than required’ (Coleambally Irrigation Cooperative Limited, sub. 46, p. 5)
- recent attempts to implement complementary ‘non-flow’ measures have been seen as ‘ad hoc’ or as an afterthought (Brian Bycroft, sub. 30; National Farmers’ Federation, sub. 55).

In the Commission’s view, the problem is that the legislative, institutional and policy frameworks in most States and Territories do not facilitate the integrated management of environmental water and waterways, as discussed below.

Supportive legislative, institutional and policy frameworks are often lacking

In different ways, all jurisdictions have indicated an intent through their legislation that water planning should have regard to other NRM planning, or vice versa. However, these provisions are not always clear and even where they are, jurisdictions’ institutional settings, policies and planning processes often do not support the intent.

For example, in developing water plans, planners in New South Wales must have ‘due regard’ to management plans prepared by the Local Land Services (LLS), while the LLS must have regard to water plans in drafting their own plans.²¹ Yet water was not explicitly mentioned in the ministerial list of priorities given to the LLS in 2016 (Blair 2016) and LLS boundaries are determined by local government areas rather than by catchments.²² As a result of both of these issues, the water-related NRM goals for LLS are weak and focus can vary significantly between catchments.

New South Wales is not the only jurisdiction where support for integration is lacking. Among other examples, the Northern Territory established the Department of Environment

²¹ *Water Management Act 2000* (NSW) s. 18(1A) and *Local Land Services Act 2013* (NSW) s. 47(3)(d).

²² Catchment management authorities were replaced by the LLS in 2014.

and Natural Resources to bring together functions including water and land resource management, but it is not clear from the department's strategic plan how water and NRM planning are aligned in practice (DENR (NT) 2017a, 2017b). Western Australia actively tries to integrate the management of water and other NRM activities through a number of coordinating bodies, but it has at least four departments with roles in NRM and its legislative provision for integration is relatively weak.²³

Victoria, the ACT and South Australia appear to have the most robust arrangements for integrating water and waterway management. In each case, legislation provides a clear direction to align water and NRM planning and this is implemented through institutions and policy frameworks that draw on the expertise of local managers.

In Victoria, waterway managers (s190) for developing regional strategies to improve waterway health, as well as planning for environmental water use and delivering that water on behalf of the VEWH. The ACT's statutory 'ACT and Region Catchment Management Coordination Group' has developed a 30-year strategy for integrated catchment management, which guides on-ground investment by its sole NRM group. South Australia's *Natural Resources Management Act 2004* (s76(2)) requires water plans to form part of regional NRM plans — and both are prepared by the same regional NRM board.

In other jurisdictions, the role of local groups in waterway management is sometimes limited. For example, regional NRM groups in both Queensland and Western Australia are non-statutory organisations that vary considerably in their responsibilities. Queensland also has statutory river improvement trusts (based within local governments) with responsibility for waterway health — but they only exist for some rivers and lack clear mechanisms to coordinate their activities with environmental water management (DNRM (Qld) 2016f).

In addition to the varied nature of their coverage and responsibilities, local managers can be hampered by a lack of capacity, insecure funding or (as in the case of the LLS) boundaries that do not facilitate integrated consideration of water and waterways. Their challenge is further complicated by the fact that much of the funding for these groups comes from the Australian Government via the National Landcare Programme. As a result, regional planning may align more with national priorities than with priorities at the local level. As is discussed below, this may not facilitate the best outcomes.

Held environmental water poses additional challenges for integration

Where jurisdictions require consistent and coordinated water and NRM planning, it increases the likelihood of integration between planned environmental water and waterway management. However, it is not as straightforward in the case of held environmental water management because it involves State and Australian government bodies with an interest in

²³ The *Rights in Water and Irrigation Act 1914* (WA) requires only that regional management plans 'set out the matters that are to guide the general management by the Minister' on integrated land and water management (at s. 26GW(c)).

basin-scale outcomes, not just outcomes at the catchment scale. A further complication is that as held environmental water management is a relatively new activity, managers have had to develop processes for coordination within the existing State frameworks. This appears to have been more successful where State arrangements are clear and facilitate joint consideration of objectives for water and waterway management at the local level.

In Victoria, catchment management authorities (CMAs) submit seasonal watering proposals to inform the VEWH's watering priorities (VEWH 2016c). As the CMAs also have responsibility for regional NRM planning and are the designated waterway managers under the *Water Act 1989* (Vic), their watering proposals account for relevant NRM considerations, and they are well placed to inform the development of long-term environmental watering plans. Such alignment is also achieved in the case of state reserves in New South Wales, as the Office of Environment and Heritage (OEH) is responsible for delivering environmental water as well as NRM on state-owned land.

On the other hand, the management of rivers, wetlands and floodplains on private land in New South Wales is outside the purview of the OEH. The LLS have legislative responsibility for NRM activities, and the opportunity to inform environmental water management in some catchments through their role as chairs of the Environmental Watering Advisory Groups (EWAGs) (OEH (NSW) 2014). However, the move away from catchments and the impact of the LLS boundaries led some EWAG members to question, as early as 2014, whether the role of the LLS as Chair might impact EWAG functionality (Lukasiewicz and Dare 2014). The institutional arrangements for the LLS appear unlikely to facilitate the effective alignment of management objectives for environmental water and waterways.

In some cases, environmental water holders are seeking to address the need for better integration by involving themselves more directly in waterway management. While water holders consider existing NRM programs in assessing the expected benefits of different watering actions (CEWO 2013a; VEWH 2016c), they do not generally fund or undertake complementary waterway management activities themselves. The Commonwealth Environmental Water Holder (CEWH) is currently developing an internal framework on how to use some of the \$9.7 million in proceeds from its trading activities to fund waterway management projects that contribute to environmental watering outcomes (CEWO 2016; DEE 2016). However, the available funding is small considering the need for such projects in the MDB, and the CEWH's involvement may mean the Australian Government is substituting funding that should be a state responsibility.

Ultimately, such efforts can only partially fill the gap created by a lack of coherent legislative, institutional and policy frameworks that ensure the integrated management of environmental water and waterways. This reinforces the need for these fundamental issues to be addressed by State and Territory Governments.

Moving toward integrated management of environmental water and waterways

State and Territory Governments are likely to achieve better alignment of water and waterway management objectives if planning is undertaken from the bottom up. The benefits of bottom-up planning were articulated by the National Water Quality Management Strategy, which stated that this approach is ‘more effective and efficient since local interests best understand the needs and problems; and it builds ownership of the objectives selected and therefore engenders commitment’ (ARMCANZ and ANZECC 1994, p. 22). The MDBA (sub. 81) also stressed the importance of local and regional knowledge.

The Commission’s view is that local organisations with clear roles and appropriate capability, working within a policy framework set by the State or Territory Government, and as part of a community-driven process, are best able to identify catchment-based environmental management objectives and priorities. This information can then inform State, Territory and Australian Government prioritisation processes to support statewide and nationally-relevant outcomes. This is consistent with the theory of integrated NRM (see, for example, Roberts, Seymour and Pannell 2011).

Local organisations are also well placed to inform the operational planning required to achieve the desired objectives, coordinate water delivery and the implementation of complementary waterway management activities, and help monitor, evaluate and report on the outcomes. In addition, given their links to the local community, they can help environmental water holders identify opportunities for recreational, cultural and other public benefit outcomes, where these are consistent with environmental objectives.

Waterway management in Victoria is the best example of bottom-up planning in Australia. Responsibilities for the different Victorian institutions with a role in waterway management are clearly defined and supported by Victoria’s legislative and policy frameworks (box 5.2). Because CMAs are responsible for delivering environmental water, as well as undertaking complementary waterway management, they are able to integrate these activities at the local level.

Although the Victorian framework has significant advantages, to apply it in other jurisdictions would require considerable (and costly) change, the implications of which are broader than environmental water management. As highlighted by the Queensland Farmers’ Federation (sub. 61), implementing integrated catchment management in Queensland would require a significant, statewide reform commitment and could not be achieved solely by adjusting existing frameworks.

State and Territory Governments should consider whether an integrated, bottom-up planning process would be cost-effective for their particular jurisdiction, and seek to move in this direction where feasible. Whether or not full integration is feasible, there are benefits in ensuring that all actors in the space are working towards a consistent long-term vision for each of the rivers, wetlands and floodplains that the community values.

Box 5.2 Waterway management in Victoria

The *Catchment and Land Protection Act 1994* (Vic) established in statute the objective of 'integrated and co-ordinated management of catchments' in Victoria. The Act created 10 catchment management authorities (CMAs), of which nine (along with Melbourne Water) also have designated management roles over regional waterways (reaches and wetlands), floodplains, drainage and environmental water under the *Water Act 1989* (Vic).

CMAs are responsible for local planning, operations and engagement, including setting environmental objectives and developing watering plans (DSE (Vic) 2009). They develop regional Waterway Strategies, which must identify and describe high-value rivers and wetlands within each region, assess their condition and set long-term objectives for their management. These strategies influence long-term and seasonal watering proposals, which must be considered by the Victorian Environmental Water Holder when considering watering priorities. The statewide Waterway Management Strategy requires the regional strategies to 'be holistic and integrate onground works with environmental water management' (DEPI (Vic) 2013, p. 43). CMAs are required to actively align complementary waterway management activities with the objectives in regional Sustainable Water Strategies and annual environmental watering plans (NWC 2012a).

Implementation has not been perfect, with difficulties in deriving statewide catchment priorities from regional priorities. The Victorian Auditor General's review of CMA planning (2014) found that their catchment management function was hampered by the absence of statewide frameworks, an inability to hold regional partners accountable and the proliferation of short-term funding arrangements. However, the review also found the waterway strategy process to be 'sound', providing an integrated approach to managing rivers, estuaries and wetlands and a clear link between regional programs and statewide priorities (Victorian Auditor General's Office 2014, p. 27).

To facilitate this, State and Territory Governments should review their legislative, policy and planning frameworks to ensure they explicitly require consistent objectives for rivers, wetlands and floodplains that will direct the management of both environmental water and waterways. In doing so, governments should also require environmental water managers to actively consider opportunities to deliver water in ways that support recreational or Indigenous cultural values, for example, where these benefits are compatible with environmental outcomes.

While the NWI acknowledges the importance of NRM, it provides little direction on how to facilitate the integrated management of environmental water and waterways (NRM Regions Australia, sub. 24).²⁴ The Commission considers this a shortcoming of the agreement that should be addressed as part of a renewed NWI.

²⁴ Paragraph 78 of the NWI covers integrated environmental management, but focuses on environmental outcomes through water provision. Paragraph 7 states that other NRM initiatives 'play an important and complementary role' and are the subject of separate (and in some cases, now superseded) agreements. Schedule E mentions the need for water plans and planning processes to give consideration to regional NRM plans and planning processes.

DRAFT RECOMMENDATION 5.2

State and Territory Governments should ensure the management of environmental flows is integrated with complementary waterway management at the local level.

To achieve this:

- a. State and Territory Governments should ensure that consistent management objectives for rivers, wetlands and floodplains govern the use of environmental water and complementary waterway management activities
- b. where possible, one planning process should be used to set objectives for both activities, but if not, State and Territory Governments should ensure planning at the local level is aligned and coordinated. Planning processes should also provide explicitly for other public benefit outcomes where these are compatible with environmental outcomes.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 5.2 (a) and 5.2 (b).

5.4 Ensuring governance arrangements are fit-for-purpose

Governments hold entitlements worth billions of dollars which are actively managed to achieve environmental outcomes in the MDB — the Commonwealth holdings alone may be valued at up to \$5 billion once water acquisition is finalised (Banks and Docker 2014). Active management by environmental water holders involves making trade-offs between competing environmental needs at different locations and times, including options to trade water or retain it for use the following year. These decisions affect regional environments and communities, are of significant interest to other water users and involve substantial funds, so the stakes are high. As a result, governments need strong governance arrangements to ensure environmental water is managed appropriately.

The Commission considers there is scope for improvement to ensure the decisions of environmental water holders are protected from potential political and stakeholder interference. Moreover, given the complexity involved in managing environmental water — with multiple players operating at local, state and territory, and national levels — it is important that processes for decision making are streamlined and that decisions are made at the right level. These issues are discussed below.

To manage environmental water holdings well, managers need independence

The NWI recognised that for environmental water managers to do their jobs well, they need ‘the necessary authority’ (paragraph 78(ii)). Authority is likely to be best achieved through governance arrangements that provide independence to the entity responsible for managing the water so that decision making is free from political interference.

It is appropriate that Governments retain responsibility for setting clear long-term rules and strategies for environmental water management — operational bodies are not policymakers because they lack political accountability. However, it is important that once a strong policy framework is in place, such bodies have the independence they need to achieve their objectives without fear or favour. Reflecting this, six jurisdictions²⁵ signed on to the Agreement on Murray-Darling Basin Reform in 2008, agreeing to the principle that environmental water management would be underpinned by ‘independence from the influence of competing uses’ (COAG 2008a, p. 36).

By its nature, influence is sometimes hard to detect. Governance arrangements are often designed to avert the risk of it occurring, and to provide reassurance to the community that it is unlikely to happen. There are instances where parties have attempted to influence governments in relation to the use of environmental water. For example, in 2006-07, local irrigators lobbied the Victorian Government to use environmental water to support crops rather than protect a fish species from extinction. Ultimately, the water was used for its intended purpose (O’Donnell and Macpherson 2014).

Given the large economic, social and environmental values of water, and the competing interests of parties, water allocation will remain a politically-sensitive area. Community ‘buy in’ to environmental watering programs will be strengthened if the community has confidence in the objectivity of the body that decides how to use the water. Governance arrangements should be designed to take this into account by providing for institutional separation from government. Such separation should be accompanied by simple and widespread community access to water holders’ decision-making processes.

Some governance models provide more independence and transparency than others

All governments that have acquired environmental water have assigned responsibility for managing their holdings to a particular entity (table 5.2). In New South Wales and South Australia, environmental water is managed as one of the many activities of a government department and there is no statutory provision for the management of the holdings. The Victorian Environmental Water Holder (VEWH) is a separate body and the Commonwealth Environmental Water Holder (CEWH) is a statutory office holder, albeit one within a government department.

²⁵ The Commonwealth of Australia, New South Wales, Victoria, Queensland, South Australia and the ACT.

Table 5.2 Responsibilities for held environmental water

<i>Jurisdiction</i>	<i>Responsible entities</i>	<i>Governance arrangement</i>
New South Wales	Office of the Environment and Heritage	Government department
Victoria	Victorian Environmental Water Holder	Statutory body corporate
South Australia	Department of Environment, Water and Natural Resources	Government department
Australian Government	Commonwealth Environmental Water Holder ^a	Statutory office holder within government department

^a The Murray-Darling Basin Authority (MDBA) is in the process of divesting its share of TLM entitlements, as discussed below, and so has not been discussed in this section.

The Commission has focused its analysis on the governance arrangements that support the CEWH and the VEWH as this best illustrates the strengths and weaknesses of the alternative models. The substantial size of the Commonwealth environmental water holdings also means there is a strong incentive to get the governance right in that case. The key points of differentiation between the VEWH and the CEWH relate to the degree to which there are constraints on the capacity of the relevant minister to implicitly or explicitly influence the allocation of water holdings, and the extent to which they both *are*, and are *perceived* to be, independent. The ramifications of this analysis for New South Wales and South Australia are discussed in the conclusion to this section.

The Victorian Environmental Water Holder

While the relevant minister may direct the VEWH in respect of some of its functions, section 33DS of the *Water Act 1989* (Vic) explicitly disallows directions concerning particular uses or trades of water. Also, any directions must be published. The VEWH's independence is further increased by its constitution as a corporate entity, with three statutorily independent commissioners responsible for its decisions. Having three commissioners has an advantage over vesting independence in just one party because it reduces the risk of inappropriate political and stakeholder influence.

The Commonwealth Environmental Water Holder

Arrangements for the CEWH also go some of the way towards protecting environmental managers from any government interference. As a statutory office holder, the function of the CEWH's office is defined in legislation. This legislation explicitly precludes the relevant minister or departmental secretary from directing the CEWH in relation to buying or selling entitlements or water allocations (ss. 105 and ss. 107 of the *Water Act 2007* (Cwlth)). Further, while the CEWH is housed in the Department of the Environment and Energy, it is supported by the Commonwealth Environmental Water Office (CEWO), which allows the CEWH to brand itself as an entity separate from the department.

Nevertheless, the *Water Act 2007* (Cwlth) still permits the minister to direct the CEWH in relation to a critical part of its functions — namely the capacity to make water available from the Commonwealth’s water holdings (s. 105(2)(d)). For example, hypothetically this could mean that the minister could direct the CEWH to deliver water to assist graziers experiencing dry conditions. While the *Water Act 2007* (Cwlth) should prevent this happening unless the water would also benefit the environment, the CEWH could not refuse such a direction on the basis that an alternative use would achieve a better environmental outcome. The fact that the Department’s annual report has so far disclosed that there have been no directions does not eliminate the potential future capacity for directions.²⁶

Moreover, the statutory office of the CEWH is held by a public servant reporting to the head of a government department. At different stages since the role was established in 2007, the officer undertaking the responsibilities exercised by the CEWH has also been allocated additional policy roles associated with normal public service business.²⁷ The CEWH had relinquished its additional public policy functions by late 2011 (ANAO 2013), but these have now returned. The Australian National Audit Office judged that the initial divestiture of the policy function in 2011 was a positive development, and so its return should equally be seen as problematic. Whilst there is nothing to suggest that those who have filled the position of CEWH have ever acted inappropriately, combining the roles of policymaking and independent decision making creates opportunities for, or at least the perception of, a conflict of interest.

Finally, although the CEWO provides comprehensive reporting of the CEWH’s activities, the CEWH has no separate annual report, and access to its material is through the Department’s website. If nothing else, this potentially reduces the *impression* among the community that it has independence.

Are decisions being underpinned by appropriate skills, knowledge and experience?

Environmental water managers need access to skills and expertise across multiple disciplines, such as science, engineering and economics. In all jurisdictions, the expertise is largely provided by public servants or consultants. In the past, expert panels have also provided advice.²⁸

²⁶ As is the case for the VEWH, there is at least a requirement for public divulgence of the particulars of any directives from the minister or departmental secretary (s. 114).

²⁷ The CEWH is currently responsible for national wetland policy under the Ramsar Convention on Wetlands of International Importance. The Australian Government’s responsibilities under this agreement include representing Australia internationally, developing wetland management plans and working on approaches to achieve the wise use of wetlands both nationally and internationally, among other things (DSEWPC 2012; CEWO, pers. comm. 28 August 2017).

²⁸ For example, until 2013, the CEWH was advised by the Environmental Water Scientific Advisory Panel, the Stakeholder Reference Panel and the Commonwealth Environmental Water Advisory Council. These committees are no longer operational and the CEWH instead obtains some advice through various professional services contracts (CEWO, pers. comm. 22 and 28 August 2017).

A related question is the skill set of the ultimate decision makers in the entities responsible for managing environmental water. Clearly, such decision makers should possess the relevant skills to interpret and question the advice they are given, and to properly administer the body they manage.

A benefit of the VEWH model is that having three commissioners expands the skill base of the decision makers and increases the likelihood that different perspectives will be brought to bear when making decisions. This is because, in addition to requiring multiple appointments, the *Water Act 1989* (Vic) (s. 33DF) specifies that any person appointed as a commissioner to the VEWH must have knowledge of, or experience in, one or more of environmental management, sustainable water management, economics, and public administration.

While there is no requirement that the VEWH's three commissioners must have different skill sets from each other, in practice they appear to have diverse skills. However, ideally the legislation would ensure that the collective outcome of the appointments is that commissioners have management, environmental and economics expertise between them. This would avoid the possibility that all appointments could relate to just one skill set, such as public administration.

Making better use of trade

The trade of environmental water can help maximise environmental and community benefits by putting water to better use in different locations or at a later time, or by using sale proceeds to fund complementary waterway management activities. Compared with the OEH and the VEWH, the CEWH has sold larger volumes of water allocations, less frequently. There may be opportunities for the CEWH to increase its use of trade, as the CEWH has only sold a small proportion of its allocations to date (and has not yet made any purchases). For example, the CEWH's largest sale of 22 864 ML in the Goulburn catchment was only about 2 per cent of its total allocations in 2015-16 (DEE 2014, 2017a).

The CEWH's ability to purchase water was previously limited by the Commonwealth Procurement Rules (CPRs). For example, where the expected value of a procurement will be \$80 000 or more, Division 2 of the CPRs requires government entities to give potential sellers at least 10 days to respond to a public offer to buy water (DOF 2017a). This would have constrained the CEWH's ability to take up purchase opportunities as the allocation market changes rapidly within a 10-day period, making some purchases less worthwhile.

Due to changes to the CPRs that came into effect in March 2017, the CEWH is now exempt from the requirements of division 2, including the minimum time limit.²⁹ It is expected that

²⁹ The CPRs that came into effect on 1 March 2017 include a revision to appendix A to clarify that division 2 does not apply to procurement including 'other immovable property *or any associated rights*' (emphasis added) (DOF 2017a, p. 29). Although the CPRs do not define 'associated rights', the Department of Finance

this will enhance the CEWH's ability to participate in the market. However, if the CEWH were to be set up as a corporate Commonwealth entity it would automatically be exempted from the CPRs. This could also provide for a greater focus on commercial and economic matters, as outlined below. Both of these factors could facilitate more effective use of trade.³⁰

Corporatising the CEWH could have some benefits

To address concerns about the CEWH's independence, and to the extent that it is desirable for the CEWH to be more active in water trading, an alternative governance structure would be a corporate Commonwealth entity. As noted by the Department of Finance (2017b), such a governance structure is desirable if all or some of the following factors are present:

- the body will operate commercially or entrepreneurially
- a multi-member accountable authority will provide optimal governance for the body
- there is a clear rationale for the assets of the body not to be owned or controlled by the Commonwealth directly
- the body requires a degree of independence from general policies of the Australian Government and direction by the executive government. The *Public Governance, Performance and Accountability Act 2013* (Cwlth) does not give ministers a general power of direction in relation to the activities of a corporate Commonwealth entity (although this could be achieved through the enabling legislation).

Changing the CEWH into a corporate entity would accordingly remove the capacity for ministerial direction, and would improve transparency as a corporate entity would have its own annual report and other obligations for reporting. It would also reorient the organisation from a public service agency to an expert body making decisions that have many commercial, as well as environmental and economic, dimensions (with a CEO and board that reflected its role). Establishing a new body is not costless, but there are ways to reduce those costs by outsourcing corporate functions (such as personnel) to a government department. The VEWH discharges its responsibilities within a small budget.

Where does that lead us?

Given the size and value of the Commonwealth holdings, the significance of decision making on their use, and the potential benefits of change, the Commission considers that the Australian Government should strengthen the governance of its environmental water. As discussed below, there is also a case for change in New South Wales, but the argument is less compelling for South Australia.

has advised the CEWH that the term captures the procurement of tradeable water rights, including water access entitlements and allocations (CEWO, pers. comm., 18 August 2017).

³⁰ Unless the Finance Minister were to specifically require the CEWH to be subject to the CPRs under section 105B(1)(b) of the *Public Governance, Performance and Accountability Act 2013* (Cwlth).

Governance of the CEWH

To increase independence, the CEWH should not be subject to directions from the minister or departmental secretary concerning the use of the Commonwealth environmental water holdings. Moreover, the office holder should only be responsible for managing the holdings. To further reduce the risk of compromised decision making and to increase the skill base of decision makers, there are grounds for the CEWH to have several statutory appointments, each with different skill sets.

Amending the *Water Act 2007* (Cwlth) to implement these initiatives would go a long way to improving governance, but the Commission recommends the Australian Government go further by establishing an independent statutory body, rather than housing the CEWH in a department. This body could be established as a non-corporate entity in the first instance, to enable an assessment of whether the recent exemption from the CPRs facilitates more nimble trading by the CEWH, but a corporate model has some advantages, as outlined above.

Governance of other environmental water holdings

In New South Wales and South Australia, there are no formal arrangements to ensure the independence of decision making on environmental water use as the holdings of these States are managed within the environment departments and, hence, can be subject to ministerial direction.

The New South Wales Government holds a substantial volume of entitlements, so there is a case for change that emulates the key elements above — a statutory environmental water holder, independent of government departments and free of ministerial direction, led by multiple decision makers with a diversity of expertise between them.

The South Australian Government could also amend its governance arrangements to establish an independent environmental water holder along these lines. However, the case for change is less compelling given that South Australia's environmental water holdings are very small at just 42.7 GL³¹ (DEWNR, pers. comm., 28 August 2017). As such, the Commission recommends that South Australia choose a model that best suits its needs, but enables decision makers to access the skills, knowledge and experience they need.

³¹ Includes 36 GL of entitlement provided for in the South Australian River Murray water allocation plan, which can only be delivered to specific wetlands.

DRAFT RECOMMENDATION 5.3

Where governments own significant environmental water holdings, they should ensure that decisions on the use of the holdings are made by independent bodies at arm's length from government.

The Australian and New South Wales Governments should review current governance arrangements for held environmental water to ensure holdings are managed:

- a. independently of government departments and political direction
- b. by statutory office holders with an appropriate range of expertise.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

Streamlining management arrangements

Efficient and effective management requires streamlining planning and decision making on the use of environmental water and removal of any duplication in roles and responsibilities. In the complex hierarchy of local, state and territory, and national interests in this issue, there will be considerable scope to rationalise arrangements over time. However, there is an obvious stand-out in the current arrangements — The Living Murray (TLM) — where there is a clear case of duplication in roles and responsibilities.

TLM is an environmental watering program that pre-dates the creation of the CEWH and the Basin Plan. In 2003, the Australian Government, New South Wales, Victoria, South Australia and the ACT agreed to recover 500 GL of water entitlements as a 'first step' towards restoring the health of the River Murray. However, as this amount of water was insufficient to provide whole-of-river benefits (MDBA 2011), TLM focused on achieving local benefits at six targeted 'icon' sites along the river.

TLM entitlements are jointly owned, but most of them are held by New South Wales, Victoria and South Australia on behalf of the TLM joint venture. Small amounts are also held by the MDBA, although the MDBA is in the process of divesting its TLM entitlements to the states of issue.³² While decisions are made by consensus, the MDBA is required to manage the TLM entitlements (*Water Act 2007* (Cwlth), s. 18H).

TLM was an important early step in addressing overallocation in the MDB and has played a pivotal role in setting the policy framework for managing entitlements for environmental purposes in shared water resources. However, with the Basin Plan now seeking to benefit the entire system, a separate resource focused solely on six sites no longer makes sense. As Murray Irrigation (sub. 16, p. 9) pointed out, there are multiple agencies 'managing

³² The Murray-Darling Ministerial Council agreed to this in November 2015 (MDBA, pers. comm., 8 August 2017).

environmental water to achieve virtually identical objectives in the River Murray and tributaries'. Further, TLM's consensus-based model of decision making would involve excessive transaction costs if applied to the MDB more broadly, and risks reducing transparency and accountability (Connell 2011; Horne and O'Donnell 2014).

A review of the *Water Act 2007* (Cwlth) in 2014 found that 'incorporating all environmental water, including TLM water, into the same Basin Plan planning and decision-making arrangements would deliver benefits and efficiencies' (Australian Government 2014b, p. 80).

For these reasons, it is the Commission's view that TLM should be disbanded. Each State and Territory should instead manage its share of former TLM entitlements as part of its broader portfolio of held environmental water, consistent with the Basin Plan. The MDBA should complete the divestment of its entitlements, which represents a conflict of interest given the MDBA's regulatory role in Basin Plan implementation.

The risk associated with the loss of TLM is low, as the icon sites will remain priorities for watering under the Basin Plan. However, while the change should result in a more efficient use of resources, it should not be used by State and Territory Governments as an excuse to dramatically reduce overall funding to environmental watering programs.

DRAFT RECOMMENDATION 5.4

Australian, State and Territory Governments should ensure there are clear roles and responsibilities for managing environmental water in shared resources, with no duplication.

Consistent with this principle, The Living Murray program should be disbanded as there is no clear rationale for its continued existence in the context of the Murray-Darling Basin Plan. Each Basin jurisdiction should manage its share of former Living Murray entitlements as part of its broader portfolio of held environmental water. The Murray-Darling Basin Authority should complete the divestment of its holdings.

More environmental water management should be devolved

In 2007, the Australian Government decided to assume responsibility for recovering water to address overallocation throughout the MDB. Ten years on, it remains accountable for its \$13 billion investment, but there is a question about whether the CEWH managing all of these entitlements is the most efficient way for the Australian Government to achieve outcomes over the longer term. The principle of subsidiarity suggests that decisions on some of this water should instead be devolved to the lowest level at which they can practically be made. This would both streamline current arrangements and allow greater connection with local communities. While there have been positive developments since the Commission first

recommended greater devolution of environmental water in 2010 (PC 2010), continuing effort is needed.

The CEWH has an important role in using Commonwealth water to achieve Basin-scale outcomes in the MDB, particularly in the hydrologically connected — and historically contested — southern Basin. However, some of the water managed by the CEWH could potentially be routinely managed by river operators to meet clearly specified environmental needs. The CEWH also manages small amounts of water in unregulated catchments where the scope for active management is relatively limited. Decisions on the use of these entitlements could potentially be devolved to local waterway managers or other suitable local groups.

Environmental water holders currently draw on local and state knowledge in making such decisions. However, devolved management provides an opportunity to make full use of such knowledge and to better integrate the planning and management of water with other river, wetland and floodplain management activities. It also gives local people the opportunity to have a greater say over local priorities.

Devolution is not always practical for a number of reasons. The Commonwealth is ultimately responsible for ensuring its assets are managed appropriately, and devolution of that management involves risks that must be carefully considered. Where local groups are involved, these risks may include variable organisational capability, insecure funding streams and a lack of accountability, for example (Lockwood et al. 2007).

Nevertheless, devolution should be possible under the right circumstances, and the CEWH has already made progress toward devolving the management of some Commonwealth water. Between 2012 and 2016 it established 3–5 year partnerships for water delivery with various entities, including the Nature Foundation SA, the South Australian MDB NRM board, the Renmark Irrigation Trust and the Ngarrindjeri Regional Authority (DEE nd).

While the CEWH still makes the decisions on the use of the Commonwealth holdings, these agreements give local entities more opportunity for active involvement in planning and delivery. Based on the experience to date, the CEWH suggests that such agreements work best where partners have an appropriate level of capacity, funding and, preferably, some authority over the area in which they work (CEWO, pers. comm., 22 June 2017). For example, the Renmark Irrigation Trust manages the irrigation infrastructure that the CEWH is using to water floodplains in the Renmark area.

The CEWH has also developed a number of decision support tools that could facilitate more devolved management in the future. For example, as part of a five-year strategy to manage Commonwealth water in the unregulated Warrego catchment in Queensland, the CEWH uses a ‘decision tree’ to guide decisions on water delivery. The CEWH has also sought to ‘automate’ water delivery in response to natural cues in the River Murray, and to develop detailed guidance on the hydrology needed to achieve environmental objectives in the Lachlan catchment (Campbell et al. 2016).

There is more work to do to develop the knowledge that locally- and state-based managers will need to play a greater role in making decisions on the use of held environmental water. For example, water managers need an in-depth understanding of the flow regimes required to meet ecological objectives across the MDB, under a range of scenarios, and they need to know what contribution held environmental water can make to these objectives. They also need to understand the possible interactions with planned environmental water, the delivery of water for consumptive purposes, and complementary waterway management activities, as well as the potential for environmental water to achieve shared community benefits.

With such knowledge (and provided suitable partners can be found), environmental water holders would be well placed to establish more long-term arrangements with on-ground managers to deliver water based on agreed rules or guidelines. While the Commission has focused here on the CEWH — on the basis that managers at the state level have a greater level of interaction with (and sometimes are) the on-ground managers — the objective to devolve management to the lowest practical level is also relevant to state environmental water holders.

DRAFT RECOMMENDATION 5.5

Where capable partners are available, Australian, State and Territory Governments should devolve the use of held environmental water to the lowest practical level, consistent with the principle of subsidiarity.

Australian, State and Territory Governments should enhance the National Water Initiative to align with this recommendation.

5.5 Improving monitoring, evaluation, reporting and adaptive management

Monitoring, evaluation and reporting of environmental and other public benefit outcomes are important for a number of reasons. As part of an ‘adaptive management’ process, these activities should lead to more efficient and effective water use — and better outcomes — over time (which is essential given the uncertainties of a changing climate). They are the key element in ensuring accountability and helping build public trust in the way water is managed. They also allow informed judgements to be made on the merits of government decisions to allocate water to the environment, whether through planning frameworks or entitlement acquisition.

Submissions to this inquiry highlighted these points. The CEWH (sub. 63) noted that ongoing investment in monitoring and evaluation is critical to inform adaptive management. The Australian Academy of Technology and Engineering (sub. 20, p. 3) said that reduced monitoring and analysis ‘could lead to a lack of community confidence in water management programs’. The National Irrigators’ Council (sub. 13, p. 17) also noted that it is important to

understand how environmental water is used because ‘The Australian public must ... be satisfied that there is value in their investment in water purchase’.

In 2014, the NWC (2014c, p. 52) found that ‘monitoring and reporting of the outcomes of environmental water use is in its infancy for many jurisdictions, and improvements in this area are needed’. In the Commission’s view, while there have been some positive developments, as discussed below, further work remains to be done. In particular, some jurisdictions still need to increase their focus on outcomes, and to report more openly about instances where objectives are not achieved. Moreover, while monitoring, evaluation and reporting is commonly promoted as being important for adaptive management, there is sometimes a gap between the rhetoric and implementation.

Guidance is available

In 2009, the Australian Government published a national monitoring, evaluation, reporting and improvement (MERI) framework for NRM programs. This informed the development of a water-specific MERI framework by the CEWH in 2012, as well as principles for monitoring and evaluating the effectiveness of the Basin Plan. Together, these frameworks establish some guiding principles for best practice MERI in the context of environmental water.

- Consistent methods that enable synthesis of outcomes across different time scales (immediate, intermediate and long-term) and spatial scales (site, catchment and basin).
- Partnerships that are collaborative, complementary and (where possible) build on existing programs.
- Multiple lines of quantitative and qualitative evidence, including the best available scientific, local and cultural knowledge.
- Efficient and cost-effective approaches that provide timely and relevant results.
- Meaningful evaluation, open access to information and feedback loops to facilitate transparent reporting and genuine adaptive management.

The following sections discuss the extent to which this guidance is being put into practice.

Monitoring and evaluation must focus on outcomes, not just flows

The NWI is clear that the focus of monitoring and evaluation should be on environmental and other public benefit *outcomes*. Consistent with the principles outlined above, this means looking not only at the immediate hydrological results from flows, but also at the intermediate and longer-term ecological responses, at both local and basin scales.

Ecological complexity makes monitoring environmental outcomes inherently difficult. Flow scenarios can be hard to replicate, responses take time to become evident, and it can be difficult to distinguish the contribution of environmental flows from other flows and

waterway management issues. The costs involved in monitoring mean that effort must be commensurate with the risk to, and value of, these outcomes to the community.

Jurisdictions such as Tasmania and the Northern Territory, which have not identified any overallocation, generally face a lower level of risk to their water resources. As a result, they have had less need to monitor the outcomes of flow delivery than jurisdictions with water resources that are under stress. Western Australia has focused its monitoring effort on high-value locations that are under pressure, such as the Gnamptara, Jandakot and Pilbara groundwater areas. A greater focus in such areas is appropriate, but even in locations where the risk is low, some monitoring of outcomes is needed to ensure planning arrangements remain sufficient to maintain the desired benefits over time.

In higher-risk areas with shared water resources, such as the MDB, monitoring of outcomes is critical to ensure these resources are being managed sustainably. Where governments have sought to address overallocation and overuse by moving water from the consumptive pool to the environment, monitoring is particularly important to ensure that the water is used as effectively as possible and assess whether the costs have been justified.

There has been some progress on monitoring environmental outcomes in the MDB ...

The Queensland Environmental Flows Assessment Program monitors ecological responses to planned environmental flows. In managing its water resources, the ACT is required to consider Environmental Flow Guidelines, which emphasise the need for ecological monitoring. Victoria, South Australia and New South Wales conduct targeted monitoring of the outcomes of held environmental water delivery, and Victoria undertakes statewide monitoring of the condition of its streams, wetlands and estuaries.

At the national level, the development of the CEWH's Long-Term Intervention Monitoring (LTIM) Project is a major step forward. The \$30 million project seeks to monitor and evaluate the environmental outcomes of Commonwealth water use in seven regions of the MDB between 2014 and 2019. LTIM involves partnerships between environmental water practitioners, scientists, local delivery partners and community members, and is designed to complement other monitoring programs (DEE 2015b, 2016).

Other positive developments include the publication by South Australia and New South Wales of extensive reviews of the ecological outcomes of their environmental watering programs (DEWNR (SA) 2016; OEH (NSW) 2015b). Water holders have also begun to give explicit consideration to other public benefit outcomes: in its latest outcomes report, Victoria sought to identify the 'shared community benefits' of environmental water deliveries (for example, for anglers and Indigenous communities) (VEWH 2016b).

... but challenges remain

There is still significant room for improvement. For example, South Australia's approach does not appear to have changed materially from 2014, when the NWC (2014d, p. 343) found 'little evidence of ecosystem health monitoring to align with plan outcomes'. In New South Wales, the agency responsible for reviewing water plans identified the lack of information on environmental outcomes as a limitation in making its assessment (NRC (NSW) 2016). The development of a monitoring, evaluation and reporting program for MDB water resource plan areas in this State, along with the recently published Water Management Science Strategy (DPI (NSW), pers. comm., 6 June 2017), is expected to help address this gap, but it is too early to say whether these measures will fully address the need.

There is also a lack of attention at present to the need to monitor outcomes in a way that can compare the relative contribution of the available management inputs — whether planned environmental water, held environmental water, consumptive deliveries or complementary waterway management activities, for example. Making these distinctions is hard, but governments will need to get better at this if they are to allocate resources as efficiently as possible to achieve the desired outcomes. Meeting the challenge will require advances in technical capability, monitoring design and applied scientific analysis.

Further, there remain challenges for the Australian, State and Territory governments in ensuring that environmental outcomes are meaningfully evaluated — the ad-hoc, opportunistic and short-term nature of much monitoring activity can make evaluation of longer-term and basin-scale outcomes very difficult. To address this, the Commission suggests governments focus on two key areas.

1. *Long-term investment*

Short funding cycles limit the ability to design monitoring programs in a way that enables an assessment of outcomes over longer timeframes and larger spatial scales. Governments should ensure they are committed to long-term investment.

2. *Better coordination*

Environmental water managers should look for opportunities to better coordinate monitoring efforts to ensure local and catchment-scale results can be used effectively to inform basin-scale, statewide and national evaluation of outcomes. To achieve this, managers should ensure they have partnerships that are collaborative and complement, rather than duplicate, the monitoring efforts of others. They also need to ensure they use consistent methods that enable the synthesis of outcomes across time and space.

A coordinated approach to monitoring and evaluation is particularly important for shared resources. Currently, jurisdictions in the MDB have a range of different monitoring programs, and efforts appear fragmented. As a first step, the Commission recommends that governments in the MDB (particularly those managing water in the highly-connected southern part of the MDB) develop a strategy to coordinate monitoring and evaluation of environmental outcomes by all environmental water managers. This should consider the contributions of both planned and held environmental water made by entities operating at

the local, state and territory, and national levels. It should also be consistent with the national MERI framework and the guidance on monitoring and evaluation provided by the Basin Plan.

Transparent reporting and independent auditing is critical for accountability

Environmental water managers need to publicly report on where objectives are met, where they are not met, and the reasons why. Open access to information on outcomes is critical for accountability, and also creates opportunities for shared learning among environmental water managers.

In the context of planned environmental water, the lack of monitoring and evaluation of environmental and other public benefit outcomes limits the capacity for reporting. However, an increased focus in this area should lead to better reporting over time. As discussed above, environmental water holders are more active in reporting outcomes, but the Commission finds that the sector is generally less than forthcoming in communicating with the public on where objectives are not being met.

For example, the VEWH's booklet on the outcomes of its activities in 2015-16, 'Reflections', outlined the benefits of watering but generally lacks information about areas for improvement (VEWH 2016b). Yet separately, in its annual report, the VEWH noted that 40 per cent of priority watering actions were either not achieved or only partially achieved in 2015-16 (VEWH 2016a). That these statistics were reported at all is commendable, and rare. But although in many cases these results were outside the VEWH's control, there will have been instances where, in hindsight, things could have been done better. It is not enough to report that things did not go as planned — environmental water holders should also be informing the public about the reasons for such results, and what they have learned that will mean things are done differently in the future.

The public reports produced through the CEWH's LTIM project are a step in the right direction: they explicitly seek to identify 'what is working and what is not' (CEWO 2017). For example, the report on the Edward-Wakool catchment noted that some indicators showed 'no detectable response' to environmental watering, and explains the reasons (Watts et al. 2016). The report includes a table outlining whether each agreed objective was achieved or not, as well as a traffic-light report card showing whether ecosystem responses were positive, mixed, negative or not detectable. This demonstrates that it is possible to communicate clearly and openly about where environmental watering objectives have not been achieved and why. However, the Commission's research suggests this level of transparency is not the norm, even for the CEWH.

To ensure accountability, independent auditing is also needed. This was recognised in the NWI, but has become less of a focus in recent years. Some independent auditing is occurring: for example, the Commission now has the NWC's former responsibilities for reviewing the NWI and the Basin Plan, and in 2017 the MDBA is also evaluating Basin Plan

implementation. However, the Commission's work cannot substitute for the detailed consideration given to environmental management arrangements through the NWC's biennial Australian Environmental Water Management reviews (in 2010, 2012 and 2014), while the MDBA's role is limited to the MDB. Reviews at the state and territory level are usually undertaken by the same government agencies responsible for implementation.

To fill the gap left by the discontinuation of the NWC's environmental water management reviews, State and Territory Governments should establish arrangements for independent auditing of environmental flow outcomes and supporting management arrangements. This would ultimately be to their benefit as accurate, unbiased assessments — if acted upon — should increase the efficiency and effectiveness of water use over time. The Australian Government should also establish arrangements to ensure regular independent auditing of the Commonwealth environmental water program and its contribution to environmental outcomes in the MDB. Governments should aim to coordinate auditing arrangements where appropriate.

Management should be adapted over time to improve outcomes

For environmental water use to be efficient and effective, managers require feedback loops to ensure that the knowledge gained through monitoring, evaluation and research is used continuously to improve management decisions. The need to adapt environmental management over time is missing from the NWI and it warrants greater focus in future reform efforts.

The importance of adaptive management was emphasised by several participants in this inquiry (CEWH, sub. 63; CSIRO, sub. 8; National Farmers' Federation, sub. 55; Wentworth Group, sub. 40, attachment 1). It is also supported by the national MERI framework, which outlines that MERI should be viewed:

... as a continuous cycle of participation and communication rather than as a single evaluation event. MERI promotes learning and adaptive management in response to progressive monitoring and evaluation which enables improvement in program design and achievement of desired outcomes. (Australian Government 2009, p. 9)

For planned environmental water, adaptive management occurs through scheduled reviews of water plans. Some reviews are overdue: for example, Tasmania is yet to undertake a number of its scheduled reviews, despite some plans being several years past their original intended life, and South Australia's plan for the Adelaide Plains has also been delayed. However, most jurisdictions have made progress in reviewing water plans. The combination of an increased focus on monitoring and evaluation, as discussed above, and regular plan reviews, should result in a gradual improvement in the efficiency and effectiveness of planned environmental flow provisions.

In the Commission’s view, adaptive management requires greater attention in the context of held environmental water. Managers must make decisions about water use despite significant uncertainty concerning future water availability, ecological responses to flow and changing on-ground conditions, for example. This inevitably involves trial and error, so it is essential that past learnings are used effectively to inform future decisions. This will only become more important in the future as climate change compels governments to re-evaluate their approach to managing water resources.

Environmental water holders have embraced the idea of adaptive management. The need for it is acknowledged in the Victorian Waterway Management Program, the CEWH’s MERI framework, the New South Wales position statement on adaptive management, and the 2015-16 Annual Environmental Watering Plan for the South Australian River Murray (CEWO 2013b; DELWP (Vic) 2017b; DEWNR (SA) 2015a; OEH (NSW) 2015a). In addition, some of the outcomes-focused monitoring and evaluation conducted by water holders provides a good foundation for future adaptive management. Yet despite the appeal of the concept, published success stories are rare (Webb et al. 2017).

Two cases from Victoria — in the Goulburn and Mitta Mitta rivers — stand out as examples of good adaptive management (box 5.3). A review of the Mitta Mitta variable flow trials identified inclusivity, local legitimacy and trust as key elements in successful adaptive management (Allan et al. 2009). Effective partnerships with contributors at different levels (local, state and territory, and national) and from different disciplines (government, scientists, on-ground managers and community groups) help build trust and also provide access to complementary sources of knowledge.

The essential factor in adaptive management, however, is commitment. The Mitta Mitta trials were undertaken with relatively modest investment (Webb et al. 2017), so it is wrong to assume adaptive management necessarily entails significant cost. While adequate resourcing is important, the key is that environmental water managers develop specific mechanisms to ensure that adaptive management is implemented consistently and explicitly in practice. This should include clearly allocating responsibility for reflection on monitoring outcomes and requiring decision makers to consider and (where appropriate) act on those reflections.

Box 5.3 Adaptive management in practice

Goulburn River

Between 2012 and 2015, the delivery of held environmental water in the Goulburn River was adaptively managed to improve environmental outcomes and address community concerns.

In 2012-13, three environmental water managers — the Commonwealth and Victorian Environmental Water Holders and The Living Murray program — worked with the Goulburn-Broken Catchment Management Authority and the river operator, Goulburn-Murray Water, to deliver flows to stimulate golden perch spawning and support vegetation recovery.

The environmental flows supplied that year did not produce the desired spawning of golden perch, but raised community concerns regarding damage to riverbanks and disruption to the start of the Murray cod fishing season.

The environmental water managers commissioned an investigation into the riverbank damage which showed that maintaining a flow at a constant height for extended periods could be harmful. They also sought advice from scientists to improve outcomes for fish, and were advised to deliver two flow events — a longer initial flow followed by a shorter one — rather than a single peak flow.

In response to this advice, the environmental water managers adjusted the timing, height and duration of flows and built a gap into deliveries to avoid the start of the fishing season.

When implemented in 2014-15, these changes led to the largest golden perch spawning event since the natural floods of 2010. No significant community concerns were raised, and anglers reported that the fishing was ‘the best in years’.

Mitta Mitta River

Between 2001 and 2008, river operators and scientists sought to reduce the environmental impacts of river regulation in the Mitta Mitta River by changing the way consumptive water was transferred between the Dartmouth and Hume dams. Both dams were operated by the Murray-Darling Basin Commission (MDBC) during this period, and by the Murray-Darling Basin Authority after 2008.

The dams are primarily used to store water for irrigation, cattle, towns and domestic use, as well as to mitigate flooding. Historically, at times when large water transfers were not needed, the MDBC had maintained minimum flow releases from the Dartmouth Dam at low, constant rates for long periods. In 1997, the MDBC reviewed the operation of the dams and found that this pattern was contributing to erosion and reduced riverbank vegetation downstream.

In response, the MDBC began a series of four trials to vary dam releases over an eight-year period. They commissioned ecologists from Charles Sturt University to monitor the environmental impacts of the different flow regimes, and this monitoring informed later trials.

Evaluation of the results showed that variable flows were preferable to constant flows in achieving environmental outcomes. As the trials were conducted within existing dam operating rules, the results also demonstrated that it was possible to improve environmental outcomes while fulfilling social and economic objectives.

After the trials, the university research team worked with the Murray-Darling Basin Authority to use the results in the design new operational guidelines, which still guide the operation of Dartmouth Dam today.

Sources: Allan et al. (2009); Docker and Johnson (2017); Webb et al. (2017).

DRAFT RECOMMENDATION 5.6

Australian, State and Territory Governments should improve monitoring, evaluation, auditing and reporting to demonstrate the benefit of allocating water to the environment, build public trust in its management, keep managers accountable and make better use of environmental water over time.

Priorities are:

- a. Australian, State and Territory Governments should increase their focus on monitoring environmental and other public benefit outcomes — not just flow delivery — where additional effort would be commensurate with the risk to, and value of, those outcomes
- b. monitoring and evaluation should involve collaborative and complementary partnerships, consistent methods that enable the synthesis of outcomes across different temporal and spatial scales, and long-term investment. In the Murray-Darling Basin, governments should develop a strategy to coordinate monitoring and evaluation of the outcomes of environmental flows, both planned and held
- c. all managers of environmental flows should publicly report on whether outcomes have been achieved or not, and the reasons why
- d. Australian, State and Territory Governments should establish arrangements for independent auditing of environmental flow outcomes to support transparency
- e. managers of held environmental water should use the results of monitoring, evaluation and research to improve water use as part of an adaptive management cycle. To achieve this, managers should clearly allocate responsibility and provide adequate resourcing for adaptive management.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendation 5.6 (e).

6 Urban water

Key points

- Urban water sector reforms undertaken since the 1990s have resulted in significant benefits. However, to address future challenges such as growth in Australia's major cities and the impact of climate change, further significant reforms are required.
- The efficiency of water service provision can be further improved through:
 - extending independent economic regulation to retailer-distributors in south-east Queensland and the Northern Territory's main provider
 - enhancing existing regulatory processes in Western Australia and south-east Queensland
 - extending financial reporting to cover all service providers in regional Queensland
 - requiring appropriately qualified independent bodies to review financial performance reporting frameworks for providers in regional New South Wales and Queensland to ensure their pricing practices are consistent with National Water Initiative pricing principles.
- Reforms are required to maintain water security while promoting affordability. This involves making centralised supply augmentation planning processes more robust and transparent, and ensuring that policy barriers and distortions do not prevent the uptake of emerging decentralised supply options. Specific reforms include:
 - clarifying the planning roles and responsibilities of governments and utilities in many jurisdictions
 - ensuring that planning processes consider all options fully and transparently, including both centralised and decentralised options
 - developing place-based integrated water cycle management plans for major growth corridors and infill developments to ensure that decentralised options are considered alongside conventional centralised options.
- Existing environmental regulations need to be effective in protecting urban waterway health, but this should be achieved as cost-effectively as possible. This can be supported by:
 - reviewing existing State and Territory-based regulatory regimes to ensure that they are sufficiently flexible and outcomes-focused
 - considering the need to amend relevant national policies and standards.
- The efficiency and quality of service provision in regional New South Wales and Queensland can be improved by:
 - reforming existing capital subsidies into targeted community service obligation payments that are not tied to capital expenditure
 - using these community service obligation payments to promote regional collaboration.

The urban water sector comprises about 194 businesses and local governments who deliver water and wastewater services to households and businesses in locations ranging from large metropolitan centres to small towns.³³ The economic contribution of these services is significant, totalling about \$17 billion in 2015-16 (ABS 2017b).³⁴ As an essential service and input for most households and business, the quality and efficiency of urban water services directly affects the quality of people's lives and the broader efficiency of the economy.

The urban water sector has been subject to continuing reform processes since the early-1990s. These reforms aimed to improve the sector's management and governance and therefore the efficiency of service delivery. Over this time, the urban water sector has also been required to meet more stringent environmental standards and is facing changes in community expectations on the role of the water sector within the urban environment. The challenge for urban water management in the future is to provide efficient and affordable water and wastewater services for rapidly growing cities and towns, while also contributing to their liveability in a potentially drier climate.

This chapter considers a range of issues where policy reform can contribute to better economic, social and environmental outcomes, including: pricing; investment decisions; regional service provision; environmental regulation; and the adoption of emerging decentralised approaches to delivering urban water services.

6.1 Australia's urban water sector

Overview of the sector

The urban water sector provides services ranging from the provision of potable (drinking quality) water and wastewater services to stormwater management and water recycling. Urban water services do not include irrigation infrastructure services that deliver water for agriculture, which are discussed in chapter 7.

Urban water services require a mix of processes throughout the supply chain (table 6.1). About half of the sector's effort, by cost, relates to the transportation of water or wastewater. Other major drivers of costs are water and wastewater treatment (about 27 per cent of costs) and bulk water supply (21 per cent). All of these activities depend heavily on capital equipment such as pipes, treatment plants and dams. The sector's asset base was worth about \$160 billion in 2015 (IPA and WSAA 2015, p. 8).

³³ In addition to these 194 providers, there are a range of private and local government owned licensees that provide localised and / or specialised water services.

³⁴ Economic contribution is estimated based on its 'gross value added', which is typically used as the contribution of an industry sector or region to gross domestic product. Gross value added is broadly the total value of goods and services produced by an industry, less the cost of goods and services (other than labour) used in the process of production.

Table 6.1 The water and wastewater supply chain

<i>Supply chain element</i>	<i>Description</i>	<i>Typical cost share^a</i>
Bulk water supply	The collection of water from rivers and aquifers, and the production of potable water by desalinating sea water.	21% ^b
Water treatment	Treatment of bulk water so that it is fit for its intended purpose.	11%
Water transport	Transportation of water from bulk supply sources to the final customer.	24%
Wastewater transport	Transportation of wastewater from its point of use to a treatment plant.	24%
Wastewater treatment	Treatment of wastewater to a standard suitable for disposal or reuse.	16%
Retail	Retailing of these services to customers; primarily billing and handling customer complaints.	4%

^a Water Services Association of Australia's (WSAA's) estimate of a typical cost share based on analysis of a range of utilities. Costs of individual utilities will differ depending on local circumstances. ^b WSAA estimate the share attributable to desalination and other bulk sources (dams, rivers and groundwater) separately; these shares were 14% and 7% respectively.

Source: WSAA, pers. comm., 24 May 2017.

Urban water services in Australia are overwhelmingly provided by government-owned entities. Most of these are vertically-integrated³⁵ monopolies, reflecting the capital-intensive nature of services, economies of scale in production, and the interconnected nature of water and wastewater supply and treatment (table 6.2). Examples of areas where bulk water or wastewater functions are separate from distribution and retail to end customers include Sydney, Melbourne and south-east Queensland. In some locations water and wastewater functions are provided by different entities. Further, in some jurisdictions the structure of the industry differs between metropolitan (capital city and surrounds) and regional areas. Metropolitan providers are typically fewer in number and have more customers, generally exceeding 100 000 per business. In regional areas in some jurisdictions, particularly New South Wales and Queensland, there are a large number of smaller providers. By contrast, in South Australia, Tasmania, the Northern Territory and the ACT there is a single jurisdiction-wide provider covering both metropolitan and regional areas. In addition to the providers detailed in table 6.2, most local governments, and some water service providers, provide drainage and stormwater management services.

³⁵ A 'vertically-integrated' entity is one that undertakes the entire water supply chain, sourcing bulk water, treating, transporting and retailing it to customers, and then transporting, treating and disposing of wastewater.

Table 6.2 Industry structure by jurisdiction and location

	<i>Ownership</i>	<i>Bulk water</i>	<i>Bulk water and wastewater</i>	<i>Retailer-distributor (water and sewerage)</i>	<i>Vertically integrated (water and sewerage)</i>	<i>Water only</i>	<i>Sewerage only</i>
Metropolitan NSW ^a	State	1		1	1		
	Private	1					
Regional NSW ^{a,b}	State	1			1		
	Local government	1		11	66	3	9
Vic	State		1	3	13		
Metropolitan (south-east) Qld	State	1					
	Local government			5			
Regional Qld	State	2					
	Local government				66		
WA ^{a,c}	State				1	2	
	Local government						1
SA ^{a,d}	State				1		
Tas ^e	Local government				1		
NT ^f	Territory				1		
ACT	Territory				1		

^a Various private and local government owned licences provide localised and / or specialised water services. ^b 64 Aboriginal communities self-supply. ^c 84 remote communities are supplied by three community service providers funded through the Remote Area Essential Services Program. ^d 18 remote communities self-supply with technical assistance from SA Water. ^e The Tasmanian Government has introduced legislation to transfer TasWater to State ownership. ^f 72 remote communities are served by a subsidiary of the Power and Water Corporation called Indigenous Essential Services.

Sources: BOM (2017d); Department of Primary Industries, Parkes, Water and Environment (Tas), sub. 57; NSW Government (2017b); qldwater (2017).

Urban water sector reforms have achieved significant benefits

Prior to the 1980s the urban water sector was vastly different to today. Water usage was often unmetered and free, with households charges generally levied on the basis of property value and independent of water usage. Transformation of the urban water sector began with the introduction of consumption-based pricing in Perth, the Hunter District, Melbourne and Sydney during the 1970s and 1980s (Salisbury, Head and Groom 2017, p. 13). Following this, the structure and governance of the sector also began to be reformed, commencing with the corporatisation of water service providers in the Hunter and Melbourne in 1992 (Salisbury, Head and Groom 2017, p. 13). Subsequent waves of national reform were driven by three COAG agreements.

- The 1994 Water Reform Framework prompted widespread movement towards cost-reflective and consumption-based pricing.

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- The 1995 National Competition Policy drove widespread corporatisation of water utilities to more clearly separate service provision from policy-making functions, required government-owned utilities to compete with private entities on a level playing field, and provided the underpinnings for price regulation.
 - The 2004 National Water Initiative (NWI) required further movements towards fully cost-reflective pricing and improvements to institutional arrangements in the urban water sector, while promoting policies in the areas of demand management, water sensitive cities and water recycling.

There is evidence that past urban water reforms have delivered significant benefits. The Commission has previously estimated that Australia's gross domestic product was about 0.35 per cent higher over the 1990s due to improved efficiency in urban water services (PC 2005). If gains of this magnitude have been maintained through to today, this would represent an annual economic gain of over \$5 billion. The widespread introduction of consumption-based pricing (along with water restrictions and awareness campaigns during droughts) resulted in changed consumer behaviour and more efficient water use. For example, between 2000 and 2016 residential water consumption (median annual residential water supplied) in cities and towns has decreased from 280 to 182 kilolitres per property (BOM 2015, 2017b).

6.2 Progress under the NWI and where to next

Progress has been made but unfinished business remains

The NWI sets out a range of outcomes for the urban water sector³⁶, including:

- implementing pricing and institutional arrangements that promote economically efficient and environmentally sustainable use of urban water infrastructure
- delivering healthy, safe and reliable water supplies
- encouraging reuse and recycling of wastewater where cost-effective, and encouraging innovation in water supply, treatment, storage and discharge.

The Commission has assessed the progress of State and Territory Governments in achieving these outcomes. This assessment is summarised in table 6.3 and set out in more detail in appendix B (section B.3).

Jurisdictions have generally made good progress in delivering on their specific commitments under the NWI and in pursuing its broader outcomes for the urban water sector. However, there is unfinished business in two areas.

- Not all jurisdictions have achieved the pricing requirements of the NWI and improvements to pricing practices are required (discussed further in section 6.3).

³⁶ The NWI includes a specific section on 'urban water reform'. However, actions relevant to the urban water sector are also included in the NWI section on 'best practice pricing and institutional arrangements'.

- There is scope to extend the use of independent bodies to set or review prices, or price-setting processes, as supported by the NWI (section 6.4).

Table 6.3 Assessment summary: urban water

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Best practice pricing and institutional arrangements		
Metropolitan providers will move towards upper bound pricing levels	Largely achieved	Providers are generally pricing at or near upper bound levels. However, there is some evidence of underpricing in south-east Queensland (bulk water) and Tasmania.
Regional providers will achieve lower bound pricing and move towards upper bound pricing if practicable. If lower bound pricing is not practicable, services will be subsidised through a transparent Community Service Obligation (CSO).	Partially achieved	There is evidence of underpricing in regional New South Wales. The use of capital subsidies in regional New South Wales and Queensland is inconsistent with the NWI and is likely to lead to inefficient pricing. Greater transparency on pricing outcomes in regional Queensland is needed to assess consistency with the NWI. Greater clarity on the use of CSOs in the Northern Territory would improve consistency with the NWI.
Jurisdictions will consider the use of independent bodies to set or review prices, or price-setting processes, on a case-by-case basis	Partially achieved	Economic regulators set prices or revenues for providers in New South Wales (metropolitan providers only), Victoria, South Australia, Tasmania and the ACT. Economic regulators make non-binding recommendations in Western Australia and south-east Queensland (bulk water only). Providers in regional New South Wales, south-east Queensland (retailer-distributors), regional Queensland and the Northern Territory are not subject to formal price regulation. The Tasmanian Government has introduced legislation that would greatly constrain the role of the independent economic regulator in that State.
Proposals for investment in new or refurbished water infrastructure will be assessed as economically viable and ecologically sustainable prior to it occurring	Partially achieved	Corporatisation and economic regulation supports more prudent investment decisions by many metropolitan providers. However, future investment decisions can be improved by clarifying supply augmentation planning arrangements and extending the use of independent economic regulation in some jurisdictions. The ongoing use of capital subsidies in regional New South Wales and Queensland is likely to undermine the objective of economically efficient investment.
Urban water reform		
Achieving healthy and safe water supplies	Partially achieved	Jurisdictions where water quality issues persist have all taken action, with some evidence of success. Better structuring and targeting of State Government subsidies is likely to be necessary to address water quality issues in Queensland. However, the success of current policy efforts cannot be guaranteed and a further review of efforts and outcomes may be required in future assessments.
Pursuing water reuse, end use efficiency, water sensitive urban design and innovation	Largely achieved	Jurisdictions, both collectively and individually, have undertaken significant action in this area and substantially met their commitments under the NWI. Recent policy efforts have shown a greater focus on cost-effectiveness, and this focus should be maintained.

^a **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

New challenges

In the period after the adoption of the NWI in 2004, the Millennium Drought intensified and increased pressure on urban water supplies, requiring urgent supply augmentation decisions. In some cases governments dictated supply options, such as desalination, and excluded these investments from scrutiny by economic regulators. In other cases, governments excluded options from consideration, such as trade of water between the irrigation and urban sectors and the use of recycled water to supplement potable supplies.

In recent years, new pressures and drivers have emerged, which have shaped the need for further urban water reform. Issues include growing populations in major cities, declining population in some regional and remote areas, and increasing pressures on water supplies from climate change. More broadly, the experience of drought has led to greater public discourse on the contribution of the water sector to the liveability of cities.

Where to next?

Reflecting on these new challenges, as well as the unfinished business from the NWI, the Commission has identified the following areas as warranting further attention:

- improved pricing practices in several jurisdictions
- extending the scope of independent economic regulation and performance monitoring to drive further efficiency improvement
- planning for growth in major cities by
 - improving major supply augmentation planning
 - ensuring that emerging decentralised integrated water cycle management approaches are considered on a level playing field alongside conventional centralised options
- ensuring that environmental regulations are flexible and cost-effective, particularly in the areas of wastewater discharge, beneficial use of wastewater and sewer overflows
- improving service provision in regional and remote areas.

6.3 Pricing practices can be improved

The NWI's key pricing requirements for urban water services are:

- continued movement towards upper bound pricing³⁷ for metropolitan providers by 2008

³⁷ Upper bound pricing can be thought of as pricing that reflects the full cost of service delivery, including allowance for a market-reflective rate of return on the capital used to provide these services. The full NWI definition is provided in appendix B.

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- achievement of lower bound pricing³⁸ by regional providers and continued movement towards upper bound pricing where practicable
 - where full cost recovery is unlikely to be achievable a transparent community service obligation (CSO) may be necessary to fund regional services.

While the National Water Commission (NWC) (NWC 2014c) found that most jurisdictions have made progress in the area of full cost recovery, it stopped short of finding that all jurisdictions has achieved this objective. Indeed, the NWC highlighted potential problems with pricing processes in Victoria, Western Australia and the ACT, suggesting that issues remained in relation to pricing practices in these jurisdictions. Further, it did not rule out the presence of pricing issues in other jurisdictions.

The Commission's analysis of pricing outcomes over the period from 1 July 2013 to 30 June 2016 also found some evidence of both under- and overpricing in the urban water sector (appendix B, section B.3). While large metropolitan and jurisdiction-wide providers are generally pricing at levels consistent with the requirements of the NWI, there is some evidence of pricing below lower bound levels in south-east Queensland (bulk water only) and Tasmania. However, it is relevant to note that pricing policies applying to south-east Queensland's bulk water provider, Seqwater, and Tasmania's state-wide provider, TasWater, explicitly allow for underpricing at present, with prices increasing towards more cost-reflective levels over time.

There is also some evidence of pricing below lower bound levels in regional New South Wales. The New South Wales Government's provision of significant capital grants to regional service providers (section 6.7) further indicates that a number of these providers are not pricing at lower bound levels. A lack of data makes it difficult to assess pricing outcomes for small service providers in regional Queensland (measures to address this are discussed in section 6.4). As in New South Wales, the Queensland Government provides capital grants to many regional service providers (section 6.7), suggesting that pricing may be below lower bound levels in that State.

DRAFT FINDING 6.1

Metropolitan and jurisdiction-wide providers' pricing practices are generally consistent with the requirements of the National Water Initiative. However, there is some evidence of underpricing in south-east Queensland (bulk water) and Tasmania.

Some providers in regional New South Wales are pricing below the level required by the National Water Initiative. It is not possible to determine whether pricing practices among smaller regional Queensland providers are consistent with the National Water Initiative due to a lack of data.

³⁸ Lower bound pricing can be thought of pricing that ensures that services are self-funding, but that does not necessarily provide a return on the capital those services employ. The full NWI definition is provided in appendix B.

Underpricing appears to persist in regional New South Wales in part due to an inadequate definition of ‘full cost recovery’.³⁹ The New South Wales Government deems a local water utility to be achieving full cost recovery if it earns a positive economic real rate of return (ERRR) or if it has ‘significantly increased its charges in order to recover its costs’ (2017b, p. 99). In practice, the second part of this definition allows providers to earn persistently negative ERRRs, which indicates a significant risk of pricing below lower bound levels. As such, while the New South Wales Government (2017b) has judged that 100 per cent of water providers and 93 per cent of wastewater providers achieved full cost recovery, 11 water providers (13 per cent) and 14 sewerage providers (16 per cent) in fact achieved a negative ERRR in 2015-16. Of these, five water providers and six sewerage providers have reported negative rates of return for the past three years (NSW Government 2015b, 2016, 2017b).

DRAFT FINDING 6.2

The New South Wales Government’s definition of ‘full cost recovery’ is not consistent with the requirements of the National Water Initiative to achieve lower bound pricing.

Efficient pricing requires more than moving towards upper bound pricing. The Commission has previously highlighted the potential for more flexible pricing (including ‘scarcity pricing’) to achieve greater efficiency in balancing water supply and demand (PC 2011). It is unclear whether the NWI Pricing Principles as presently drafted support the use of scarcity pricing; the primary guidance they provide is to ‘have regard to the long run marginal cost of the supply of additional water’ (COAG 2010a, p. 10), whereas scarcity pricing requires a deeper examination of how the expected cost of supply varies between different climatic scenarios and over time. While the NWI Pricing Principles do not preclude going beyond consideration of a simple estimate of the long run marginal cost of supply, there may be value in considering the case for including further guidance on these matters. This would support further efforts to achieve efficient pricing, particularly by utilities that are already achieving upper bound pricing.

6.4 Reform is needed to support efficient pricing and decision-making in urban water

Efficiency in government-owned utilities can be improved

The urban water sector is dominated by government-owned monopoly service providers (section 6.1). This means that government must simultaneously fulfil a range of roles in the sector: it is the shareholder of major service delivery entities and so is interested in efficiency and their financial returns, but it also regulates these entities in a range of ways, including through oversight of prices, the access to infrastructure they provide to potential competitors,

³⁹ The Commission has previously highlighted issues with the definition of full cost recovery used in New South Wales (PC 2011).

and environmental and water quality standards. Further, while water service providers are accountable to their customers for their performance, governments as shareholders are also held accountable for water-related matters by voters.

These inter-linked obligations and accountabilities create a range of inherent governance tensions in the urban water sector. Governments may pursue policy objectives through intervening in the operations of utilities, blurring the distinction between service provision and policy-making. One issue is that governments may politicise water pricing. This could be overpricing to extract dividends from utilities to improve budgetary outcomes or to reduce reliance on tax revenue or, alternatively, underpricing to improve affordability for customers. Another issue is that governments may intervene in investment decisions for political reasons. This could create uncertainty in utility planning and decision-making, imposing costs through delay and lost opportunities. Prescriptive government directions can also impose higher costs on customers.

Reform efforts over several decades have sought to resolve these problems by clearly separating policy-making from service delivery and, further, the policy interests of government from their financial interests, usually by establishing distinct portfolio (ministerial) responsibilities within government, and arms-length monitoring of pricing and performance. This was a key focus of National Competition Policy reforms which encouraged corporatisation and the establishment of economic regulatory frameworks to monitor and more closely align utility performance with the interests of consumers. This focus continued through the NWI, which required parties to the agreement to:

... use independent bodies 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 ... (paragraph 77)

Despite jurisdictions making progress in implementing National Competition Policy and NWI reforms, a range of stakeholders have identified that work remains to be done to separate policy-making and service delivery to support efficient outcomes. For example, the NWC found that:

There is a need to clarify, and clearly articulate the role of government and in particular to separate the roles of owner, policy maker, regulator and price setter, and those which sit with the utility service provider. (2014c, p. 69)

Ongoing government interference in price-setting was of particular concern to the NWC.

Political intervention in independent economic regulatory determinations, whether motivated by shareholder-return considerations or short-term political dynamics, is deferring cost-reflective pricing and efficient price signalling. This behaviour is a clear barrier to the achievement of efficiency and innovation outcomes sought through corporatisation ... (2014c, p. 7)

One particular example of interference in price-setting mentioned by the NWC (2014c) was the 'Fairer Water Bills' policy in Victoria, which required service providers to reduce prices through a rebate to customers. The potential for interference remains, as indicated by the Tasmanian Government's introduction of legislation in July 2017 to greatly restrict the role of the economic regulator in that State and limit the rate of price increases to address concerns about affordability.

There is also evidence that governments have intervened in specific investment decisions, when these should ordinarily be determined by through clear planning processes following arms-length vetting by the economic regulator. Two prominent examples are the Sydney and Victorian desalination plants; in both cases the relevant governments effectively excluded the decision to invest in these assets from regulatory scrutiny (box 6.1).

Box 6.1 Major desalination investments were not subject to regulatory scrutiny

Sydney Desalination Plant

The New South Wales Government committed to build a desalination plant in 2007 (after significant preparatory work). The plant entered full operation in February 2010. At full capacity the plant can supply about 250 megalitres of water per day (or about 90 gigalitres per year).

The New South Wales Government required the Independent Pricing and Regulatory Tribunal (IPART) to include the efficient costs of complying with its requirement to build the Sydney Desalination Plant in Sydney Water's 2008–2012 price determination. This direction was made on 5 July 2007 by the relevant Minister under section 16A of the *Independent Pricing and Regulatory Tribunal Act 1992* (NSW) (the IPART Act) (IPART 2008). In effect, IPART could not scrutinise the decision to build the plant, but could assess Sydney Water's efficiency in complying with the Government's requirement to build it.

Victorian Desalination Plant

The Victorian Government committed to build a desalination plant in 2007. The plant entered full operation in December 2012. At full capacity the plant can supply about 150 gigalitres of water per year.

The Victorian Government's 2012 Water Industry Regulatory Order required the Essential Services Commission to set prices in a way that 'minimise[s] the extent of any under or over recovery of revenue associated with the desalination plant' (2012, p. 2365). In effect, this requires that all costs incurred by the Victorian Government in its public-private partnership to deliver the desalination plant are passed through to consumers, and so prevents the regulator from questioning whether the original investment decision was efficient.

Sources: Aquasure (nd); IPART (2008); SDP (nd); Victorian Government (2012).

The Commission has previously highlighted examples where governments have imposed implicit or explicit policy bans on particular supply options, and these are likely to have imposed significant costs on the community (PC 2011).

- The Victorian Government's restrictions on water corporations using the 'North-south pipeline', which connects predominantly rural supply systems in the Goulburn Valley with metropolitan Melbourne's supply.
- The Western Australian Government's decision to prevent the Water Corporation from accessing the Yarragadee aquifer to supply metropolitan Perth, in favour of irrigation use. In effect this forced the Water Corporation to invest in a desalination plant.

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- Policy bans on the use of recycled water to supplement urban water supply (‘planned potable reuse’) in New South Wales, Victoria and South Australia, and restrictions on use of the Western Corridor potable reuse scheme in south-east Queensland.

Bans on some forms of potable reuse remain. For example, the Queensland Government has banned direct potable reuse under the *Public Health Regulation 2005* (Qld). While the social and political aspects of planned potable reuse — particularly direct potable reuse (DPR) where recycled water is directly injected into a drinking water supply — need careful consideration, the case for an outright policy ban is weak. As highlighted in a submission by the UNSW School of Civil and Environmental Engineering:

... ATSE [the Academy of Technological Sciences and Engineering] is convinced of the technical feasibility and safety of drinking water supply through DPR when properly managed. ATSE considers there may be considerable environmental, economic, and community benefits of supplying highly treated recycled water direct to drinking water distributions systems in appropriate circumstances ... ATSE is concerned that DPR has been pre-emptively excluded from consideration in some jurisdictions in the past, and these decisions should be reviewed. (sub. 7, pp. 5–6, quoting ATSE (2013))

While the cheapest water supply option will always be case-specific, in some cases foregoing the use of planned potable reuse can have significant economic costs. For example, the Toowoomba City Council’s decision to not use indirect potable reuse to augment its drinking water supplies required it to invest in a pipeline with a capital cost over \$100 million in excess of the estimated cost of the recycling proposal (PC 2011, p. 96).

While governments will always remain ultimately accountable to the public and retain the right to intervene in the urban water sector to support policy and political objectives, reforms over a number of decades have sought to place structured processes around such interventions, so that they are well justified and do not interfere with the day-to-day operations of utilities. These reforms can work as envisaged if appropriate attention is given to the inherent tensions between different government roles. The examples above suggests that there is further scope to separate service provision and policy-making and embed the reforms begun in the 1990s.

Good governance, economic regulation and competition support efficient service delivery

Good institutional arrangements and policy frameworks can minimise tensions between service provision and policy-making. Three areas are particularly important in this regard.

- Governance arrangements that allow utilities to focus on efficient service provision in accordance with clear commercial objectives, while remaining accountable and responsive to formal policy obligations imposed by government. This requires roles and responsibilities for decision-making to be clear.
- Independent economic regulation encourages efficient service delivery by applying rigorous scrutiny to utilities’ operational and investment decisions, and so requiring

regular, consistent and high quality business planning processes. It increases the transparency of decision-making and reduces the risk of political interference in price-setting processes.

- Robust competition frameworks increase competitive pressure on incumbent utilities, while potential private entry places greater discipline on governments to regulate the sector in predictable ways.

The importance of these three areas is reinforced in a policy document developed by Infrastructure Partnerships Australia (IPA) and the Water Services Association of Australia (WSAA) (2015). IPART's submission to this inquiry also considers these to be the key areas for reform.

In general terms, we consider that efficiency in the provision of rural and urban water services can be enhanced through more widespread application of independent economic regulation of monopoly providers of water services, improved governance and regulation of state-owned water utilities, and measures to enhance the potential for competition in the water market. (sub. 18, p. 2)

Governance

Historically, corporatising government businesses has been a key reform to separate service delivery from policy-making. However, to be most effective, corporatised entities should be provided with clear objectives and managerial autonomy so that they can operate independently on a day-to-day basis, while remaining accountable to government and responsive to changes in government policy. The Commission (PC 2011) and IPA and WSAA (2015) set out a number of key principles for good governance of State-owned corporations. These are summarised in table 6.4.

The Commission has identified some weaknesses in processes for planning and decision-making on major supply augmentations. This is discussed further in section 6.5.

Independent economic regulation

Independent supervision or regulation of prices is crucial to efficient service delivery. Independent regulatory processes scrutinise the prudence and efficiency of expenditure, supporting better operational and investment decisions. This is partly achieved by requiring utility businesses to produce sound proposals in support of expenditure. Economic regulation also supports the separation of service delivery and government policy-making by ensuring that pricing processes are transparent and undertaken in accordance with the long-term interests of consumers (encompassing both cost and quality considerations), rather than being driven by, for example, a short-term desire to extract dividends or simply keep prices low for consumers.

Table 6.4 Elements of good governance of State-owned corporations

	<i>Commission (2011)</i>	<i>IPA and WSAA (2015)</i>
Clear and non-conflicting objectives	An objects clause can provide guidance on how to prioritise objectives. Regulatory functions should not sit with utilities. Removing environmental and health objectives should give them a predominantly commercial focus.	Enterprises should have clear guidance on any trade-offs between objectives that may be necessary. Maximising commercial performance should be a prime objective. Regulatory functions should be moved to specialist regulatory agencies.
Managerial responsibility, authority and autonomy	Boards should be independent, responsible and accountable for internal governance. Directors should be appointed because of their expertise and ability to govern the utility, not to represent particular interest groups. All ministerial directions to utilities should be publicly disclosed.	Directors should be appointed solely to represent the commercial interests of the owner. Board and management should have the authority to make the major decisions affecting the performance of the enterprise. Owner-imposed constraints should be limited to key issues such as defining the activities the enterprise should undertake and determining dividends and borrowing policies.
Performance monitoring by owner-governments	Performance reporting should include a range of indicators reflecting a utility's objectives.	Independent and objective performance monitoring is necessary to ensure that the Board and management are held accountable for performance.
Sanctions for non-performance	Effective sanctions are needed in the event of underperformance. This can include removal of directors or an entire Board.	Rewards and sanctions need to be pre-defined against agreed performance indicators. A range of sanctions are needed to deal with varying degrees of underperformance, including termination of appointments.

Sources: IPA and WSAA (2015) based on New South Wales Treasury (1991); PC (2011).

Regulation provides a further check on political interference by reinforcing the principle that government obligations and directions should be made formally and transparently. Regulators generally are obliged to allow efficient costs to be recovered from customers. For example, section 24FB of the IPART Act provides that:

- (1) In exercising its regulatory functions (other than its licence auditing functions), the Tribunal [IPART] must give effect to any current government policy that has been communicated to the Tribunal, and certified to be government policy, by the relevant Minister or by the Premier.
- (2) For the purposes of this section, the relevant Minister is the Minister who administers the provisions of the legislation relating to the grant of the relevant operating licence, licence or authorisation.
- (3) The Tribunal is to make each such policy communicated to it and certificate received by it publicly available.

The Commission considers that there are several jurisdictions where reforms to existing arrangements for economic regulation and price monitoring will increase efficiency. These are discussed later in this section.

Competition

Competition in the urban water sector can promote efficient service delivery by encouraging entry and innovation by private entities, and by exposing incumbent, largely monopoly, businesses to competitive pressure. Competition can have a further benefit of giving governments a strong incentive to make regulatory regimes robust and predictable, because private entities are typically sensitive to regulatory uncertainty. It is also important that regulators apply these regimes robustly to reinforce the predictability of outcomes for private entities.

While competition is likely to offer benefits in principle, inquiry participants have expressed mixed views on the role of competition in the urban water sector. While a number have sought clarification on the role of competition in the sector (IPART, sub. 18; WSAA, sub. 35; Australian Water Association (AWA), sub. 66; Living Utilities, sub. 68), others have highlighted the practical limits on competition in urban water, such as the potential for uniform ('postage stamp') pricing policies to lead to inefficient private entry (Sydney Water, sub. 36) and the high cost of institutional and legal frameworks to sustain competition (Queensland Government, sub. 45).

Jurisdictions have adopted a range of reforms to promote competition. The most advanced is New South Wales, which legislated the *Water Industry Competition Act 2006* (NSW) (WICA) that has underpinned licencing, access and wholesale pricing arrangements to support competitive entry in a range of areas, such as greenfields service provision, sewer mining and, potentially, wholesale competition through access to pipeline infrastructure at regulated prices (though the latter approach has not been taken up to date). The number of customers and volume of water supplied by WICA licensees has increased in recent years; in 2015-16 over 3000 customers received water and sewerage services from WICA licensees, and over 2 GL of recycled water (IPART 2016a). South Australia and Western Australia have established licencing regimes to allow alternative water service providers to operate, while South Australia and Queensland have legislated third-party access regimes to facilitate access to key pipeline infrastructure.

Competition can support efficient service delivery in the urban water sector and reinforce the benefits of robust economic regulation and corporate governance in the sector. Policy-makers should assess the need for, and tailor delivery of, competition reforms in their respective jurisdictions, as has been done in New South Wales. In New South Wales new entry under the WICA regime has occurred entirely through licensing rather than the access provisions (IPART, sub. 18). This means that providers have purchased wholesale water or sewerage services from Sydney Water or Hunter Water and on-sold to retail customers, rather than seeking access to those providers' pipeline assets to provide competing wholesale services. This suggests that licensing and wholesale pricing regimes may be the key reform to promote competition in the short- to medium-term, with the emergence of wholesale competition likely to take longer to emerge. The Commission is interested in hearing from stakeholders on whether similar approaches could be replicated in other locations, and other ways competition can be promoted.

Expanding the coverage of economic regulation

Price-setting arrangements vary within and between jurisdictions. Economic regulators set maximum prices (or revenues) for delivery of bulk and retail urban water services in areas of New South Wales, and all of Victoria, South Australia, Tasmania⁴⁰ and the ACT. Prices for service providers in Western Australia and the bulk water provider in south-east Queensland are recommended by an economic regulator, but the final decision is made by the State Government. Prices for the Northern Territory's Power and Water Corporation, and local government owned businesses in south-east Queensland, regional New South Wales and regional Queensland are set without reference to or review by an independent expert body (table 6.5).

Table 6.5 Price-setting in the urban water sector

<i>Price set by</i>	<i>State/Territory government ownership</i>	<i>Local government ownership</i>	<i>Private ownership</i>
Economic regulator	NSW bulk water (1) Sydney (1) Hunter (1) Broken Hill (1) Victoria (17) South Australia (1) ACT (1)	Tasmania (1) ^a Central Coast NSW (1)	Sydney Desalination Plant (1)
State Government with recommendation from economic regulator	Western Australia (3) South-east Queensland bulk water (1)		
State Government acting independently	Northern Territory (1)		
Business ^b	Regional Queensland bulk water (2) ^c	South-east Queensland retail/distribution (5) Regional NSW (89) Regional Queensland (66)	

^a The Tasmanian Government has introduced legislation that would greatly constrain the role of the economic regulator in that State. ^b Including local government as the business owner. ^c SunWater's irrigation prices are regulated but not those for supply of bulk water to urban service providers. The Gladstone Area Water Board sets its own prices but is subject to price monitoring by the Queensland Competition Authority.

Sources: ERA (2017); ESC (2017); ESCOSA (2016); ICRC (2013); IPART (nd); OTTER (2015); QCA (2015, 2017); Utilities Commission (NT) (2017).

⁴⁰ The Tasmanian Government has introduced legislation to the Tasmanian Parliament that would greatly restrict the role of the economic regulator in that State.

The Commission considers that independent oversight should be extended to unregulated retailer-distributors in south-east Queensland and the Northern Territory's Power and Water Corporation. Independent scrutiny should promote increased efficiency in water services provided by these entities.

It is relevant to note that the Queensland Competition Authority previously monitored prices charged by the south-east Queensland retailer-distributors, and reviewed the regulatory framework for these entities in 2014. However, the Queensland Government is still considering the recommendations of that review (DNRM (Qld), pers. comm., 1 June 2017) and its intentions for the future regulation of those providers are unclear. In the case of Western Australia's water providers and south-east Queensland's bulk water provider, existing processes provide transparency and scrutiny but they can be made more effective. In particular, the Economic Regulation Authority in Western Australia and the Queensland Competition Authority can only undertake price reviews at the discretion of the relevant Minister. Confidence in the price-setting processes would be enhanced by giving these regulators a standing reference to review or set prices, rather than leaving the occurrence of a review subject to Ministerial discretion.

It is appropriate that jurisdictions retain flexibility to tailor their regulatory regime to their particular needs. However, the approach and form of regulation should be determined by the independent regulator in consultation with stakeholders. This approach allows for innovation to occur, such as the Essential Services Commission's recent development of its new 'PREMO' regulatory approach. Jurisdictions may choose to adopt a range of regulatory approaches such as price monitoring or benchmarking through to detailed forward-looking reviews of costs and prices to develop a price recommendation or a formal price or revenue determination. The latter, more deterministic regulatory processes, heighten the obligation of governments to impose any additional policy requirements through transparent and formal processes.

Expanding the coverage of economic regulation as proposed will support national consistency. It would mean that all metropolitan and jurisdiction-wide providers would be subject to independent scrutiny. Further, while the form of regulation will vary across jurisdictions, stakeholders have argued that national principles or standards would support good practice and promote competition by assisting private entities that seek to operate in multiple jurisdictions (IPART, sub. 18; WSAA, sub. 35; AWA, sub. 66; Living Utilities, sub. 68). The Commission agrees that regulation in each jurisdiction should follow a set of common principles. Consistent with those suggested by participants, these include:

- clarifying that the objective of regulation is to promote the long-term interests of consumers
- ensuring that prices reflect the full efficient cost of service provision
- providing incentives for utilities to innovate and improve their efficiency
- considering the long-term financial viability of utilities in regulatory decisions
- promoting transparent customer engagement

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- facilitating effective competition in potentially contestable parts of the industry.

The importance of regulatory frameworks for facilitating competition was highlighted by the Australian Government's Competition Policy Review (Harper et al. 2015, p. 53), which considered that:

Governments should focus on strengthening economic regulation in urban water and creating incentives for increased private participation in the sector through improved pricing practices.

This point was also emphasised in IPART's submission, which noted that its pricing framework for wholesale water and sewerage services 'aims to facilitate efficient new entry to the urban water market for the benefit of end-use customers over time' (sub. 18, p. 3).

DRAFT RECOMMENDATION 6.1

State and Territory Governments should ensure that independent economic regulation is in place for all urban water service providers of an appropriate scale, to further promote efficient service delivery.

Priorities are:

- a. extending independent price regulation to retailer-distributors in south-east Queensland and the Northern Territory's Power and Water Corporation
- b. establishing a standing reference for the Economic Regulation Authority in Western Australia and the Queensland Competition Authority to set or review prices.

Increasing transparency and scrutiny of regional service provision

While extending economic regulation to smaller regional providers in New South Wales and Queensland would promote transparency and scrutiny, it is not clear that the transaction costs of formal price regulation would be justified given the small size and large number of providers in these areas. However, transparency and scrutiny of the performance of these providers can be increased by improving existing reporting processes. This can occur in two main ways:

- increasing the scope and consistency of reported information to promote 'competition by comparison'
- using independent bodies to analyse reported information so as to provide greater scrutiny on outcomes and so better highlight where performance is poor and improvement is required.

Performance reporting (or 'benchmarking') varies significantly between New South Wales and Queensland. While the New South Wales Government (2017b) reports on a comprehensive range of performance metrics across providers of all sizes, reporting in Queensland is not consistent or comprehensive. In particular:

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- larger providers (with more than 10 000 connections) report on financial performance metrics, particularly the ERRR, through the Bureau of Meteorology's National Performance Report (BOM 2017b), but smaller providers do not
 - providers report for a Queensland Government benchmarking exercise (DEWS (Qld) 2017), but the metrics used in this process often differ from those used in the National Performance Report, increasing the reporting effort for providers
 - while Queensland providers are required to report on water quality under the *Water Supply (Safety and Reliability) Act 2008* (Qld), these results are not summarised in a way that allows easy comparison between providers or across jurisdictions.

In general, performance data should be transparently reported for providers of all sizes and across both financial and non-financial indicators to promote competition by comparison. This requires reform in Queensland, specifically, increased reporting of financial information by smaller providers.

While increased reporting has compliance costs, providers in Queensland already comply with multiple reporting requirements. Given the duplicative nature of existing processes, streamlining these into a single reporting process, similar to that undertaken in New South Wales, should have a minimal effect on costs. Further, by encompassing financial information and using a range of commonly used service quality metrics, this would greatly support competition by comparison.

The issues with pricing practices in regional New South Wales discussed in section 6.3 demonstrate the importance of independent and rigorous scrutiny of financial performance. In particular, while the New South Wales Government reports a range of metrics, this data has not been adequately scrutinised to highlight areas where pricing practices have been deficient.

It is important that financial performance reporting frameworks are sufficiently robust to allow pricing practices to be assessed for compliance with the NWI Pricing Principles. Independent bodies should also review existing frameworks and recommend changes to ensure that the pricing practices of regional service providers are monitored for consistency with the NWI Pricing Principles in the future. The primary value of this scrutiny will be to highlight cases where users are not fully funding the water services they use and, in these cases, the additional cost imposed on taxpayers for the support they receive to make up this difference. Typically this support will take the form of capital subsidies or CSO payments — these are discussed further in section 6.7. Given the pricing issues identified in New South Wales in particular, the cost of achieving this is likely to be justified by its benefits in improved compliance.

Scrutiny of financial performance can be further improved by refining the approach used in the National Performance Report. This is particularly important for providers in regional New South Wales and Queensland, who are not subject to formal economic regulation and who primarily report financial performance through the ERRR metric. However, the Commission's analysis in appendix B (section B.3) shows that the effect of developer

charges and contributed assets⁴¹ can distort this metric; in general it tends to overstate the rate of return a provider is earning and so can mistakenly suggest cases of overpricing, while obscuring cases of underpricing. If the ERRR metric is published alongside a second metric that excludes developer charges and contributed assets, this would better test whether pricing practices are consistent with the requirements of the NWI.

DRAFT RECOMMENDATION 6.2

To promote competition by comparison, Australian, State and Territory Governments should ensure that performance monitoring data are transparently reported for providers of all sizes and subject to independent scrutiny.

Priorities are:

- a. the Queensland Government extending the reporting of financial information to service providers with fewer than 10 000 connections
- b. the New South Wales and Queensland Governments requiring appropriately qualified independent bodies to review financial performance frameworks to ensure that the pricing practices of regional service providers are monitored for consistency with National Water Initiative pricing principles
- c. the Bureau of Meteorology, and the New South Wales and Queensland Governments, requiring providers to report a financial return metric that excludes developer charges and contributed assets alongside the economic real rate of return metric.

6.5 Planning for growth

Australia's major cities are growing rapidly and it is essential that planning processes accommodate this growth. By 2050, there is expected to be an additional 8.3 to 13.3 million people living in Australia's capital cities (ABS 2013). This growth, coupled with the expected drying impacts and increased rainfall variability of climate change, means that the affordability of future water services will depend on efficiently supplying this growing demand. Supply options include both centralised infrastructure such as dams and desalination plants and emerging decentralised supply options, such as localised wastewater reuse and stormwater harvesting. Demand management can complement these supply options and help to balance supply and demand.

Australia's experience during the Millennium Drought showed that investing in new major supply options to maintain water security can be very expensive and highly contentious. Infrastructure Australia's submission presents data indicating that capital expenditure in the

⁴¹ When new housing is developed in an area, developers generally either pay water utilities 'developer charges' to contribute to infrastructure costs, or construct assets themselves and provide these to utilities for no charge ('contributed assets').

water sector between 2008-09 and 2012-13 ‘far exceeded the long-term average’ (sub. 50, p. 4), largely reflecting significant investments in desalination plants to address drought conditions. Past Commission analysis indicates that inefficient investment augmentation decisions in Melbourne and Perth alone could have imposed costs on consumers in the order of \$3.2 to \$4.2 billion over 20 years (PC 2011, p. xxv).

While the need for major supply augmentation has reduced following the Millennium Drought, it is likely that pressure on potable water supply will increase over time as a result of climate change and pressure from ongoing population growth, and that significant augmentation will be required in the future. Robust decision-making processes will help to ensure that future investment decisions are prudent and cost-effective.

Planning for growth in the face of these challenges requires reform in three main areas.

- Centralised supply augmentation planning decision-making processes need to be robust and recognise the linkages between centralised and decentralised supply options.
- Roles and responsibilities in supply augmentation planning need to be clear.
- Remaining policy barriers and distortions that may affect the uptake of decentralised ‘integrated water cycle management’ approaches need to be addressed.

These issues are discussed in turn below.

Planning takes place at different scales

Planning for water infrastructure in large cities occurs at two scales — the city or metropolitan scale (‘city-scale planning’) and the local scale. City-scale planning focuses on the centralised water supply system — primarily large-scale centralised infrastructure such as dams, desalination plants and networks of pipelines. Local planning for water infrastructure (‘local water planning’) involves more than just building pipes to transport water from the central system to end users — it also involves considering opportunities to implement decentralised options for water supply and management such as reuse of wastewater treatment and stormwater, and managing stormwater locally through ‘water sensitive urban design’ (WSUD) measures such as rehabilitating wetlands and natural waterways. These decentralised approaches are collectively referred to as ‘integrated water cycle management’ (IWCM).

Decentralised supply options are often most effectively implemented in greenfields or major infill development areas where they can be incorporated at the planning and design stage of new developments and new suburbs. Their benefits are also determined by localised factors, such as the potential for stormwater harvesting and reuse, or the cost of transporting wastewater to a centralised water treatment plant. Further, capturing these benefits may rely on close collaboration between entities across different parts of the supply chain. This means that it is important that the potential benefits of decentralised options are considered early in planning of major growth corridors and development locations, as discussed further below

(draft recommendation 6.4 relates). It is also important that decentralised options do not face barriers and distortions from the general policy framework (draft finding 6.3).

The emergence of decentralised options means that good planning involves more than just optimising the centralised system — it also involves ensuring that city-scale and local water planning interact in ways that promote efficient outcomes, and that local water planning interacts with land-use planning processes (these three planning processes are compared in box 6.2). City-scale planning should recognise the potential contribution of decentralised supply options to supporting water security, and take these into account in determining the size, timing and nature of new major augmentations. In some cases, decentralised options may make centralised augmentation unnecessary.

Box 6.2 Different but related planning processes

City-scale water planning

Optimising the use of centralised infrastructure such as dams, desalination plants and pipes to ensure reliable water supplies, while managing affordability. This requires forecasting demand and recognising the supply contribution of decentralised options emerging from local water planning. City-scale planning takes these factors into account to determine whether supplies meet desired reliability levels and, if not, the timing and nature of augmentations to the centralised system.

Local water planning

The planning of water infrastructure to serve a local area, typically a greenfields or major infill development. This will usually involve extensions of the centralised system to supply water and remove wastewater, but increasingly also involves examining options for localised reuse of wastewater and stormwater, as well as localised stormwater management. Decentralised options will tend to reduce demands on the centralised system, and so affects city-wide water planning.

Land-use planning

Zoning and permitting land use in a localised area to determine the shape of development. This will also consider a range of infrastructure needs, including water infrastructure. Efficient supply of water services to a local area will require land-use planning to incorporate and facilitate detailed local water planning that considers a full range of IWCM options.

The price of water supplied by the centralised system effectively sets the benchmark for assessing the cost-effectiveness of decentralised options. Therefore both end-user and bulk water prices (where applicable) need to accurately signal the value of new supply to entities considering decentralised options (these are often not traditional water service providers). This is because:

- if end-user prices are higher than fully cost-reflective levels there will be risk of excessive investment in decentralised options, while the reverse will be true if prices are too low, as the benefit of decentralised supply options depends on the avoided cost of purchasing water services

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- in a disaggregated industry structure where bulk water providers sell water wholesale to entities such as retailer-distributors, the bulk water price will affect the decisions of wholesale water purchasers to invest in decentralised options.

The NWI Pricing Principles set out a range of matters relating to efficient pricing, but the most important is that prices are set based on forward looking, long-run costs — this ensures that decentralised options will be encouraged if they are cheaper than conventional centralised options.

Principles for good planning

Principles for good planning are reinforced by the COAG National Urban Water Planning Principles (DAWR 2016c). Important principles include:

- *all options should be ‘on the table’* — arbitrary policy bans should not be applied to specific supply options, as has occurred in the past in relation to irrigation-urban trade and indirect potable reuse (chapter 4 and section 6.4, respectively). In particular, direct and indirect potable reuse should be considered on its merits and assessed against the same health standards as other water sources, rather than being arbitrarily banned due to the ‘yuck factor’.
- *planning should consider the interaction of centralised and decentralised supply options* — this includes full consideration of the potential use of alternative water sources such as indirect and direct potable reuse, recycled water or stormwater alongside centralised options. Policies to support the consideration of decentralised supply options on an equal footing are considered further later in this section.
- *planning should be adaptive* — an adaptive or ‘real options’ approach uses up-to-date information on uncertain factors, such as rainfall, to adjust and optimise system planning. A ‘set-and-forget’ approach will tend to perform poorly relative to a more adaptive approach under conditions of uncertainty. Much of the benefit of demand management approaches, such as scarcity pricing and temporary water restrictions, comes from deferring supply augmentation decisions and adjusting these decisions in response to changing climatic conditions.
- *pricing and markets can support an efficient balancing of supply and demand* — tariff structures should signal the full value of water resources to encourage efficient use and the efficient cost of water services. Rights to water can also facilitate trading and efficient price signals.

While the National Urban Water Planning Principles provide a strong basis for supply augmentation planning, there is no formal requirement for jurisdictions to comply with them. The NWI should be amended to ensure that planning processes comply with these principles, particularly that all options are fully and transparently considered (including both centralised and decentralised approaches), and are adaptive in response to new information.

Role and responsibilities in the planning process for major supply augmentations

Clear roles for governments and utilities in major supply augmentation planning are critical to ensuring that decisions are made by those best placed to make them, are not delayed due to uncertainty over who is responsible for making them, and that decision-makers can be held accountable for their decisions.

Inquiry participants have expressed concern that roles and responsibilities for supply augmentation planning are not always clear. For example, Infrastructure Australia noted that:

Despite the notional separation of policy, service provision and regulatory functions through corporatisation of urban water utilities, the NWC (2011) recognised the lack of clarity within and between jurisdictions. This lack of clarity is still firmly entrenched. This compromises accountability and transparency and can increase the costs of service delivery where uncertainty comprises [sic] planning for urban water supply security. (sub. 50, p. 7)

WSAA considered that roles and responsibilities are generally clear, but can become blurred when water supplies are under pressure:

... for the most part there is a good level of accountability and responsibility between governments and utilities. However ... arrangements are not always resilient. When put under pressure through challenges such as water security or concerns about affordability, the roles of government, utilities, regulators and shareholders can become blurred. (sub 35, p. 17)

A recent study for the World Bank reinforces this view:

... as the nation approached a crisis point in the midst of the Millennium Drought, urban water leaders faced an urgent need for reform. There was also, however, an uncertainty about which level of government, or which sections within government agencies, should be responsible for drought response and, indeed, long-term water supply planning (Salisbury, Head and Groom 2017, p. 24)

These views are broadly consistent with a finding of the NWC:

Water utilities operate without clear mandates, often-opaque governance arrangements and unclear authority regarding their ability to make planning and investment decisions. (2014e, p. 28)

The relationship between governments and utilities is crucial

As the elected representatives of a community, governments determine the policy framework within which planning decisions are made. Therefore, governments must determine whether or not to delegate these decisions. A range of approaches are possible, but the two clearest cases in practice are where:

- government coordinates the planning process and seeks technical input from utilities
- government delegates planning to utilities but reserves the right to approve the outcome.

An example of the first case is the New South Wales Government’s planning processes for Greater Sydney and the Hunter regions. While these run as whole-of-government processes, they draw on the expertise of the major water utilities. The division of bulk water supply responsibilities between WaterNSW and the Sydney Desalination Plant, plus the important role of Sydney Water as the primary purchaser of bulk water, strengthen the case for government coordination across these entities in this case.

An example of the second case is in south-east Queensland where the bulk water provider, Seqwater, is required by legislation to develop and regularly update a ‘water security program’, and runs this process independently of Government. While Government reserves the right to recommend changes to Seqwater’s water security program (under section 356 of the *Water Act 2000* (Qld)), this occurs after the draft program is developed. The position of Seqwater as a region-wide bulk water provider means that it is well placed to lead planning processes with greater independence from Government.

Whatever the formal delineation of roles and responsibilities, it is important that they are clearly defined and transparent — entities cannot be properly held accountable if it is not clear on what basis a decision was made or by whom.

Planning processes require clarification in some cases ...

While roles and responsibilities are clear in the cases highlighted above, in other jurisdictions they can be clarified. In South Australia legislation requires the minister to publish demand and supply statements and outline policies and plans to ensure supplies are secure and reliable. However, it is not clear what the role of the primary utility, SA Water, is in these processes, nor how any policies and plans published by the minister would interact with SA Water’s investment planning.

In Western Australia, the Northern Territory and the ACT planning occurs on an informal and occasional basis, and whilst utilities have published comprehensive planning documents in the past there is no formal requirement for them to do so. This creates risks as roles and responsibilities will not be sufficiently clear to support good planning practices. Further, planning may only occur in response to emerging water security concerns and may therefore be rushed and there may be indecision, with both utilities and governments waiting for the other to take the lead.

... and they should be made more transparent

A lack of transparency in planning processes means that it is difficult to hold entities accountable for their decisions. Whilst utilities in south-east Queensland and Victoria are required to consult during their supply augmentation planning processes, the transparency of processes in some other jurisdictions could be enhanced, albeit to differing degrees.

The New South Wales Government consults as part of developing its metropolitan plans but it could disclose more information on the basis on which planning decisions are made. For example, the 2017 Greater Sydney Metropolitan Water Plan makes a series of technical judgements, such as that there is sufficient supply to meet demand for more than 10 years (New South Wales Government 2017a), but the basis on which these are made is unclear. Further, the Government makes use of demand scenarios prepared by Sydney Water and hydro-economic modelling prepared by WaterNSW, but it is not clear how its final conclusions reflect these technical assessments. This process could be made more transparent, for example through releasing supplementary reports detailing the underlying technical analysis.

South Australia's planning processes also lack transparency. While legislation requires state-wide demand and supply statements to be published and updated every five years, this has not occurred (though some regional plans have been published (DEWNR (SA) nd)). Further, while the South Australian Government reviewed its state-wide water policy in 2014-15 (DEWNR (SA) 2015a) this review was not published. The Commission understands that the South Australian Government is developing a new water security plan based on the Water for Good review (DEWNR (SA), pers. comm., 2 August 2017), however, the content of and process for developing that document is not clear.

Tasmania's key urban water service provider, TasWater, has not previously published comprehensive planning documents. It is likely that greater transparency in investment planning in that State would also be of value.

DRAFT RECOMMENDATION 6.3

State and Territory Governments should:

- a. ensure that roles and responsibilities for supply augmentation planning are clearly allocated between governments and utilities
- b. require that decision-making processes are consistent with good planning principles, in particular that they consider all options fully and transparently, including both centralised and decentralised approaches (including indirect and direct potable reuse, and reuse of stormwater), and are adaptive in response to new information.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendation 6.3 (b).

Supporting the implementation of integrated water cycle management approaches

IWCM approaches offer a range of benefits; they can:

- provide a new water source to complement rainfall-dependent potable water supplies

-
- improve urban amenity through supporting the maintenance of green space, and through providing communities with wetlands and waterways
 - improve the ecological health of urban waterways by reducing the level of, or pollution in, urban stormwater runoff, or the level of wastewater discharge.

The broad nature of the potential benefits of IWCM has led to industry discussion on how the urban water sector can efficiently harness these approaches, and in turn contribute to the ‘liveability’ of cities; see for example WSAA (2014, 2017). WSAA summarised its considerations this way:

Contributing to liveability is how the water industry will meet customers’ expectations and provide better responses as the world changes and our customers’ needs and preferences evolve. To achieve this, we need to extend the breadth of our contribution from just being the city’s plumbers. We need to participate in our cities’ and regions’ future as master planners. This includes working across and linking a range of issues and opportunities to provide value to our customers. (2014, p. 9)

IWCM approaches also involve costs. In some cases the costs of establishing and operating a decentralised urban water service (such as local wastewater treatment) will be lower than taking a conventional centralised approach (because it avoids the cost of wastewater transport, for example). However, in other cases IWCM approaches will be relatively more expensive; for example, recycled water is quite energy-intensive to produce and will typically be higher cost than using available dam water (though it may well be lower cost than building a new dam).

It can be hard to quantify benefits and identify beneficiaries of integrated water cycle management projects

Ideally, water policy settings would support the implementation of IWCM approaches where they are efficient — that is, the benefits outweigh the costs, and it is the best available option to achieve a given objective.

However, while IWCM approaches can have many benefits (as highlighted above), these can be hard to quantify in many cases. For example, it can be challenging to quantify improved urban amenity or ecological outcomes.

It can also be difficult to identify a clear beneficiary or responsible agency to lead the project. Further, and as discussed earlier, consideration of IWCM approaches require collaboration between water utilities, local government and, in some cases, the private sector to develop and identify options, particularly in greenfield and major infill developments.

Collaboration between different entities poses challenges. First, it imposes transaction costs on the parties involved. Second, it requires one of the parties to take a leadership role to drive the planning to identify the options and the costs and benefits. In many cases, IWCM options are not investigated because it is not clear which entity should lead.

While collaboration comes at a cost, this should not be a firm barrier to implementation. Highly beneficial projects will generally be able to overcome the costs and effort of collaboration, though projects with more limited benefits may not.

VicWater observed that collaboration amongst responsible institutions is often effective:

There are numerous case studies of Victorian water corporations showing leadership beyond traditional roles and collaborating with partners such as councils and developers to achieve IWM [integrated water management] outcomes (with varying levels of cross-subsidy). These examples provide confidence of the steady adoption of integrated solutions within a broader portfolio of servicing options. (sub. 47, p. 3)

The challenges of collaboration are not unique to IWCM. While clarity on roles and responsibilities is crucial for the successful deployment of IWCM approaches, it is unlikely that there will be an alternative set of institutional arrangements that are unambiguously superior in supporting these approaches. This suggests that ongoing efforts by industry to support collaboration and share good practice, rather than institutional change, will be critical to support future IWCM projects. Submissions indicate that industry recognises its own important role:

The next big gains for the water industry are likely to come through integration, looking beyond the narrow scope of water and sewerage provision, and collaborating with other sectors and the community. (WSAA, sub. 35, p. 23)

Roles and responsibilities are not clear; however, collaboration and planning processes is likely to be the key rather than institutional changes. (AWA, sub. 66, p. 23)

Further, not all IWCM projects are complicated by the need to coordinate across multiple beneficiaries. If a single beneficiary is willing to pay for the entire project due to their private benefit, then it is not necessary to seek financial contributions from all beneficiaries, nor to assess the magnitude of these secondary benefits. In these cases it is unlikely that the costs of collaboration will prevent IWCM projects from being pursued.

Stakeholders have identified a number of potential impediments to integrated water cycle management

In addition to the general challenges that can be created by the complexity and multiple beneficiaries of IWCM approaches, some inquiry participants have also suggested that opportunities to use IWCM approaches are being stifled by specific policy impediments. These are discussed in turn below.

Land-use planning and integrated water cycle management

A number of stakeholders submitted that the interaction of the water sector with land-use planning creates barriers to the uptake of IWCM approaches:

There is an opportunity to transition to a water sensitive city by ... optimising the whole urban water cycle (e.g. stormwater, groundwater) through integrated water cycle management. Greater integration of water, wastewater and stormwater planning within built environment planning is required at an early stage to reduce costs, and create and capture the value of urban water services. (WSAA, sub. 35, pp. 22–23)

... there has not been a concerted effort to ensure that coordinated water and land planning processes, as well as governance of urban water, are well aligned to enable large scale adoption of IWCM in Sydney where it delivers value through efficiencies or superior liveability outcomes. (Sydney Water, sub. 36, p. 4)

Roles of master water planning in cities are very muddled, too many players leading to an absence of real implementation of IWCM approach [sic]. Integration is required both across the water cycle and across sectors (e.g. with local councils and planning sectors). (AWA, sub. 66, p. 23)

In principle there appears to be a strong case for ensuring that land-use planning processes explicitly consider how water infrastructure and management affects development, including options for supply of water and wastewater services, and how stormwater management interacts with land use. The Commission's research indicates that this already occurs to varying degrees in different planning regimes.

AWA (sub. 66) identified that the interaction of the water sector with land-use planning may also be made more difficult due to the number of players involved. However, it is not clear how these could be reduced. The responsibility of land-use planning bodies and water service providers are distinct and should remain so. Land-use planning bodies need to take into account a range of factors other than water, and it would not be appropriate for them to subsume the separate functions of water service providers. Similarly, it would not be appropriate for water service providers to take on formal or informal land-use planning responsibilities; the Commission has previously identified that this is not an appropriate function for water service providers (PC 2011).

Given these considerations, and consistent with draft finding 6.3, the main scope for improvement is likely to be through collaboration between planning bodies and water service providers, rather than formal integration.

Stormwater roles and responsibilities

Some stakeholders have suggested that roles and responsibilities in relation to stormwater in particular can create difficulties for IWCM. The general argument is that, if different entities are responsible for different elements of the water cycle, it will be more difficult to integrate approaches involving stormwater alongside other water or wastewater services. For example:

Within councils, the functions of stormwater management are typically separated from drinking water and sewerage management ... thus roles and responsibilities are universally complicated by governance arrangements. (qldwater, sub. 41, p. 16)

To enable effective IWCM, different roles may need to be allocated to existing water managers. For example, water and wastewater operators could be given responsibility for stormwater management in new growth areas. (Sydney Water, sub. 36, pp. 5–6)

While in many locations stormwater is managed by local governments separately from water service providers, this is not true in all locations. In regional New South Wales and Queensland local governments are ultimately responsible for stormwater, potable water and wastewater, potentially supporting integration of these functions (although in practice different local governments adopt different degrees of integration across these functions). Further, in Melbourne, Sydney and Perth water service providers share responsibility for stormwater management with local governments.

It is not necessary for a water service provider to be directly involved in a project that uses stormwater as an alternative water resource. Where stormwater reuse displaces potable water use the proponent can benefit from avoided potable water costs without a water service provider delivering the project.

Local governments may be better placed than water service providers to capture the benefits of stormwater management approaches. To the extent that naturalised channels or wetlands improve amenity for local ratepayers, it is logical for local governments to fund such projects and recover the costs from ratepayers.

Consistent with draft finding 6.3, collaboration between relevant entities is likely to be important irrespective of specific roles and responsibilities. This is consistent with the view expressed by WSAA in its submission, where it noted that ‘collaboration between all agencies responsible for stormwater management ... is encouraged’ (sub. 35, p. 6).

The Commission welcomes views on how stormwater roles and responsibilities can be clarified to support uptake of IWCM approaches that address stormwater.

Inflexible economic regulation

WSAA argues that current approaches to economic regulation can limit IWCM approaches:

... inflexible [economic] regulation frameworks mean that the water businesses are not required and in most cases discouraged from considering benefits beyond their regulated responsibility of water and sewerage when making investment decisions. (sub. 35, p. 23)

This argument reflects debate that occurred in Sydney Water’s 2016 price determination by the Independent Pricing and Regulatory Tribunal (IPART). As IPART observed:

Most of the stakeholder input on liveability [during this price review] asked whether an alternative to Sydney Water’s proposed price and bill reductions would instead be for Sydney Water to maintain current prices and use the additional surplus to increase expenditure on the environment and recycled water in order to achieve better liveability outcomes. (IPART 2016c, p. 34)

However, IPART further noted that it would:

... consider, and could allow, expenditure proposals to achieve standards higher than those mandated by Parliament and / or government. In such a case, IPART would require clear evidence that it would be prudent and efficient for customers to pay to exceed the mandated standards. (IPART 2016c, p. 37)

The Commission broadly agrees with the logic outlined by IPART in both its Sydney Water price determination and its submission to this inquiry. The Commission considers that placing limits on what costs utilities can incur and pass on to customers is an important discipline to focus decision-making on the net benefits of a proposal and the willingness of customers to pay for it. However, where IWCM projects directly benefit customers of a water services provider it is entirely appropriate for such projects to be delivered by the utility.

Are regulatory frameworks a barrier to integrated water cycle management approaches?

Private sector utility Flow (sub. 44) highlighted a number of potential policy and regulatory barriers to its IWCM projects.

- Only registered ‘public authorities’ are entitled to participate in planning gateway processes with developers, excluding smaller utilities focusing on IWCM.
- Water recycling facilities are listed as ‘high impact’ and therefore prohibited in residential areas.
- Recycled water discharged into the environment is licensed as a pollutant.

The first of these points could arbitrarily restrict uptake of IWCM. The New South Wales Government should consider whether the existing exclusion is appropriate. However, the Commission notes that the rule does not preclude public authorities from pursuing IWCM, and so is not a barrier to IWCM itself.

The second and third points above relate to the stringency of specific planning and environmental regulations. The outcomes sought by these restrictions are likely to be appropriate; the key issue is that the regulations are well-designed and cost-effective to achieve those outcomes. The Commission does not have a view on the cost-effectiveness of these specific regulations, but in general, as highlighted in section 6.6, it is important that environmental regulations applying to water service providers are flexible and outcomes-focused. Failure to achieve this may preclude ‘win-win’ outcomes using IWCM approaches that address environmental pollution while also providing additional benefits for urban amenity and liveability.

Material barriers to adoption of integrated water cycle management approaches should be removed

Policy-makers should seek to remove any material barriers and distortions arising from the general policy framework. It is also important that environmental and health regulations are sufficiently flexible to allow for IWCM approaches to be adopted (section 6.6). Further, it is important that developer charges are cost-reflective, as the way these are levied can affect the choice between centralised and decentralised approaches, and therefore shape the overall planning approach to new developments (particularly developments in major greenfields development corridors). The interaction between developer charges and IWCM approaches is discussed further in box 6.3. Given the importance of cost-reflective developer charges for ensuring that IWCM approaches are considered on an equal footing alongside centralised approaches, and more broadly for funding greenfields infrastructure, there may be a case for further consideration of how developer charges are set in a refreshed NWI (chapter 9). Finally, it is important the IWCM options are identified and considered in a timely manner in major development areas; measures to support this are considered further below.

Box 6.3 Developer charges and integrated water cycle management

Developer charges are levied by utilities on developers of land to recover some of the cost of building or upgrading shared infrastructure to service new areas. Typically developer charges are thought of as applying to assets that serve, or may serve, multiple developments, rather than 'reticulation' assets that serve only one development.

IWCM approaches can avoid the need for future augmentation of centralised infrastructure. For example on-site water recycling will reduce both the need to transport potable water to that site, and the need to transport wastewater from that site to a centralised treatment plant. If developers are not rewarded for these avoided costs through appropriately reduced developer charges, their incentive to invest in on-site options will be reduced.

Setting developer charges at cost-reflective levels requires detailed technical assessments of future demands on, and costs of, infrastructure. They will inevitably rely on assessments made by incumbent utilities. The level of detailed guidance for these assessments varies by jurisdiction; for example, New South Wales provides quite detailed guidance.

Policy settings can move developer charges away from cost-reflective levels. For example, the New South Wales Government has a policy to set developer charges to zero in the Sydney Water and Hunter Water service areas (for water, wastewater and stormwater, but not for recycled water assets). This could potentially reduce the incentive for developers to invest in decentralised IWCM approaches.

Sources: DPI (NSW) (2016a); Sydney Water (sub. 36).

DRAFT FINDING 6.3

In some cases integrated water cycle management (IWCM) projects will be justified by their benefits to a single beneficiary. In other cases, the multiple potential benefits of these approaches, such as improved liveability and ecological health of urban waterways, mean that collaboration across multiple beneficiaries will be required to capture these benefits.

To ensure that this complexity does not mean that cost-effective IWCM opportunities are missed, governments should ensure that material barriers and distortions to the adoption of IWCM approaches are removed from the general policy framework.

Should governments intervene to promote integrated water cycle management?

Some participants favoured direct policy support to overcome the challenges facing IWCM approaches. In general, the Commission recognises that policy support can be appropriate when the broader social benefits of an action cannot be captured by an individual entity, reducing their incentive to undertake those beneficial actions — these are known as ‘positive externalities’. Successful intervention requires correct identification of positive externalities, and appropriate targeting of incentives to change behaviour.

IWCM-focused utility, Flow, proposed that IWCM approaches should be promoted by mandating their uptake:

Our recommendation is that the NWI recommend States mandate the implementation of current trusted solutions such as recycled water and encourage emerging IWCM solutions. (sub. 44, p. 6)

The Australian Academy of Technology and Engineering suggested a mix of approaches:

Adoption [of WSUD] is typically voluntary and as such it is currently patchy, localised, and small in scale. It may be beneficial to consider incentives or statutory requirements to expand its implementation. (sub. 20, p. 5)

The City of Newcastle submitted that grant funding may be required:

... our Council has investigated stormwater harvesting with Hunter Water and found that there are opportunities in our LGA [local government area]. However there are significant costs associated with implementation of this infrastructure. When comparing the costs of alternative water supply to the use of potable supply, the projects are deemed unviable. Grant programs or incentives to implement alternative water supply would assist in implementing new innovations. (sub. 43, pp. 1–2)

Mandating the uptake of IWCM approaches, such as recycled water or stormwater harvesting, is a blunt, risky and potentially costly policy option. While such approaches offer a range of potential benefits, only a subset of projects are likely to deliver a net benefit from a community-wide perspective; a mandate would promote projects that are not cost-effective as well as ones that are. While it is appropriate for the government to regulate to avoid

negative environmental outcomes, these regulations should be outcomes-focused rather than specifying particular ways to achieve the desired outcomes. Mandating a particular approach to reducing environmental impacts, such as stormwater harvesting or reuse of wastewater, is likely to be inflexible and impose higher costs than necessary to achieve the desired objectives.

Appropriately targeted government subsidies for particular IWCM projects are more likely to be cost-effective than broad mandates, but can still be problematic. A subsidy may be justified where there are material environmental or amenity benefits that justify the cost to government. Robust case by case analysis of the public benefits and costs of IWCM projects is essential to ensure that subsidies are justified. Further, government subsidies should only be provided when a project would not go ahead without public investment. The Commission is aware of a range of IWCM projects that received government funding despite the fact that it was in the private interest of a clearly identified beneficiary to undertake the project. For example, the New South Wales Government's (now closed) Climate Change Fund subsidised a range of private entities such as golf clubs and industry to undertake alternative water supply projects that would benefit those entities through reduced potable water costs (box 6.4). Subsidies of this kind represent a transfer from government to private industry, and create a risk that funding will be motivated by political objectives rather than genuine community-wide benefits.

Box 6.4 The New South Wales Climate Change Fund

In 2007-08 the New South Wales Climate Change Fund committed about \$116 million to a range of energy and water efficiency projects. Of this, about \$71 million went to water conservation and recycling projects. This included alternative water sources or water efficiency measures for a broad mix of organisations including Caltex, Port Kembla Coal, Tahmoor Coal, Orica, Amcor packaging, Austral bricks, Stockland, Sydney Airport, AGL, Arnotts, Inghams, Qenos, the Sydney Turf Club, universities, sporting clubs and local governments. The Fund provided in excess of \$4 million to subsidise alternative water sources at various golf courses.

While the New South Wales Government's analysis indicated that the energy and water savings delivered by the program were generally cost-effective, the rationale for spending public money through the program was not entirely clear.

In general these projects should have been funded by the benefiting organisation rather than by taxpayers in general. The project proponents benefited directly from reduced energy and water bills and, in the event that these bill savings were adequate to fund the projects, they should have been entirely privately funded (project proponents generally part-funded the projects). In the event the bills savings were not adequate, the projects should not have proceeded. While there may be a case for targeted public intervention to support efficiency or alternative water sources, for example regulation or the provision of information, subsidies of this kind are unlikely to be a good use of public money.

Source: DECC (NSW) (2008).

While subsidies and mandates carry significant risk, it is important that IWCM approaches be considered on an equal footing alongside conventional centralised approaches. In order to ensure this occurs, IWCM should be considered as part of land-use and water planning activities. An approach along these lines was advocated by the Monash Sustainable Development Institute:

It is recommended ... that Integrated water management strategies (IWMs) be set as a requirement by all governments, to be incorporated across all urban planning activities. (sub. 51, p. 4)

The Institute for Sustainable Futures (sub. 74, p. 3) also highlighted the need to proactively plan for IWCM to capture its potential benefits:

In most jurisdictions there are no formal processes for identifying opportunities for small systems in advance of centralised investment and communicating this to the market ... This lack of information limits the ability of private investors to suggest other alternatives, or to plan local recycled water developments to maximise benefits to both their customers and the wider centralised system.

The best way to implement IWCM plans is likely to vary based on local institutional and planning structures. In some cases it might be better undertaken by water sector entities, and then fed into broader land-use planning processes. This is similar to the process envisaged by the Victorian Government through the *Water for Victoria* policy framework, which committed to require ‘the development of place-based integrated water management plans, with water corporations leading the development of these plans, unless it makes sense for another organisation to do so’ (2016, p. 93). In other cases it may be appropriate for land-use planning authorities to lead the process, drawing on technical input from water utilities as appropriate.

These plans will be of most value for major growth corridors and infill development locations. Retrofitting comprehensive IWCM approaches to substantially developed areas is challenging. In more developed areas project-specific approaches are likely to be more appropriate than large-scale IWCM plans.

DRAFT RECOMMENDATION 6.4

State and Territory Governments should ensure that decentralised integrated water cycle management (IWCM) approaches are considered on an equal footing alongside other water supply and management approaches, particularly in the planning of new developments to support growth.

Priorities are:

- a. ensuring that place-based IWCM plans are developed for major growth corridors and significant infill development locations
- b. ensuring that options identified in IWCM plans are considered in water system planning, including both high-level system-wide planning and detailed investment planning, and in land-use planning
- c. ensuring that IWCM projects are implemented when they are shown to be cost-effective (considering their full range of benefits)
- d. reviewing the role that developer charges play in planning for new developments.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 6.4 (a) to 6.4 (d).

6.6 Environmental regulations should be more outcomes-focused

Urban water utilities are subject to a range of regulations designed to achieve health, environmental and community safety objectives. Examples include drinking water and recycled water quality standards, water extraction limits, wastewater discharge licencing, stormwater management and dam safety (DPI (NSW) nd; PC 2011).

Inquiry participants have not disputed the need for regulation, but some consider the design or implementation of some regulations could be improved to allow innovation in the sector and lower the costs of achieving the desired outcomes,⁴² particularly some environmental regulations.

Regulation has contributed to the better environmental performance of water utilities

Historically, discharge from discrete point sources (such as industrial discharge pipes) was the primary source of waterway pollution, contributing to deteriorating environmental outcomes. In some cases, waste was dumped directly into waterways without particular concern for environmental impacts. In response, environmental regulators in the States and

⁴² WSAA (sub. 35); Sydney Water (sub. 36); qldwater (sub. 41); VicWater (sub. 47); AWA (sub. 66); Local Government Association of Queensland (sub. 71).

Territories applied various pollution control regulations on discharges from point source pollution, including wastewater treatment plants (WTPs) and sewer overflow points.

Tightened regulations and increased compliance have meant that point source pollution is in many cases no longer the biggest threat to waterway health. Diffuse sources of pollution, such as runoff from land previously cleared of vegetation, now often pose a greater risk to ecosystems (SOE Committee 2011). Urban stormwater is another important diffuse source of pollution.

However, in many cases, environmental regulators still primarily regulate identifiable point sources of pollution rather than diffuse pollution. This is understandable, as the present regulatory regime was developed when point source pollution was still the primary environmental concern (VicWater, sub. 47). Further, diffuse source pollution is challenging to regulate using conventional approaches — regulators are usually unable to attribute ambient pollution to a specific activity, and the sources of diffuse source pollution may be beyond their mandate.⁴³

Could some regulations be more flexible?

Participants have raised specific concerns with inflexible approaches to establishing and enforcing effluent discharge standards for WTPs (VicWater, sub. 47 and the Local Government Association of Queensland (LGAQ), sub. 71), standards for sewer overflows (IPA, sub. 19, attachment 1) and to providing environmental flows with treated wastewater (Flow, sub. 44). WSAA argued more generally that a move towards an ‘outcomes-based approach’ would be ‘more cost effective and beneficial to the environment’ (sub. 35, p. 18).

Wastewater discharge standards

Current WTP discharge regulations in many jurisdictions are based on enforcing prescribed standards, rather than meeting environmental outcomes. For example, some States (such as Queensland and Tasmania) enforce a maximum nutrient concentration for water leaving point sources and apply penalties when this limit is breached (DEHP (Qld) 2016; DPIPWE (Tas) 2001). New South Wales has a load-based licensing system where WTPs pay licence fees based on the quantities of pollutants discharged to the waterway (EPA (NSW) 2014).

There are likely to be cheaper ways to achieve water quality outcomes than requiring utilities to undergo costly investments to meet tighter wastewater discharge standards. Treatment costs can increase quite rapidly when moving from basic treatment to more advanced forms (LGAQ, sub. 71). ACIL Allen Consulting (2014) found that many low-cost technical solutions to reduce wastewater pollution have already been implemented in New South Wales.

⁴³ For example, the Commission previously noted the main source of pollution in the Great Barrier Reef lagoon was agricultural runoff. The environmental regulator had no mandate to regulate agricultural landholders — but had the authority to regulate point sources (and did so) (PC 2003).

Beneficial use of treated wastewater

Regulatory approaches in some jurisdictions restrict beneficial use of wastewater within waterways. This appears to reflect an assumption by regulators that reuse is necessarily better for the environment than disposing wastewater to waterways. For example, the principles of the National Water Quality Management Strategy include a hierarchy for waste management, prioritising land-based reuse and recycling above waterway disposal (ARMCANZ and ANZECC 1994). Both Victoria (*State Environmental Protection Policy (Waters of Victoria)*, clause 28) and Tasmania (EPA (Tas) 2014) have similar policies for the licencing WTPs. These hierarchies do not appear to consider the actual costs and benefits of different disposal options, nor how those costs and benefits can vary between different cases.

One area where flexibility may be valuable is in the use of highly-treated wastewater for environmental flows (Flow, sub 44). While wastewater is usually considered a pollutant, reflecting that its discharge brings some risk to water quality, it is likely that in many cases these risks can be effectively managed. The National Guidelines for Water Recycling do not provide guidance on water quality targets for water reused as environmental flows, except for aquifer recharge (NRMMC, EPHC & NHMRC 2009). This has led to a jurisdiction-by-jurisdiction approach, with some jurisdictions being more supportive than others.

While some existing regulations appear prescriptive, several jurisdictions have policies that permit reuse for environmental flows. For example, Victoria permits water to be reused to ‘supplement or create environmental flows in streams and wetlands, and [to] augment groundwater supplies’ (EPA (Vic) 2003, p. 35). However, this option has not been used to date. By contrast, Western Australia’s water recycling guidelines allow for recharging wetlands and aquifers (DOH (WA) 2011) — as will occur after the development of the Perth groundwater replenishment scheme (Water Corporation 2017). Further, in New South Wales, the St Marys Advanced Water Recycling Plant provides recycled water for environmental flows in the Hawkesbury-Nepean River (Sydney Water 2015).

Sewer overflow standards

Jurisdictions usually regulate sewer overflows through prescriptive sewer-size metrics. There are two main approaches.

- One approach focuses on containing rainfall events of a certain size. For example, Victoria’s standard focuses on a one in five year rainfall event (EPA (Vic) 1995).
- A second approach is to require sewers to be sized to handle a given multiple of the average dry weather flow. For example, Queensland requires sizing of five times the average dry weather flow (DEWS (Qld) 2014).

Prescriptive sewer overflow standards have the potential to impose significant economic costs. For example, Sydney Water has estimated that plant upgrades to meet sewer overflow

targets would cost about \$5.5 billion (in 2011-12 dollars), a 20 per cent increase (over time) in total wastewater costs (Port et al. 2016).

The Commission is not aware of rigorous cost-benefit analyses of these regulatory regimes, and notes that few comprehensive reviews have occurred; an exception being in New South Wales, where the State Government is currently reviewing whether load-based licencing meets environmental objectives in a cost-effective way (EPA (NSW) 2017).

The above suggests that some regulatory regimes for WTP discharge standards and sewer overflows are poorly targeted and inflexible, and may not meet the standards of good regulatory practice. The emphasis on minimising discharge to waterways from WTPs similarly imposes costs and precludes possible in-stream benefits from treated wastewater, such as for environmental flows.

There is a significant risk that, if left unchanged, these regulations will impose unnecessary costs on water utilities and water users over coming decades, particularly in light of growing population (increasing pressure on wastewater treatment and sewer infrastructure), the drying impacts of climate change (increasing the potential value of wastewater for environmental or other uses) and greater recognition of integrated water cycle management (section 6.5).

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Environmental regulations applying to wastewater treatment plants and sewer overflows can be overly prescriptive in many cases, and so can exclude alternative approaches that achieve the desired environmental outcomes at lower cost. Further, some alternative approaches can offer better environmental and social outcomes, such as improved urban amenity and reuse of wastewater as environmental flows to improve waterway health.

Alternative approaches offer potential benefits but are exposed to regulatory risk

Utilities are contributing to environmental objectives by addressing diffuse pollution

A number of water service providers have developed alternative approaches towards meeting the underlying water quality objectives of environmental regulation at a lower cost. These efforts have been, to a large extent, motivated by internal assessments of the substantial cost of compliance with existing regulations, and concern that incurring these costs will not materially improve environmental outcomes. Two case studies are discussed in box 6.5, but the Commission is aware of several others (for example, WSAA, sub. 35).

These case studies suggest that a focus on environmental outcomes allows utilities to pursue options that can achieve (or exceed) pollution reduction objectives at a lower total cost than

complying with effluent discharge standards, while sometimes producing further benefits such as improved amenity (section 6.5).

These alternative approaches generally involve offsetting the environmental impact of effluent discharge by financing lower-cost activities to reduce diffuse pollution. Examples of such activities include revegetating or excluding livestock from riparian zones, addressing accidental or illegal connections of wastewater to stormwater mains, and promoting behavioural change to reduce industrial runoff.

While industry-led projects (box 6.5) can offer substantial benefits, they also create risks for utilities. As highlighted by the AWA:

In some mature jurisdictions, reasonable conversations are held between regulators and entities to ensure regulatory objectives are achieved at least cost, and there are examples of this, but ... it is often slow and driven by the utility not the philosophy of the regulator. (sub. 66, p. 22)

When utilities pursue alternative approaches to addressing pollution, they incur a number of costs including undertaking data collection and monitoring, and engaging with community stakeholders. In some cases, this occurs without assurance from the regulator that their approach will be authorised, and utilities risk being found to be non-compliant with existing prescriptive regulations. Further, not all utilities will have the relevant skills or sufficient time to develop alternative approaches.

Given these risks, it is reasonable to expect that some utilities will not be willing to take on the cost and uncertainty of pursuing alternative approaches. This suggests that more flexible regulatory regimes that explicitly support these approaches will assist utilities to pursue these approaches.

Changes to regulatory approaches would be beneficial in some cases

Environmental regulation should be designed such that, at a minimum, the environmental benefits (as valued by the community) outweigh the total costs. Outcomes-based regulations can contribute to this ideal where there are multiple ways of achieving a particular policy objective by allowing the regulated entity to select the most cost-effective way of meeting the specified outcome. There are likely to be further opportunities for more flexible policy frameworks to meet water quality objectives at a lower cost than more onerous restrictions on WTP discharges and sewer overflows.

More flexible and outcomes-focused regulation is emerging in some areas, and this is leading to the implementation of pilot projects. The Queensland Government has implemented an offsets policy that creates a voluntary framework for utilities to undertake certain prescribed nutrient reduction activities to offset WTP discharge pollution (DEHP (Qld) 2014). A pilot program is currently in progress around the Beaudesert WTP, where Queensland Urban Utilities invested \$800 000 to offset a portion of the plant's annual nitrogen discharge through riparian vegetation restoration, thereby avoiding an \$8 million plant upgrade (WSAA, sub. 35, attachment 2, p. 40). Unitywater has implemented similar projects to reduce nutrients in the Maroochy and Caboolture Rivers (WSAA 2017).

Box 6.5 Industry-led waterway pollution reduction programs

Melbourne Water: Enhancing Our Dandenong Creek

Bulk sewers in Victoria are required to meet the standard of not overflowing in high rainfall events (the 'one-in-five-year' rainfall event). The Ringwood South Branch Sewer near Dandenong Creek, Melbourne, is one of a few sewers that does not meet that standard, and the cost of improving it to the standard is about \$100 million (Melbourne Water 2013, p. 26).

Dandenong Creek is in poor condition, with significant heavy metal pollution. Melbourne Water funded a program to improve the creek's ecological health as cost-effectively as possible, instead of upgrading the Ringwood South Branch Sewer. After assessing options, Melbourne Water designed a catchment improvement plan that addressed stormwater pollution through a behavioural change program, and that directly improved biodiversity through a fish breeding and habitat construction program and returning some piped sections of the creek to a naturalised open waterway. The latter element of the program had the additional benefit of improving local amenity. These measures were complemented by targeted, lower-cost improvements to the sewer network to reduce overflows.

The program has allowed Melbourne Water to improve environmental condition at a relatively low cost, while deferring costly infrastructure investment. The total cost of the program was \$14.5 million over five years. Even allowing for the cost of the future (but deferred) upgrade of the Ringwood South Branch Sewer, the program's total cost was about \$15 million lower than the cost of improving the sewer to standard immediately.

Hunter Water: Congewai and Quorrobolong Catchment Improvement Program

Following a 2011 expansion of the small Paxton Water Treatment Plant, the New South Wales Environmental Protection Authority raised concerns with Hunter Water over the long-term impact of increased effluent discharge to Congewai creek. To comply with the discharge limits, Hunter Water explored ways to offset its contribution to nutrient pollution in the catchment.

Monitoring indicated that the Paxton plant supplied only about five per cent of total nitrogen load to the river, and even less for phosphorus. Other sources of pollution included vegetation clearing, agricultural land run off and urban stormwater. In response, Hunter Water designed a program to manage nutrient pollution in the catchment through erosion control, revegetation and urban stormwater management, at a cost of about \$500 000.

Hunter Water estimates that the catchment improvement program would cost about \$63 per kilogram of nitrogen removed from the catchment, substantially less than the cost of upgrading the Paxton Water Treatment Plant at about \$394 per kilogram of nitrogen.

Sources: Hunter Water (2016); pers. comm., 9 August 2017; Melbourne Water, pers. comm., 18 May 2017.

While these are positive steps, there is likely to be scope to do more. Governments should proactively assess whether existing regulations meet best practice, and where they do not, explore the possibility of using more flexible and outcomes-based approaches in their place. In any such review, governments should also consider whether potential benefits from treated wastewater are properly considered.

There may also be a need to amend various national frameworks to ensure that they do not prevent cost-effective and flexible approaches to managing wastewater. For example, as noted above, the National Water Quality Management Strategy's principles recommend jurisdictions prioritise wastewater reuse over possible beneficial use in waterways (ARMCANZ and ANZECC 1994), while the National Guidelines for Water Recycling do not cover reuse of wastewater for environmental flows (NRMMC, EPHC & NHMRC 2009). There may be scope to revise these provisions to better support the beneficial use of wastewater.

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State and Territory Governments should ensure that current environmental regulations protect urban waterway health as cost-effectively as possible, and do not prevent the achievement of other public benefits.

Priorities are:

- a. reviewing existing regulatory regimes for wastewater discharges, beneficial use of wastewater and sewer overflows to ensure that they are sufficiently flexible and outcomes-focused
- b. considering the need to amend relevant national policies and standards.

6.7 Reforms are required to address challenges in regional service provision

Regional service providers face a range of challenges

Regional service providers face a range of distinct challenges. For example, regional water utilities often serve small and highly dispersed population centres which means that a given amount of infrastructure serves fewer people, increasing costs. Further, remoteness means that it can be hard to attract skilled staff and more expensive to obtain materials. In some areas these challenges are becoming greater over time due to declining populations.

One indicator of these challenges is that drinking water quality issues are more prevalent in regional and remote areas than in metropolitan areas. The Commission's analysis in appendix B (section B.6) indicates that water quality issues are very likely to exist in parts of regional Queensland, though a lack of comprehensive reporting makes it difficult to assess the extent of the problem. In addition to Queensland, there are water quality issues in some regional areas of Western Australia, Tasmania and the Northern Territory.

Policy action will be required in some areas to address water quality issues and high service costs. Possible actions include:

- targeting government grants to provide disadvantaged utilities with additional resources to allow them to maintain adequate quality services

-
- achieving economies of scale through either amalgamation or collaboration, as larger organisations will generally be better placed to attract and retain skilled labour.

These issues are discussed in further detail below.

Government funding can be better targeted to areas of greatest need

The NWI recognises that not all communities will be able to deliver viable and affordable water services without some external assistance. Specifically, the NWI 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. (paragraph 66(v)(c))

The Local Government New South Wales and the Water Directorate argue in their joint submission, in a similar vein to the NWI, that it is appropriate for governments to make payments to assist some communities to meet service standards:

... some communities might not be able to afford the desired level of water supply and sewerage services ... Horizontal equalisation objectives such as equal supply security, demand restrictions and achievement of comprehensive health and environmental standards, are more appropriately achieved through subsidies funded from a broader base such as general taxation income. (sub. 72, p. 19)

Funding practices in New South Wales and Queensland are almost certainly inconsistent with the NWI

Both the New South Wales and Queensland Governments provide significant payments to regional service providers to build water and wastewater infrastructure (box 6.6). However, these subsidies generally do not conform to the NWI concept of a CSO as they are not provided on the basis of need and they are tied to capital expenditure — the only exception is the New South Wales Government's Aboriginal Communities Water and Sewerage program, which effectively functions as a CSO. The Queensland Government also provides funding to general local government operations through programs structured broadly as CSOs, such as the State Government Financial Aid program, the Works for Queensland program and the Indigenous Local Government Sustainability Program (DILGP (Qld) 2016a, 2016b, 2017a). However, the value of funding these programs provide for water services is likely to be small in the context of the water funding identified in box 6.6.

The Commission's analysis of a number of major capital subsidy programs in New South Wales — Water Security for Regions, Water and Waste Water Backlog and Resources for Regions programs — indicates that funding through these programs has not been provided on the basis of need. If these subsidies were provided on the basis of need, the recipients would be clustered in the bottom right-hand corner of figure 6.1; that is, the recipients would have relatively high bills and still earn a relatively low rates of return on their existing assets.

Box 6.6 State Government funding for regional service provision in New South Wales and Queensland

Capital subsidies for local water utilities have been in operation in New South Wales since at least 1880 (Audit Office of New South Wales 2015, p. 2). Recent programs include:

- \$1.2 billion spent or committed through the Country Towns Water Supply and Sewerage Program between 1996 and 2016-17 to remove a backlog of regional water and sewerage projects identified in 1996 (Audit Office of New South Wales 2015, p. 2)
- \$325 million reserved in the 2014-15 Budget for the Water Security for Regions program, of which \$110 million has been committed through the Regional Water and Waste Water Backlog Program for further 'backlog' projects
- about \$50 million for further projects funded through the Resources for Regions program (DPI (NSW), pers. comm., 6 June 2017)
- \$200 million over 25 years (from 2009) to improve services in Aboriginal communities through the Aboriginal Communities Water and Sewerage Program
- \$500 million^a for regional water and wastewater projects committed in the 2017-18 State Budget through the Safe and Secure Water program.

From 1932 to 1942 and from 1944 to 2009 the Queensland Government provided a fixed share of most water infrastructure capital spending (LGAQ, sub. 71, p. 25). Since 2009 the Queensland Government has not provided specific water infrastructure funding, but provides a range of general purpose infrastructure funds to local government. Of these, the Commission has identified the following funding for urban water infrastructure:

- \$67 million through the Royalties for the Regions program between 2012 and 2015 (Queensland Audit Office 2015, p. 40)
- about \$21 million through the Royalties for Resource Producing Communities Fund
- about \$44 million through the Regional Capital Fund
- about \$6 million through the Remote Communities Infrastructure Fund.

In addition, a portion of the \$200 million Works for Queensland and the \$46 million Local Government Grants and Subsidies programs has been used for water infrastructure, but this proportion is not clear from public documents.

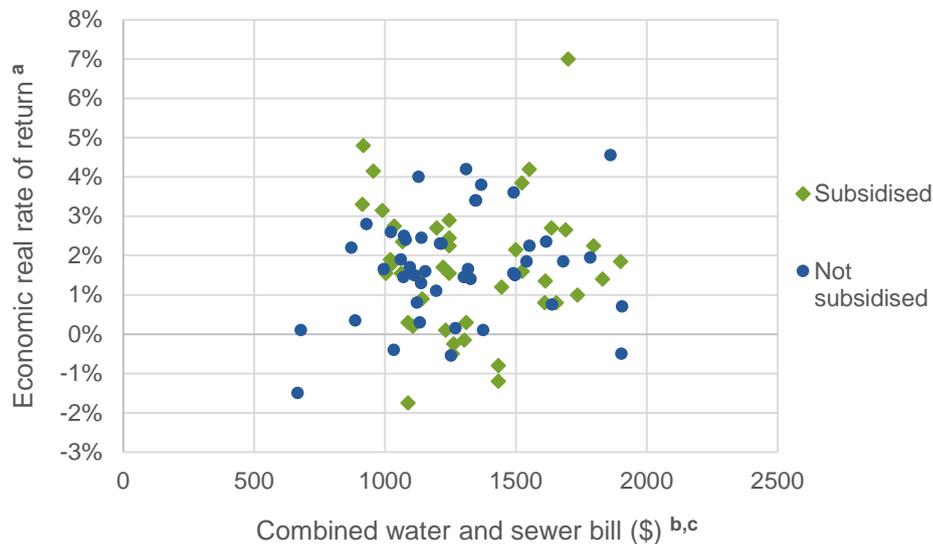
Queensland's 2017-18 Budget commits \$225 million for water security measures for Townsville and \$120 million for an Indigenous Water Infrastructure Program.

^a While the Safe and Secure Water Program is announced as having \$1 billion in funding, \$500 million has already been allocated to a previously announced project, the Broken Hill pipeline.

Sources: AAP (2017); DILGP (Qld) (2017b, 2017c); DPI (NSW) (2017a, nd, nd, nd); DSD (Qld) (2017a); Queensland Government (2017b).

Such providers may not be able to fund all necessary infrastructure as they cannot use their return on existing assets to do so, and cannot easily increase bills further due to potential limits on the ability of their customers to pay. Conversely, providers in the top left-hand corner will generally be able to fund infrastructure out of retained earnings or through increased bills.

Figure 6.1 Capital subsidies in New South Wales are poorly targeted



^a Calculated as the simple average of water and wastewater rates of return. ^b Calculated as a standardised bill assuming annual household water consumption of 200 kilolitres. In some areas water and wastewater services are supplied by different providers; in these cases, bills and rates of return are calculated across both providers. ^c One service provider (Byron Shire) has a usage based sewerage charge; the analysis assumes that this charge is applied to the same volume as the water usage charge.

Data sources: Department of Industry (NSW) (nd); DPI (NSW) (nd, nd); NSW Government (2017b).

The same data are not available to assess how Queensland Government subsidies have been targeted. However, there is substantial informal evidence that this funding is not targeted to local governments with greater funding needs or service challenges. The Commission’s analysis indicates that about 60 per cent of water infrastructure funding under the Regional Capital Fund programs has been allocated to projects in larger local government areas such as the regions of Townsville, Cairns, Mackay, Rockhampton, Bundaberg, Hervey Bay⁴⁴ and Gladstone, and in the metropolitan area served by Queensland Urban Utilities. These communities have significant resources to draw on and it is not clear why these projects would require State Government assistance. This conclusion is reinforced by the Queensland Government’s (2017b) recent commitment of \$225 million to water security measures for Townsville in the 2017-18 Budget. Further, while the \$6 million Remote Communities Infrastructure Fund is likely to primarily benefit communities with significant service challenges, the \$20 million Royalties for Resource Producing Communities funds explicitly targets communities that host resource sector activity (DSD (Qld) 2017b); this is likely to be a poor way to assess whether a community is able to fund its own water infrastructure.

⁴⁴ Hervey Bay is the largest centre in the Fraser Coast Regional Council area, which has a total population of about 100 000.

DRAFT FINDING 6.5

The substantial capital subsidies available for water and sewerage projects in regional New South Wales and regional Queensland are inconsistent with the National Water Initiative.

Capital subsidies should be reformed into targeted CSO payments

The Commission recognises that State and Territory Governments may wish to provide funding to regional communities for various reasons. However, the case for funding water infrastructure, as opposed to other infrastructure or services, is weak. In addition to being inconsistent with NWI principles, capital subsidies are likely to distort behaviour and create a range of problems. In general, they will:

- drain scarce government resources away from services that are difficult or undesirable to fund through user charges (such as roads, public hospitals and public schools) towards water and sewerage services that are, in most cases, capable of being self-funded
- create a risk that funds will not be directed to the most cost-effective projects due to a lack of clarity in assessment criteria or processes
- create a moral hazard problem where local governments that systematically under-invest in their water and sewerage infrastructure are rewarded with greater assistance
- potentially introduce a ‘capital bias’ into service provider decision-making, taking them away from the lowest total cost solution to more capital-intensive solutions
- are likely to allow ongoing underpricing of water services and therefore inefficiently high water use.

The moral hazard problem created by capital subsidies is evident in New South Wales. The State Government has been addressing a ‘backlog’ of projects since 1996, with no signs that the level of State subsidy to local governments is declining; in fact, the 2014-15 and 2017-18 State Budgets both committed significant further funding to continue beyond the life of the longstanding Country Towns Water Supply and Sewerage Program. With the incentives created by these programs it is entirely reasonable to expect that local governments would wait to invest in major water infrastructure until they had secured a State Government grant.

Queensland participants recognise that ad hoc capital grants create distortions and inefficiencies, in particular through introducing capital bias:

In Queensland [investment] decision-making is primarily driven by local requirements (including regulatory standards) and the availability of state (or federal) funding. This can lead to perverse outcomes particularly if the political imperative is to spend available funds ... This problem has been exacerbated in Queensland through funding processes with no strategic oversight and *ad hoc* and politically-motivated funding rounds. These processes do not select infrastructure based on optimal TOTEX [total expenditure] nor fit-for-purpose outcomes as they are commonly driven by contemporary political exigencies. (qldwater, sub. 41, p. 7)

The “shovel ready” projects that are funded by these programs have sometimes been more suited to political imperatives than long-term community outcomes and sustainable infrastructure ... The LGAQ believes that these funding arrangements are not encouraging good asset management practices ... Of particular concern to local government is that only new capital infrastructure is eligible in current funding programs. The result is a financial incentive to replace infrastructure prematurely, or to discourage (i.e. ineligible for funding) exploring alternative management of existing infrastructure to prolong its life. (LGAQ, sub. 71, p. 24)

Unlike capital grants programs, CSO payments do not result in capital bias. Untied CSO funding can be used for either operational or capital expenditure as is most required by the recipient. For example, this funding could be used to attract and retain skilled personnel, thereby helping service providers to make better planning and operational decisions.

While the Queensland Government’s recently announced Indigenous Water Infrastructure Program appears better targeted to need than other programs in that State, it does not avoid the problem of capital bias as it only funds capital expenditure. This is unlikely to represent a well-targeted approach to improving outcomes in remote Indigenous communities, which the Commission understands often do not have access to sufficient skills to deliver high quality water services. Expenditure on personnel and other operating expenditures may better address their needs than new capital equipment. In extreme cases capital subsidies could induce service providers to invest in infrastructure projects that they do not have the human and financial resources to operate sustainably.

These issues make a strong case for discontinuing the existing practice of providing capital subsidies for urban water and sewerage infrastructure in regional New South Wales and Queensland. Consistent with the NWI, these should be replaced with CSO payments that target genuinely unviable services. Given the significant quantum of existing subsidies and the principle that CSOs should be tightly targeted, this would be likely to reduce the overall quantum of funding these States provide to regional providers overall. It would also mean that high-cost and / or remote communities would receive more funding per resident than at present, while communities with less challenging operating environments would receive less.

DRAFT RECOMMENDATION 6.6

To improve service efficiency and address remaining water quality issues, funding arrangements for local water utilities in regional New South Wales and regional Queensland should be significantly reformed.

These States should replace existing capital grants to water utilities with Community Service Obligation payments that are not tied to capital expenditure, and are tightly targeted at unviable (high-cost) regional and remote services.

Achieving economies of scale

Amalgamation has helped to achieve economies of scale ...

While improved targeting of government funding can improve regional service provision, it is also very important that the recipients of funding are well managed and have sufficient skills. A particular challenge for regional service providers is that many are small in size (in terms of customer base, typically measured by the number of customer connections). If service provision is geographically fragmented, it may be more difficult to identify the best water supply and wastewater disposal options; while small providers can collaborate to build shared infrastructure, this is likely to be more complicated to coordinate across multiple providers than to deliver from within a single organisation. Further, larger utilities will generally be better placed to attract and retain skilled staff as employees will see greater career opportunities in a larger organisation, and a larger organisation will be more likely to be able to justify the cost of retaining people with specialised skills.

The scale of water service providers varies significantly across Australian jurisdictions and by location. While metropolitan or jurisdiction-wide entities generally exceed 100 000 connections, regional water utilities in New South Wales and Queensland are often much smaller. A breakdown of the water sector by size and jurisdiction is provided in table 6.6.

Table 6.6 Scale of water utilities
Excludes bulk water providers

<i>Jurisdiction</i>	<i>More than 100 000 connections</i>	<i>50 000 to 100 000 connections</i>	<i>20 000 to 50 000 connections</i>	<i>10 000 to 20 000 connections</i>	<i>Fewer than 10 000 connections</i>
New South Wales	3		12	12	65 ^a
Victoria	4	5	5	2	
Queensland	4	3	6	8	50 ^b
Western Australia	1			3	
South Australia	1				
Tasmania	1				
Northern Territory		1			
ACT	1				

^a 24 utilities with 4000 to 10 000 connections; 23 with 1500 to 4000 connections; 18 with fewer than 1500 connections. ^b 20 with 1000 to 10 000 connections, 30 with fewer than 1000 connections.

Sources: BOM (2017d); NSW Government (2017b); Power and Water Corporation (2014); qldwater (2017).

Historically, governments around Australia have recognised the potential to improve regional service provision by amalgamating small service providers. Two key examples are the experiences of Victoria during the 1990s and Tasmania since 2009 (box 6.7).

Box 6.7 Amalgamation of regional water utilities in Victoria and Tasmania**Victoria**

Between 1982 and 1994 the Victorian Government reduced the number of local water utilities from over 400 to 15. These 15 entities were statutory State-owned corporations and entirely separate from local government. They were further rationalised to the present 13 in 2005.

Tasmania

The Tasmanian Government rationalised its local water utilities from about 21 to the present single provider (TasWater) in two stages. On 1 July 2009 the previous mix of local entities were merged to form three regional corporations, and on 1 July 2013 these were merged to form TasWater. Through these mergers the regional corporations and TasWater remained owned by local government, though the State Government has introduced legislation to transfer it to State ownership.

Sources: Armstrong and Gellatly (2008); DPIPWE (Tas), sub. 57; OTTER (2011); Parliament of Tasmania (2017a, 2017b); Victorian Auditor General's Office (2000).

Local water utilities in regional New South Wales and Queensland have not amalgamated to the same extent as those in Victoria and Tasmania. This is due in part to concerns expressed by stakeholders in these States that further amalgamation would cause local governments to lose 'economies of scope'. In this context, economies of scope are efficiencies that are gained when water functions are operated alongside other functions of local government. The Local Government New South Wales and the Water Directorate explained this in detail:

... the integration of water supply and sewerage function and other general purpose functions allows councils to capture "economies of scope" ... [across] water supply and sewerage, roads and transport, communication, waste management, or recreational services. Economies of scope also arise from the ability to effectively and efficiently coordinate strategic land use planning and land use development control with infrastructure intensive services such as water supply and sewerage services. (sub. 72, p. 18)

A review of potential business models undertaken for the Local Government Association of Queensland and qldwater (Fearon 2015) and a review of regional water supply in New South Wales (Armstrong and Gellatly 2008) both highlighted concerns about lost economies of scope if local water utilities are amalgamated. This suggests that assessments of the overall costs and benefits of amalgamation need to consider its impact across all local government operations, not just water services.

... however collaboration can help too

Amalgamation of water service providers is not the only way to achieve economies of scale; collaboration between multiple providers is another potential option. Further, collaboration can achieve some of the same benefits as amalgamation, while avoiding some of these difficulties. In particular collaboration need not affect the economies of scope that arise between water services and other local government functions. It can involve a range of

activities such as, joint procurement, joint planning and shared services; these can be tailored to operate with varying degrees of formality around governance alongside other local government functions. Another approach to collaboration is bilateral partnerships; for example, a large council can partner with a nearby smaller council, allowing the smaller council to access specialist skills and helping the larger council to maintain its staffing and resources. A further advantage of collaboration over amalgamation is that it avoids the risk of creating cross-subsidies between service areas.

Both amalgamation and collaboration have been implemented in regional New South Wales.

- Amalgamated regional ‘county councils’ supply water services across multiple council areas, these being Rous Water, Goldenfields Water, MidCoast Water, Central Tablelands Water and Riverina Water.⁴⁵
- The Fish River scheme supplies bulk water to both the Lithgow and Oberon council areas.
- Formal collaboration occurs through two ‘alliances’ or ‘regional organisations of councils’, these being the 12 member Lower Macquarie Water Utilities Alliance and the 14 member Central Regional Organisation of Councils (‘Centroc’).

Together these arrangements mean that about half of the 65 New South Wales utilities with fewer than 10 000 connections participate in some form of regional collaborative arrangement, or obtain bulk water and / or water distribution services from a broader regional entity.

There are fewer example of amalgamation or collaborative work amongst small regional water utilities in Queensland.⁴⁶ The primary collaborative efforts have been through the Queensland Water Regional Alliance Program (QWRAP). This program drew on Queensland Government funding to support the development of five regional alliances. Of the 50 local water utilities with fewer than 10 000 connections identified in table 6.6, 18 participate in a QWRAP alliance. The depth of cooperation and scope of joint activities varies across the five alliances.

DRAFT FINDING 6.6

About half of small providers (with fewer than 10 000 connections) in New South Wales participate in some form of regional collaborative arrangement or obtain services from a larger regional entity, and 18 of 50 small providers in Queensland participate in the Queensland Water Regional Alliance Program. While these jurisdictions have made progress, there is likely to be further scope for them to capture economies of scale through collaboration.

⁴⁵ Sewerage services remain with the participating councils. Rous Water supplies bulk water only.

⁴⁶ While the water operations of the large metropolitan councils in south-east Queensland merged in 2008 to form Queensland Urban Utilities and Unitywater, these experiences are not of great relevance to the challenges facing smaller regional and remote local water utilities.

CSO payments in Queensland and New South Wales can promote further regional collaboration

While collaborative approaches are promising, progress in implementing them appears to be slow, particularly in Queensland. Further, as alliances are often informal, there is a risk that they will become less active and even disband over time, such as due to a change in political priorities among the participating local governments. Qldwater's submission implies that further collaboration will require impetus and funding from State Governments:

While QWRAP will continue to be successful in bringing councils together as regional Alliances it cannot generate step-change in institutional arrangements without external incentives for change. (sub. 41, pp. 17–18)

While efforts to achieve economies of scale through amalgamation and collaboration have been largely successful in New South Wales, about half of its smaller local water utilities continue to operate independently (draft finding 6.6 refers), and there is no indication of new alliances emerging. This suggests, as in Queensland, that external impetus may be required to unlock further benefits from collaboration in New South Wales.

This impetus may be best provided through making CSO payments conditional on collaboration. As discussed above, CSO payments should be targeted to remote and / or high-cost communities facing acute supply challenges, and it is these communities that are likely to benefit most from collaboration. These efforts may assist to overcome the challenges of their small scale, low customer density and difficulty in attracting and retaining sufficiently skilled staff. As CSOs would replace existing ad hoc capital grants, this impetus can be provided by State Governments at no net financial cost.

Ideally, the relevant local governments would identify joint programs that best address the skills and service challenges they face, and that offer the greatest potential efficiency gains. However, there may be value in the relevant State Governments providing in-kind assistance to the joint programs through coordinating efforts, and by providing program management and planning expertise during the scoping and early implementation phases.

DRAFT RECOMMENDATION 6.7

Local water utilities and State Governments in New South Wales and Queensland should strategically examine opportunities to improve service delivery through collaboration. Contingent Community Service Obligation payments may provide an opportunity to promote this collaboration.

7 Water infrastructure for agriculture

Key points

- Prices for the majority of irrigation infrastructure services across Australia are set to at least recover operating costs and an allowance for future asset replacement and refurbishment. This level of cost recovery has resulted in the removal of many government subsidies previously required to support the operation of irrigation infrastructure.
- However, new irrigation infrastructure has been underpriced when funded by government grants. By failing to recover the capital cost of new infrastructure from irrigators, an important check on that infrastructure's viability — irrigators' preparedness to pay — has been missing.
- With over \$4 billion of Australian Government grants and loans available for irrigation infrastructure and funding also available from the State and Territory Governments it is crucial that poor past decisions are not repeated. Specifically:
 - National Water Initiative-consistent water entitlements and planning frameworks should be in place before any new irrigation infrastructure is considered (including infrastructure being financed under the Northern Australian Infrastructure Facility)
 - governments should not provide grant funding for infrastructure, or that part of infrastructure, that is for the private benefit of irrigators
 - sufficient water entitlements should be sold to reduce a project's risks before construction starts.
- Governments need to exercise caution in any decision to provide finance (such as loans) for new irrigation infrastructure where the private sector is unwilling to accept the same risks. Any government finance should be subject to:
 - a framework being in place to deliver merit-based decision-making and ongoing monitoring of, and public reporting on, the government's investment
 - an independent assessment confirming the finance can be repaid on commercial terms and that assessment being released for public comment before any announcement on new infrastructure is made.
- Unlike New South Wales and Victoria, the cost of River Murray Operations (RMO) are not recovered from entitlement holders in South Australia.
 - To support the recovery of RMO costs from all entitlement holders there should be five-yearly reviews of the efficiency and transparency of RMO costs conducted by an independent expert and overseen by the economic regulators from New South Wales, Victoria and South Australia.
- Independent economic regulation can drive improved operating efficiency, increase transparency and reduce political interference in pricing. Removing limits on the role of the Queensland Competition Authority in recommending user charges and establishing an option for the independent review of the pricing of government-owned services in Western Australia and Tasmania would be beneficial.
- Local ownership and management of distribution networks is generally considered to have brought about improved productivity, greater accountability and responsiveness to users. It should be the preferred model for any new distribution networks.

Water is an essential input for agriculture. Reliable supplies of water through irrigation allows agricultural producers to grow more and / or higher quality crops and pasture. It also reduces the business risks associated with variable rainfall.

Irrigated agriculture consistently accounts for about 25 per cent of the value of Australia's total agricultural production despite occupying 0.6 per cent of the land used for agriculture. The total value of irrigated agricultural production in 2014-15 was \$15.1 billion (or approximately 1 per cent of Australia's gross domestic product) (ABS 2016b, 2016a).

Under the National Water Initiative (NWI), Australian, State and Territory Governments agreed to four key actions in relation to the provision of water services to the irrigation sector. The four actions were:

- to achieve cost-reflective pricing for infrastructure services
- that an independent economic regulator would have an appropriate role in the review or setting of infrastructure prices
- that water planning and management functions would be separated from the role of service delivery
- that all new government investment in infrastructure would be economically viable and environmentally sustainable.

The *White Paper on Developing Northern Australia* (Australian Government 2015c) sets the agenda for Australia's next concerted effort at expanding irrigated agriculture. This effort will be backed by billions of dollars in grant funding and loan finance from the Australian Government. This investment comes despite the burden on taxpayers that has resulted from previous Government investments in irrigation infrastructure. The increasingly apparent cost of past subsidies and the underpricing of new irrigation infrastructure was a key driver of the water reforms that have delivered much improved levels of cost recovery for irrigation infrastructure over the past decade.

This chapter considers where and how the institutional and regulatory arrangements for irrigation infrastructure can be improved to ensure the mistakes of past development are not repeated.

7.1 Australia's irrigation sector

Irrigated agriculture is Australia's largest water user and accounts for 60–70 per cent of total water consumption in most years. Over two-thirds of Australia's water use for irrigation occurs in the Murray-Darling Basin (MDB) even though the MDB captures only 6 per cent of Australia's rain runoff (Kirby 2011).

The largest irrigated products by value in 2014-15 were vegetables, fruit and nuts (excluding grapes) and dairy production. In contrast, the top three water users were pasture (for grazing), cotton and sugar (table 7.1).

Table 7.1 Major irrigation uses: 2014-15

<i>Major irrigation uses (by water consumption)</i>			<i>Major irrigation uses (by value)</i>			
Commodity	Water use	Share of total use for agriculture	Commodity	Value of irrigated production	Share of total value of irrigated agricultural production	Share of total value of agricultural production ^a
	GL	%		\$ million	%	%
Grazing ^b	2301	26	Fruit & Nuts	2882	19	5
Cotton	1213	13	Dairy	2830	19	5
Sugar Cane	1121	13	Vegetables	2676	18	5
Rice	878	10	Cattle	1072	7	2
Other cereals	816	9	Sheep ^c	1055	7	2
All other	2621	29	All other	4593	30	9
Total^d	8950	100	Total^d	15 108	100	28

^a The total value of agricultural production — both irrigated and dryland — was \$54 billion. ^b Water used in grazing supports dairy, cattle and sheep production. ^c Sheep and other livestock (excluding cattle). ^d Total for irrigated production.

Data sources: ABS (Gross Value of Irrigated Agricultural Production, September 2016, Cat. no. 4610.0); ABS (Water Use on Australian Farms, April 2016, Cat. no. 4618.0); ABS (Value of Agricultural Commodities Produced, March 2016, Cat. no. 7503.0).

Infrastructure servicing the irrigation sector is generally divided into bulk water and distribution services.

- Bulk water services involve the harvesting and storage of water using infrastructure (such as dams), and the transport of that water to users (through natural watercourses, pipes or major channels) often over large distances. Bulk water infrastructure often has multiple uses such as delivering water for urban supplies and, in some locations, flood mitigation. All Australian bulk water services supporting irrigation agriculture are owned by government (table 7.2).
- Distribution services include the transportation of water via a network of pipes and / or channels to properties serviced by the system and located away from a watercourse. Distribution services are owned by users (sometimes referred to as locally owned and managed) in New South Wales, South Australia, Western Australia and parts of Queensland, but government-owned elsewhere (table 7.2).

The ABS (2016b) estimated the total charges paid by irrigators for both bulk water and distribution services in 2014-15 was \$265 million (or less than 2 per cent of the total value of irrigated agricultural production).

Table 7.2 Providers of irrigation services^a

	<i>Nature of services</i>	<i>Provider(s)</i>	<i>Owner(s)</i>
NSW	Bulk water services	WaterNSW	New South Wales Government
	Distribution services	Various such as Coleambally Irrigation, Jemalong Irrigation, Murray Irrigation and Murrumbidgee Irrigation	Users of the respective distribution schemes
Vic	Bulk water services	Various such as Goulburn-Murray Water and Southern Rural Water	Victorian Government
	Distribution services	Various such as Goulburn-Murray Water, Lower Murray Water and Southern Rural Water	Victorian Government
Qld	Bulk water services	SunWater	Queensland Government
	Distribution services	SunWater and Seqwater	Queensland Government
		Pioneer Valley Water	Users of the distribution scheme
WA	Bulk water services	Water Corporation	Western Australian Government
	Distribution services	Gascoyne Water, Harvey Water, Ord River Corporation and Preston Valley	Users of the respective distribution schemes
SA	Bulk water services ^b	—	—
	Distribution services	Central Irrigation Trust and Renmark Irrigation Trust	Users of the respective distribution schemes
Tas	Bulk water services	Tasmanian Irrigation	Tasmanian Government
	Distribution services	Tasmanian Irrigation	Tasmanian Government

^a Excludes the Northern Territory and the ACT as there are no dedicated water services for irrigated agriculture in those jurisdictions. ^b Bulk water delivery in South Australia is facilitated by the shared water delivery functions (the River Murray Operations) within the Murray-Darling Basin coordinated by the Murray-Darling Basin Authority.

Australian irrigation: a brief history

The development phase

The development of irrigated agriculture in Australia dates to the 1850s but it was not until the turn of the twentieth century that significant development commenced. Development was spurred, in part, by arguments for ‘drought proofing’ following the Federation Drought. Much of the new development occurred in the MDB where the newly irrigated land was used in much the same way as it was previously — for improved pasture on which to fatten lambs and cattle or to graze dairy cattle (Davidson 1981).

A severe drought delivered the first effort at co-operative management of the MDB in 1915 when the New South Wales, Victorian and South Australian Governments signed the River

Murray Water Agreement and established the River Murray Commission (RMC). The RMC provided a framework for the development of joint headworks infrastructure to deliver water down the River Murray.

The development of new water storages continued unabated after World War II as part of a broader program of nation building. This saw the area of irrigated land grow from 600 000 hectares in 1945 to 1.6 million hectares by 1975 (Davidson 1981). The start of Australia's irrigated cotton industry in the 1960s was a key part of this growth. In contrast, the creation of new distribution networks had largely ceased by the 1960s due to a realisation that Australia's comparative advantage lay in broad acre farming, as well as the growing burden on State budgets of maintaining those networks (Musgrave 2008).

The expansion of irrigation development into northern Australia during this period was challenged by extremes of weather, pest invasions, distance to markets, lack of supporting transport infrastructure and outbreaks of disease. The Humpty Doo rice project, Camballin Irrigation Area and cotton and sugar cane crops in the Ord-Kimberly region are among the projects that succumbed to these challenges.

Scarcity and salinity

From the late 1960s the demand for irrigation water began to outstrip the sustainable supply and volumetric allocations were first applied (Murray Irrigation, sub. 16, p. 4). It was during this time that the unconstrained provision of water entitlements by governments in the MDB essentially ceased (although water use continued to rise). The relative scarcity of water from the 1970s onward drove the uptake of technologies, such as laser levelling, that made more efficient use of water on farms.

The regulation of rivers and poor irrigation practices continued to have adverse environmental impacts into the 1980s and contributed to the mouth of the River Murray closing in 1981. That closure, along with the effects of increased salinity and the spread of toxic algal blooms, provided the impetus for reforming the management of the MDB. The Murray-Darling Basin Agreement of 1987 was intended to reboot intergovernmental cooperation in the management of the MDB. The River Murray Salinity and Drainage Strategy followed in 1989 — the strategy included salt-interception scheme construction and an accountability system of salinity credits and debits.

A period of major reform

Through the late 1980s and early 1990s irrigators became dissatisfied with government attempts to reform the management and pricing of distribution networks. This led to the transfer of networks to local ownership and management in New South Wales, South Australia and Western Australia, and the establishment of regional government-owned corporations in Victoria, Queensland and Tasmania. These actions, particularly the transfer to local ownership, are generally considered to have improved productivity, accountability and responsiveness to users within distribution networks.

At the same time there was a need to improve the operating efficiency of headworks infrastructure and this, along with the 1995 National Competition Policy, drove the corporatisation of bulk water providers in all jurisdictions through the 1990s. The corporatisation of bulk water providers has delivered more efficient water services and a stronger commercial focus that has benefited irrigators.

The changes to management arrangements for distribution and bulk water services complemented the separation of service delivery from water planning and management functions agreed under the Council of Australia Government's (COAG's) 1994 Water Reform Framework. Separating service delivery from the broader role of government has allowed more focused policy making to occur.

COAG's Water Reform Framework also set strategies and actions to achieve the efficient and sustainable use of water for irrigation. Many of these actions would be reflected in the NWI including: pricing infrastructure for full cost recovery; unbundling water rights from land; the promotion of efficient trade to encourage the best use of water; and, greater allocation of water to environmental uses. A cap on diversions in the MDB followed in 1995 with a goal of preventing further environmental degradation.

The progressive unbundling of water from land, water entitlement reform and the development of water markets allowed new irrigation projects to access water (via trade) without breaching the cap on diversions within the MDB. The development of trade and water markets was to prove vital to the financial survival of many irrigators during the Millennium Drought. Legally-defined (and secure) water entitlements allowed irrigators to use their water entitlements as collateral for loans and, in doing so, provided another means through which they could manage their business risks.

The impacts of the Millennium Drought from 1997 provided a prompt for further reform. That reform arrived in 2004 with the NWI and was followed by the *Water Act 2007* (Cwlth). The Water Act included a new Murray-Darling Basin Agreement that, like past agreements, sought coordinated and co-operative management of the MDB. Unlike past agreements, however, a significant role for the Australian Government was included. This role was reflected in the creation of the Murray-Darling Basin Authority (MDBA) to oversee the MDB's water resource planning and implementation and operate joint infrastructure to deliver the agreed water shares to the Basin States. The Agreement also resulted in powers being given to the Australian Consumer and Competition Authority (ACCC) to oversee water markets and infrastructure pricing.

The Basin Plan, which became law in 2012, brought a focus on recovering water for the environment. Governments commenced purchasing water from irrigators and funding new investments in water efficient irrigation infrastructure to deliver water back to the environment. As a result, 14 per cent of the water entitlements in the MDB are now managed by the Commonwealth Environmental Water Holder for environmental uses rather than irrigation (DEE 2017b). This, along with climatic conditions and water trading more generally, has led to a new round of challenges for some distribution networks — most notably from declining water delivery volumes.

Lessons from the past

Concern over the viability of irrigation infrastructure dates to the 1880s (for example, Black and Gordon (1882)). Since the 1960s, that concern has repeatedly manifested itself in calls for government investment in infrastructure to be based on robust cost-benefit analysis. Where those calls have gone unheeded, the imprudence of using regional development as the rationale for otherwise unviable projects has been repeatedly proven by projects that fail to deliver the promised jobs and / or fail to deliver water into productive use. Experience suggests that unviable irrigation projects may not have proceeded had the associated user charges reflected the full cost of building, owning and operating the infrastructure.

The response under the NWI

The lessons from past experience were well understood by 2004 and the NWI sought to address them through a combination of actions focused on the adoption of best practice pricing and institutional arrangements. In doing so, the NWI sought to achieve the following objectives:

- advance the economically efficient and sustainable use of water resources, irrigation infrastructure and government resources
- minimise any distortion to water markets from the pricing of infrastructure
- avoid any perverse or unintended outcomes.

These three objectives were to be achieved by a mix of actions including: cost reflective infrastructure pricing; economic regulation; separation of service delivery from other functions of government; and, a requirement that all infrastructure should be economically viable and environmentally sustainable.

7.2 Progress under the NWI and where to next

Progress against the actions set out in the NWI is detailed in appendix B (section B.3) and summarised in table 7.3.

Progress against the NWI has arguably been strongest within the MDB where:

- independent economic regulation of government-owned service providers is in place to promote economically efficient prices for infrastructure services
- upper bound pricing (box 7.1) for bulk water services is being achieved in New South Wales and Victoria (excluding infrastructure used in the River Murray Operations (RMO) where lower bound pricing is being achieved).

However, there are also shortcomings in the MDB. In particular, the failure to recover the cost of the MBDA's RMO from South Australian irrigators and the absence of regulatory scrutiny of RMO costs.

Table 7.3 Assessment summary: Best practice pricing and institutional arrangements^a

<i>NWI commitment</i>	<i>Assessment^b</i>	<i>Comments</i>
Achieve lower bound pricing (or better) for infrastructure services and move to upper bound pricing where practicable	Largely achieved	All jurisdictions except South Australia (bulk water), are generally delivering lower bound pricing (or better). Where this does not occur, the resultant subsidies are usually being reported (albeit through different methods) by the jurisdictions.
An independent economic regulator should have an appropriate role in the review or setting of infrastructure prices	Partially achieved	New South Wales, Victoria and Queensland have met the actions set out in the NWI. There is scope to refine Queensland's arrangements to deliver better outcomes. The economic regulator has a more limited role in Western Australia and no role in Tasmania. There is scope to improve arrangements in both jurisdictions.
All new infrastructure should be environmentally sustainable and economically viable	Partially achieved	NWI water entitlements and planning principles have been applied (or are to be applied) for the large majority of new major projects announced since 2014. This has supported the environmental sustainability of new projects. The viability of new projects since 2014 are said to have been confirmed through cost-benefit analysis but the confidentiality of those analyses means this cannot be verified. There is room to improve in all jurisdictions in relation to: <ul style="list-style-type: none"> • the role of government in new infrastructure projects where the benefits created are largely private in nature • the extent to which the capital cost of new infrastructure projects is recovered from users and / or beneficiaries • the nature of any government support provided to new infrastructure given the potential for subsidised infrastructure to distort trade and investment decisions.
Separation of water planning and management functions from the role of service delivery	Achieved	All jurisdictions have achieved the agreed separation of service delivery from government.

^a Excludes the Northern Territory and the ACT as there are no dedicated water services for irrigated agriculture in those jurisdictions. ^b **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

Progress has been inconsistent outside of the MDB. On one hand, all States have benefited from the institutional separation of water management functions from service delivery. On the other hand, there are areas of unfinished business — most notably, the minor role of economic regulators in setting or reviewing prices in Western Australia and Tasmania.

The role of governments in delivering new irrigation infrastructure is unfinished business from the NWI for all jurisdictions and an area of concern shared by many inquiry participants (especially in relation to northern Australia).

Box 7.1 Lower and upper bound pricing for irrigation infrastructure

Lower bound pricing ensures that services are self-funding without necessarily providing a return on capital deployed in the provision of services. The full definition from the NWI is provided in appendix B (section B.3).

Upper bound pricing recovers the full cost of service delivery, including an allowance for a market-reflective rate of return on capital deployed in the provision of services. The full definition from the NWI is provided in appendix B (section B.3).

The main difference between lower and upper bound pricing is that upper bound pricing requires service providers to earn a commercial return on the capital used to provide services and achieve full recovery of that capital, whereas lower bound pricing does not.

Current and emerging issues for irrigation services

Issues of concern for the irrigation industry include: falling irrigation water delivery volumes; rising energy prices; and the overlap and duplication in the reporting requirements for distribution networks. There is also concern that regulation, such as the infrastructure pricing rules within the MDB, limits the ability of distribution networks to respond to emerging issues:

The proposed [*Water Charge (Infrastructure) Rules 2010* (Cwlth)] requirements are very proscriptive and will constrain IIOs [irrigation infrastructure operators] from becoming more innovative in terms of their business models and / or from generating new business. (National Irrigators' Council, sub. 13, p. 24)

The Independent Pricing and Regulatory Tribunal's consideration of prices for the north coast valley and south coast valley bulk water services (IPART 2017) has highlighted the challenge of managing services where full cost recovery is unlikely to be achieved and ongoing government subsidies are required.

Where to next?

Of all the issues listed above, there is a lesser imperative for the Commission to consider reporting requirements for distribution network operators. Reporting requirements have been considered in three recent reviews (Australian Government 2014a; IWG 2016; PC 2016). Progress has been made on implementing the recommendations of those reviews through amendments to the *Water Regulations 2008* (Cwlth) in 2016 and 2017 aimed at reducing the reporting burden.

Matters directly related to energy policy (including energy prices) are beyond the scope of this inquiry. However, the extent to which the regulation of the irrigation sector influences the sector's ability to respond to changing costs (including energy prices) falls within scope and is considered within this report (section 7.5).

The issues assessed in this chapter have been considered under the broad themes of:

- the role of economic regulators in price setting
- bulk water services, which considers the recovery of RMO costs from irrigators and the ongoing government subsidisation of some bulk water schemes
- distribution services, which in addition to assessing whether regulation is placing an undue limit on the ability of distribution networks to adapt to operating challenges (such as falling delivery volumes and rising energy prices), explores whether there may be benefit in changing the ownership of government-owned distribution networks
- new infrastructure for irrigation, which considers the role of government investment in new irrigation infrastructure.

7.3 Pricing government-owned infrastructure

The role of economic regulators in pricing of government-owned irrigation infrastructure services varies across Australia (table 7.4). Economic regulators set irrigation infrastructure prices in New South Wales and Victoria and these arrangements are generally delivering upper bound prices. Prices have tended toward lower bound outcomes in jurisdictions (Queensland, Western Australia and Tasmania) where economic regulators have played a lesser role (appendix B, section B.3).

Table 7.4 Government-owned bulk and distribution infrastructure: revenue and price setting processes

	Annual revenue ^a	Price setting process
	\$ million	
NSW	114	Maximum prices are set by the Independent Pricing and Regulatory Tribunal.
Vic	173 ^b	Maximum prices are set by the Essential Services Commission.
Qld	67 ^c	The Minister sets prices after receiving advice from the Queensland Competition Authority. The terms of reference for that advice are set by the Minister.
WA	na	The Western Australian Government can request the Economic Regulation Authority review prices. Otherwise, prices are negotiated between the Water Corporation and its customers.
SA	nil	No charges applied to irrigators for bulk water services in South Australia.
Tas	7	Prices are unregulated and are set by the government-owned operator (Tasmanian Irrigation).

na not available — revenues are commercial-in-confidence. ^a Revenue requirement for 2016-17 as determined by the respective economic regulators for New South Wales, Victoria and Queensland. Actual revenue for 2015-16 in the case of Tasmania. ^b Combined revenues of Goulburn-Murray Water (\$117 million), Lower Murray Water (\$28 million) and Southern Rural Water (\$28 million). Revenues include both bulk water and distribution services. ^c Combined revenues of Seqwater (\$5 million) and SunWater (\$62 million). Revenues include both bulk water and distribution services.

Sources: ESC (2013a, 2016); IPART (2017); QCA (2012a, 2013); Tasmanian Irrigation (2016a).

As outlined in chapter 6 on *urban water* (section 6.4), inquiry participants have raised the need for economic regulators to play a larger role in the determination of prices within the urban water sector. The case for refining or expanding the role of economic regulators in Queensland, Western Australia and Tasmania is examined below.

DRAFT FINDING 7.1

The pricing of government-owned bulk irrigation and distribution services has tended toward lower bound outcomes in Queensland, Western Australia and Tasmania, where economic regulators have not been responsible for setting prices. In New South Wales and Victoria, where economic regulators have been responsible for setting prices, upper bound outcomes have generally been achieved.

Transparency could be improved in Queensland

Some inquiry participants have expressed a preference for the unconstrained scrutiny of infrastructure pricing in Queensland by the Queensland Competition Authority (QCA) (for example, Queensland Farmers' Federation (sub. 61)).

The QCA has previously been limited in the advice it could provide on prices due to constraints imposed by the relevant Minister (box 7.2). For example:

- the QCA was precluded from considering nodal pricing in its review of distribution prices for 2012–17. Nodal pricing reflects the differences in the cost of service delivery to individual customers, or groups of customers, across a network
- a Ministerial direction of September 2010 removed consideration of prices for Paradise Dam and Kirar Weir from the scope of the QCA's review of prices for 2012–17 (QCA 2012a).

Nodal pricing minimises cross-subsidies between users in the same network. Precluding nodal pricing from the QCA's considerations reduced its ability to deliver that outcome. Excluding Paradise Dam and Kirar Weir from the QCA's considerations reduced the transparency of user charges for those assets.

While there may be legitimate reasons for imposing constraints on infrastructure prices, the current approach obscures the cost of doing so. Allowing the QCA to make its recommendations on prices based on the *NWI Pricing Principles* (box 7.3) would make clear the costs and trade-offs of any ministerial decision to apply a different pricing structure.

Box 7.2 Limits on the QCA's price recommendations

In considering prices for SunWater schemes for the period 2012–17, the Queensland Competition Authority (QCA) received submissions on: users' capacity to pay; treatment of contributed assets; dam safety upgrades; nodal pricing; national metering standards; and, whether prices should recover recreation management costs from irrigation customers. A Ministerial Direction in March 2010 (and further advice from the Queensland Government in September 2010 and June 2011) put those issues outside the scope of the QCA's review (QCA 2012a, p. 4). The Ministerial direction of September 2010 also removed consideration of prices for Paradise Dam and Kirar Weir from the scope of the QCA's review.

Box 7.3 NWI Pricing Principles

The *NWI Pricing Principles* (COAG 2010a) were developed to address differences across the jurisdictions in their approaches to recovering capital expenditure on water infrastructure (among other matters). The Principles provide that:

- prices should achieve full recovery of capital expenditure for new or replacement infrastructure assets (including a return *on* capital and either a return *of* capital or a renewals annuity) — effectively, upper bound pricing
- prices should include an annuity allowance (or depreciation charge) for legacy assets (those built no later than 1 January 2007) and, depending on the circumstances, a return on capital — effectively, lower bound pricing
- grant funding from governments should be excluded from pricing considerations. An annuity may be applied to provide for the replacement of contributed assets.

New arrangements for Western Australia and Tasmania

Chapter 6 (section 6.4) sets out the broader case for economic regulation. The same arguments apply to government-owned bulk water and distribution services but they need to be considered in the context of the small scale of many operations in Western Australia and Tasmania. The annual revenue for the smaller schemes can be as low as \$0.5–2.0 million. This limits the size of the efficiency gains to be made from economic regulation and increases the likelihood that those benefits would be insufficient to offset the costs of a formal price setting or review process.

Thus, an alternative, cost-effective form of regulatory scrutiny is required that provides the key benefits from an economic regulator's oversight but is also proportionate to the risks to be managed. The Commission considered a reporting regime similar to that set out for smaller urban suppliers in chapter 6 (section 6.4). However, the unique nature of services across Western Australia and Tasmania and the small number of supply contracts (four distribution networks and one private company) in Western Australia means such an approach is unlikely to provide meaningful comparisons or benchmarks. Further, the benchmarking of irrigation services has previously cost more than it delivered in benefits (section B.3, appendix B).

In the Commission's judgment cost-effective regulatory oversight of prices can be achieved by:

- giving Western Australia's irrigation bulk water customers the ability to request a review by the Economic Regulation Authority (ERA) of the prices and / or services proposed by the Water Corporation in their contract negotiations
- bulk water and distribution customers of Tasmanian Irrigation being able to request Office of the Tasmanian Economic Regulator (OTTER) review the prices and / or services of Tasmanian Irrigation.

Should a review be requested and the economic regulator find that prices should be changed, the relevant government should provide a public response to the inquiry that sets out the reason for the final pricing decision. An equitable share of the cost of any review should be treated as a regulatory cost and passed through to customers at the discretion of the bulk water supplier. This would serve to limit any vexatious claims and ensure reviews were only undertaken when there was likely to be a benefit from doing so.

DRAFT RECOMMENDATION 7.1

State and Territory Governments should ensure the delivery of government-owned irrigation infrastructure services is underpinned by full cost recovery and economic regulation that is proportionate to the scale of the regulated service.

Priorities are:

- a. any terms of reference issued to the Queensland Competition Authority by the Queensland Government for advice on the pricing of irrigation infrastructure services should be aligned to the National Water Initiative Pricing Principles. The reason(s) for any Government decision to diverge from price recommendations based on those principles should be published
- b. the Western Australian Government should amend the role of the Economic Regulation Authority (ERA) so that irrigation bulk water customers can request the ERA to review the infrastructure prices and / or services proposed by Water Corporation (WA) as part of bulk water supply contract negotiations
- c. the Tasmanian Government should amend the role of the Office of the Tasmanian Economic Regulator (OTTER) so that irrigation bulk water and distribution customers of Tasmanian Irrigation can request OTTER to review the infrastructure prices and / or services of Tasmanian Irrigation
- d. an equitable share of the cost of any price review requested by users should be treated as a regulatory cost and passed through to users at the discretion of the bulk water supplier in Western Australia and Tasmania.

7.4 Bulk water services

Under the NWI, the jurisdictions are to achieve a minimum of lower bound pricing for irrigation bulk water services. The majority of bulk water services across Australia are achieving at least lower bound pricing. The exception is South Australia where the recovery of RMO costs from irrigators is unfinished business from the NWI (appendix B, section B.3).

In addition to the unfinished business from the NWI, this section also considers the current issues (section 7.2) affecting bulk water services:

- the need for some form of regulatory oversight to be applied to RMO costs
- the challenges in managing and pricing services where full cost recovery is unlikely to be achieved and ongoing government subsidies will be required.

River Murray Operations

RMO comprise the collective activities of the MDBA and the State Constructing Authorities (SCAs)⁴⁷ to deliver River Murray water shares to New South Wales, Victoria and South Australia. Those activities include: renewing and maintaining the suite of River Murray water storage and delivery assets; operating those assets to deliver water shares and environmental outcomes; accounting for interstate water trade; and operation of Salt Interception Schemes.

Irrigators are concerned that the MDBA is inefficient in how it manages RMO and that there are costs being recovered from them despite the ‘public benefit’ nature of underlying activities. These concerns have led some to conclude that the MDBA should be subject to independent regulatory oversight (IPART, sub. 18), that consideration should be given to how MDBA funding arrangements and cost recovery are reported (ACCC, sub. 28) or both (National Farmers’ Federation, sub. 55). Some of these views are also shared by the MDBA:

The MDBA is of the view that RMO should be subject to the same tests for efficiency and prudence that apply to other infrastructure providers under the *Water Charge and Infrastructure Rules*. Indeed, this was the Commonwealth Government’s intention in legislating these rules. (2015b, p. 1)

The funding arrangements for RMOs

The MBD Agreement sets out the funding arrangements for RMO. Operating and maintenance costs are shared by the Basin States in proportion to their water entitlement holdings and water use within the MDB. The Australian Government covers 25 per cent of the cost to investigate the need for infrastructure works and the cost of any works, with the

⁴⁷ The State Constructing Authorities are: WaterNSW and the Department of Primary Industries (Water) (New South Wales); Goulburn–Murray Water (Victoria); and, SA Water (South Australia).

remaining cost share being the States' responsibility in proportion to their water entitlements and use within the MDB. The RMO budget is informed by the MDBA's scrutiny of the SCA's proposed infrastructure works, subject to recommendations from the Basin Officials Committee and requires final approval by the Ministerial Council.⁴⁸

The SCAs' proposals have not historically been subject to independent regulatory oversight but the process is not without checks and balances. For example, 'investigation and construction' activities are generally subject to a competitive tender process (MDBA 2014) and large expenditure items may also need to be justified by a business case (Aither 2017a). RMO costs have also been subject to independent review and found to be efficient (Synergies Economic Consulting 2014).

How RMO costs are passed on to water entitlement holders

The share of RMO costs recovered from irrigators (and other entitlement holders) through infrastructure charges in New South Wales is set by the Department of Primary Industries, advised to Water NSW and implemented by IPART in its pricing determinations (IPART 2016d, 2017). In the most recent determination for bulk water services, IPART (2017) applied a 1.25 per cent compounding annual reduction to the costs passed through the entitlement holders.

The Essential Services Commission (ESC) provides for the recovery of RMO costs from Victorian irrigators (and other entitlement holders) through infrastructure charges. In contrast to the approach taken in New South Wales, the ESC used a long-term average of RMO costs as the basis for Goulburn-Murray Water's user charges in the most recent pricing determination (ESC 2016). Any material variation between that average and the actual RMO costs incurred by Goulburn-Murray Water will be assessed as part of the annual tariff approval process and potentially passed through to entitlement holders in revised user charges.

There is no recovery of RMO costs from irrigators in South Australia.

Concerns over RMO costs are not new

Irrigators concerns are not new and three reviews have been conducted since 2014 to consider the MDBA's costs and / or cost sharing arrangements (Aither 2017; Buckley 2014; Synergies Economic Consulting 2014). These reviews made a number of recommendations including:

- the development (and implementation) of service standards and performance metrics

⁴⁸ The *Basin Officials Committee* comprises one official from each of the Australian, New South Wales, Victorian, Queensland, South Australian, and ACT Governments. The Committee's role is to facilitate co-operation and coordination between the jurisdictions in managing the MDB and funding the necessary works. The *Ministerial Council* comprises Ministers from each of the Basin States and the Australian Government.

-
- that there should be greater transparency in the way States pass on MDBA costs to water entitlement holders
 - that consideration be given to the implementation of an efficiency incentive mechanism for the MDBA with Synergies suggesting an ongoing 1 per cent efficiency target for operating costs
 - MDBA expenditures should be subject to periodic and independent review that is publicly available
 - clearer requirements on when a business case is required for capital expenditure and greater requirements for SCAs to justify their proposed expenditure.

While the MDBA (2015a, 2016a) has commenced various programs of work to implement these recommendations, there is no public record of the work to be undertaken or progress against the recommendations.

Room for improvement

To be assured of the ongoing delivery of RMO at an acceptable service standard, irrigators (along with other entitlement holders) need to fund those activities. The risk of relying on governments for funding was highlighted by the New South Wales Government's 2012 decision to cut its contribution to the MDBA.

If entitlement holders (including those in South Australia) are to pay for RMO, the MDBA needs to be accountable to them for the services delivered. Accordingly, the development of service standards and performance metrics in consultation with users (as recommended by Synergies Economic Consulting (2014)) should be a priority. There also needs to be transparency in what irrigators are paying for and assurance they are not paying for services that are the responsibility of government. The latter is a concern of irrigators and distribution networks.

There is wide agreement among stakeholders (as outlined above) that a periodic and independent review process is required to ensure that RMO operations (and costs) remain efficient and that the resultant user charges are transparent to entitlement holders. The ACCC did not see itself filling that role, noting that:

... Basin States, in conjunction with the Commonwealth, being the parties who directly fund MDBA and BRC [Border Rivers Commission] activities, are best-placed at present to progress reforms to improve transparency of MDBA and BRC costs and funding arrangements. (2016, p. 240)

As water entitlements are state-based instruments, it is appropriate that the States have the lead role in scrutinising the costs passed onto entitlement holders. Further, as economic regulators with water infrastructure pricing expertise are in place in each of the Basin States, it would make sense to utilise that expertise in the scrutiny of RMO costs. The involvement of each jurisdiction would support the consistent pass through of RMO costs to entitlement holders regardless of the State in which those entitlements are held.

DRAFT RECOMMENDATION 7.2

Relevant jurisdictions should ensure that the cost of River Murray Operations (RMO) are recovered from water users. RMO costs should also be subject to a periodic independent review. Specifically:

- a. South Australia should pass through RMO costs to bulk water entitlement holders
- b. RMO should be subject to transparent and independent five-yearly efficiency reviews overseen by the economic regulators in New South Wales, Victoria and South Australia. The next review should be completed by 31 December 2019.

Government subsidisation of bulk water charges

Unlike the delivery of water for urban uses (where governments may be justified in providing payments for service providers to deliver on community service obligations), there are no grounds to justify government subsidies for bulk water infrastructure delivering water to irrigated agriculture. This is because the benefits are overwhelmingly private in nature and are captured by irrigators. As such, it is those irrigators who should bear the costs of building, owning and operating that infrastructure. Where subsidies are paid, they distort trade and investment decisions (particularly in connected systems such as the MDB).

Despite this, ongoing subsidies are being paid by State Governments toward the operating costs of some legacy bulk water assets. These subsidies can take two forms:

- an explicit subsidy applied toward operating expenses, infrastructure replacement and refurbishment, and / or capital costs (table 7.5)
- an implicit subsidy paid via charges on unsold water entitlements (box 7.4).

Box 7.4 **Implicit subsidies arising from unsold water entitlements**

Some government-owned service providers have significant holdings of unsold water entitlements. For example, SunWater holds 85–90 per cent of 144 gigalitres of water entitlements from Paradise Dam. The cost associated with SunWater's entitlement holdings for Paradise Dam is estimated to be in the order of \$2 million per year (based on operating costs for 2009–12). It is unclear whether this cost is ultimately subsidised the Queensland Government (as SunWater's owner) or cross-subsidised by other SunWater customers.

Similar implicit subsidies, though smaller in nature, arise for some of Tasmanian Irrigation's older schemes where there are unsold water entitlements. There is also a significant volume of unsold water in Western Australia's Ord district.

Sources: DPIPWE (Tas), pers. comm., 2 June 2017; MJA (2010); QCA (2012b); SunWater (n.d, 2016).

Table 7.5 Government subsidies for bulk water supplies to irrigators

	Average annual subsidies	Period	Comments
\$ million			
WaterNSW	0.8 ^a	2017–21 ^b	Subsidies relate to the north valley and south coast valley bulk water services. Attempting to transition to full cost recovery for these valleys is considered likely to price all customers out of the market before cost recovery is achieved (IPART 2017). As a result, prices have been set between the customers' capacity to pay and the avoidable cost to WaterNSW if the services were not supplied.
Victoria	nil		
SunWater (Qld)	5.4 ^c	2014–16	Queensland has set price paths for the relevant schemes that will see the subsidies reduce over time. There was a decrease in the subsidies paid to SunWater from \$6.0 million in 2014-15 to \$4.7 million in 2015-16. Over the same period there was a 10 per cent decline in the subsidies paid to Seqwater.
Seqwater (Qld)	2.1 ^c	2014–16	
Water Corporation (WA)	29.9 ^a	2017-18 ^b	Prices are negotiated on a case-by-case basis by the Water Corporation with its irrigation bulk water customers (four distribution networks and one private company). Prices are set to recover operating costs and an allowance for asset replacement (that is, lower bound pricing). There are no material government subsidies for operating costs or asset replacement — the quoted subsidy almost entirely relates to a return on, and return of, capital for pre-existing assets.
Tasmanian Irrigation	0.9	2015-16	The majority of the subsidy is for unfunded borrowing costs.
South Australia	While there is no supplier of bulk water for irrigation in South Australia, there is effectively a government subsidy for the cost of River Murray Operations. The amount of this subsidy is not publicly disclosed.		

^a Subsidy relative to upper bound pricing. ^b A forecast subsidy was used in these instances as it is the most recent and reliable indicator available. ^c Includes bulk water services and distribution services.

Sources: ERA (2017a); IPART (2017); NWC (2014c); Responses to State and Territory information requests; Seqwater (2016); SunWater (2016); Tasmanian Irrigation (2016a).

The implicit subsidies arising from unsold water entitlements do not detract from allocative efficiency when infrastructure charges are set to achieve cost recovery. They are, however, a use of public resources for which governments should be accountable. As such, the NWI requirements to disclose such subsidies and consider actions to reduce them (such as reducing the price at which the entitlements are available for sale) are relevant and should be complied with.

Governments usually publish the details of explicit subsidies and explore ways to remove or reduce those subsidies (appendix B, section B.3). Despite this, it is unclear whether governments have considered all available options for bulk water schemes where the prospects for full cost recovery are remote.

Where cost recovery is unlikely to be achieved

The typical and prudent response to ongoing subsidies is to set a price path that sees the progressive removal of the subsidy over a reasonable period. There are, however, cases where a subsidy will be required for many years if not indefinitely. For example, IPART (2017) consider it unlikely that cost recovery can be achieved in New South Wales' north coast valley and south coast valley bulk water services without pricing all customers out of the market.

In these situations, governments should consider whether the ongoing subsidy is the best use of their resources. Such considerations should be informed by a cost-benefit analysis of the possible alternatives including: whether an increase in scale would make the infrastructure viable; whether the infrastructure has an alternative use (such as urban supply); whether the supply contracts with users can be satisfied from another water source; and, in the extreme, decommissioning infrastructure where the cost of doing so is less than the present value of the cost of maintaining the infrastructure that cannot be recovered from users.

7.5 Distribution services

Distribution networks are generally delivering the pricing and infrastructure investment outcomes expected under the NWI. The durability of these outcomes depends upon the ability of network operators to manage the business risks arising from emerging issues (such as declining delivery volumes — box 7.5) and evolving circumstances (such as rising energy prices and changing customer demands).

Box 7.5 Declining delivery volumes in distribution networks

There is a long-term trend of declining delivery volumes for some networks within the Murray-Darling Basin (MDB) that dates to the 1970s. The trend is, in part, driven by the introduction of a cap on diversions within the MDB in 1993-94, the introduction of water trading and the recovery of water for the environment since 2007.

More recently, environmental factors and the sale of water (entitlements and allocations) by irrigators have driven further declines in the water delivery volumes of some networks. For example, a 30 per cent decrease in water deliveries is apparent in comparisons of delivery volumes for Goulburn-Murray Water (2001, 2016) before and after the Millennium Drought. Some distribution networks are forecasting declines relative to past delivery volumes. For example, Murray Irrigation (sub. 16) is forecasting long-term average annual water deliveries at 50 per cent of the volume associated with the water entitlements held by the network in 1995.

Distribution networks across Australia have been given the autonomy and powers necessary to manage their business risks through either corporatisation or being transferred to local ownership and management. This section considers whether there is any water-related regulation imposing an undue limit on distribution networks' ability to manage their business

risks and adapt to evolving circumstances. It also explores whether there are net benefits in changing the ownership and management arrangements for some networks.

The laws, regulation and rules applying to distribution networks

The infrastructure underpinning distribution networks has high capital costs, long useful lives and few (if any) alternative uses. Further, it is usually impractical and / or unviable to duplicate established infrastructure. As a result, the costs of supplying and maintaining infrastructure are typically minimised through supply by a single infrastructure provider. This results in a lack of competition for distribution services in individual irrigation districts.

The regulation of distribution services pricing in Victoria (by the ESC) and Queensland (by the QCA) has reduced the scope for distribution networks in those jurisdictions to abuse their market power. For locally owned and managed distribution networks in other jurisdictions, prices are either unregulated or subject to light touch regulation. The light touch approach has been taken in recognition of the greater incentives for those networks to pursue efficient operations and prudent capital expenditure, and to set prices at a competitive level.⁴⁹

Notwithstanding, it can still be in the interest of both government-owned and locally owned networks to engage in discriminatory behaviour against selected customers (such as those seeking to permanently trade water out of a network). Governments have sought to limit this behaviour through regulation such as the rules applying in the MDB (box 7.6). These rules are a source of concern for participants such as Coleambally Irrigation Cooperative Limited (sub. 46) and the National Irrigators' Council (sub. 13).

The rules are required because protections for customers under the laws of trusts, corporations and co-operatives do not address all the risks faced by the customers of distribution networks. Further, where those laws provide protections, the cost of accessing remedies is usually prohibitive (ACCC 2016).

The number of irrigators, value of infrastructure charges and scale of the water market (and water trading) within the MDB dwarf any other Australian irrigation system. Combined, these factors mean the cost of any exploitation of market power will be much greater than in other regions — particularly in relation to distortions in the water market. This explains the approach to regulating distribution networks within the MDB compared to other regions.

The revised rules proposed for the MDB (box 7.6) represent better regulatory practice as they place an emphasis on outcomes rather than prescription. The ACCC's (2011) graduated and proportionate approach to compliance matters and the enforcement of the rules is also better regulatory practice. A proportionate approach to enforcement and compliance is important for locally owned distribution networks as a punitive approach based on fines and penalties would ultimately hurt the users regulation should be protecting.

⁴⁹ An example of the light touch regulation is the requirement to publish a schedule of charges under the *Water Charge (Infrastructure) Rules 2010* (Cwlth).

Box 7.6 Regulation of distribution pricing in Murray-Darling Basin

Distribution networks within the Murray-Darling Basin are subject to the *Water Charge (Infrastructure) Rules 2010* (WCIR) and the *Water Charge (Termination Fees) Rules 2009* (WCTFR):

- the WCIR restricts discriminatory pricing and requires transparent prices and price setting
- the WCTFR sets out the maximum termination fees that can be charged to those disconnecting from a network and requires transparency in how those fees are determined.

The ACCC proposed refinements to the WCIR in September 2016. The refinements include the introduction of a ‘reasonableness test’ intended to provide networks with sufficient flexibility to innovate while still protecting against the exploitation of market power. The ACCC’s final advice addressed most of the concerns raised over the reasonableness test by stakeholders in their responses to the draft advice. The ACCC’s final advice also flagged the development of guidance material (in consultation with stakeholders) should the proposed rules be accepted by the Minister for Agriculture and Water Resources.

Source: ACCC (2016).

The ACCC’s (2016) review of the rules (box 7.6) has resulted in the removal of regulation no longer seen as necessary (that is, the requirements for network service plans). This highlights the need for ongoing review of the rules to ensure they remain fit-for-purpose and that opportunities are taken to reduce the regulatory burden where ever possible.

Ownership arrangements

Local ownership and management of distribution networks in New South Wales, South Australia and Western Australia has often brought improvements in: productivity; accountability and responsiveness to users; and long-term planning within networks. For example, Coleambally Irrigation Cooperative Limited’s user charges fell by 5 per cent in real terms between 2008-09 and 2016-17 (sub. 46).⁵⁰

More generally, local ownership and management is expected to support good outcomes by bringing water users’ knowledge and expertise to bear in generating solutions best suited to local circumstances. For these reasons, and those above, local ownership and management should be the preferred model for any new distribution networks.

Irrigators accepted full responsibility for all risks and costs associated with distribution infrastructure as part of the transfer to local ownership — including the potential for, and costs of, a distribution network’s financial failure. Governments are under no obligation to

⁵⁰ The reduced costs were the result of productivity gains driven by a number of factors including (but not limited to) targeted management actions and investment by Coleambally Irrigation (and Government) to improve the operating efficiency of their distribution infrastructure.

provide support to locally owned networks, nor do they have any say in the operation of those networks.⁵¹

A transition to local ownership and management is underway for four networks in Queensland (box 7.7) but other Queensland networks, along with Victorian and Tasmanian networks, remain under government ownership. The benefits of local ownership and management raise the question of whether there might be net gains from a change in the ownership of these networks.

Box 7.7 Queensland's distribution schemes

Queensland irrigators raised concerns about the long-term sustainability of SunWater's eight distribution schemes in 2012 and called for those schemes to be put under their control. The Queensland Government decided in September 2015 that:

- schemes at Emerald, Eton, St. George and Theodore should be transferred to local ownership and management by July 2018 (subject to the support of users)
- arrangements for the Bundaberg, Burdekin-Haughton, Mareeba-Dimbulah and Lower Mary schemes required further consideration and a decision on their future will be made in October 2017.

These schemes will not be the first in Queensland to be transferred to local ownership and management. The first such scheme was Pioneer Valley Water Co-operative Limited (PV Water) which replaced the Pioneer Valley Water Board (a statutory board) in March 2016.

Sources: LMA Irrigation (nd); Pioneer Valley Water (nd); Webbe and Weller (2009).

A well-functioning economic regulation regime will support efficient prices, prudent capital expenditure decisions and incentivise operational efficiency. Where such a regime is in place for a corporatised distribution network (as in Victoria), transferring distribution networks to local ownership and management may not bring material gains. Net gains may also be difficult to realise for smaller networks, such as some of those in operation in Tasmania, because of the fixed costs of transferring ownership and the relatively small cost base on which to make efficiency gains.

The viability of any transition to local ownership and management is dependent upon the ability of irrigators to demonstrate a collective ability to manage their network. Further, as long-term users of a distribution network, irrigators are often best placed to make a judgment on whether their management of the network would be beneficial. Accordingly, any initiative to progress toward local ownership and management needs to be advanced on the initiative of irrigators — as was the case for those schemes that have made the transition in New South Wales and Western Australia (Local Management Arrangements Working Group 2012). This means the role of government becomes one of:

⁵¹ The New South Wales Government can become (or appoint) a manager of last resort in order to continue the supply of water for essential human needs (DPI (NSW), pers. comm. 6 June 2017). In Western Australia, any such an action requires a network to be designated under the *Water Services Act 2012* (WA) but to date, no networks have been designated (DOW (WA), pers. comm. 30 June 2017).

-
- providing reasonable information to users to allow them to complete their due diligence
 - having the machinery of government in place to allow a transfer to local ownership and management should such a transition be deemed viable
 - determining any payments to networks that are necessary to form a reserve to cover unfunded future capital expenditure requirements.

DRAFT FINDING 7.2

The transfer of existing irrigation distribution networks to local ownership and management in New South Wales, South Australia, Western Australia and parts of Queensland has benefited irrigators. In exchange, irrigators have accepted responsibility for all the risks and costs associated with ownership — including the potential for, and costs of, a distribution network's financial failure.

Local ownership and management is the preferred model for any *new* distribution network. In contrast, the transfer of *existing* government-owned distribution networks to local ownership needs to be considered on a case-by-case basis.

There are rules in place to limit the exploitation of market power by distribution networks in the Murray-Darling Basin. Those rules and the approach to their enforcement:

- are proportionate to the risk posed and potential detriment
- are focused on outcomes and seek to avoid undue limits on the ability of networks to manage their business risks (such as declining water delivery volumes)
- have been subject to a transparent review process to ensure they remain fit for purpose.

7.6 Building new infrastructure for irrigation

All jurisdictions agreed under the NWI that government investment in new or refurbished infrastructure would only proceed where that infrastructure was shown to be both economically viable and ecologically sustainable (paragraph 69).⁵² The NWC (2009, 2011c, 2014c) repeatedly raised concerns over government spending on all forms of irrigation infrastructure — bulk water, distribution and on-farm water efficiency initiatives — in its assessments of progress under the NWI. In 2014, the NWC came to the conclusion that:

... overly optimistic estimates of viability, inadequate cost-benefit analysis and inefficient pricing impose long-term costs on the community through ongoing subsidies or unanticipated environmental degradation. (2014c, p. 9)

Inquiry participants have also raised similar concerns. For example:

⁵² The NWI provided scope for the jurisdictions to pursue unviable projects where they were necessary for 'social and public health obligations' (paragraph 66 v) but the private benefits from irrigation means that this exclusion should not apply to irrigation infrastructure.

... there is now too much official confidence in public investment in new irrigation infrastructure in northern Australia given well-known shortcomings in the technical and economic prospects for major agricultural developments in that part of the world. (Alistair Watson, sub. 49, p. 3)

Cost-benefit analyses of proposed water infrastructure projects in Queensland has not been robust, which has led to several dams that have been constructed in recent years not meeting financial and environmental performance requirements. (WWF Australia, sub. 15, p. 5)

We note that some water infrastructure projects have been built on limited business cases in the past. It is essential that development proposals are carefully considered. (Engineers Australia, sub. 34, p. 4)

The cost of continued poor decisions on irrigation infrastructure is potentially significant. The Australian Government currently has over \$4 billion in grant funding and loan finance available for various forms of irrigation infrastructure (table 7.6) and there is no shortage of potential projects on which this money can be spent. For example, there was over \$3.5 billion in headworks infrastructure delivering water for irrigation under consideration across Australia in 2014 (Australian Government 2014b).

The section examines how government processes can be improved to avoid the costs of poor decisions on new infrastructure.

Table 7.6 Major Australian Government irrigation infrastructure programs

<i>Program</i>	<i>Amount</i>	<i>Details</i>
	\$ billion	
Northern Australia Infrastructure Facility (NAIF)	5.0	<ul style="list-style-type: none"> Available for airport, communications, energy, port, rail and water projects. NAIF's investment mandate requires the Commonwealth to be repaid in full.
National Water Infrastructure Loan Facility (NWILF)	2.0	<ul style="list-style-type: none"> Minimum loan amount under the NWILF is \$50 million and full repayment is required within 15 years.
National Water Infrastructure Development Fund (NWIDF)	0.5 ^a	<ul style="list-style-type: none"> The project must be economically viable and water is to be managed according to NWI principles. Commonwealth funding (from all sources) is not to exceed 49 per cent of the total project cost. Economic viability is to be established via a cost-benefit analysis with review by Infrastructure Australia where Commonwealth funding exceeds \$100 million.
Commonwealth On-Farm Further Irrigation Efficiency Program	1.6	<ul style="list-style-type: none"> The program runs from 2017–2024. Funding is available for infrastructure upgrades and on-farm water efficiency to deliver water savings to the Commonwealth.

^a \$248 million of this fund was committed during the 2016 federal election campaign and \$40 million has been set aside for feasibility studies across northern Australia.

Sources: DAWR (2016b); *Northern Australia Infrastructure Facility Investment Mandate Direction 2016*.

Both old and new irrigation projects have under delivered

Unfortunately, there has been a tendency for public investment in irrigation infrastructure to deliver less than the anticipated benefits (box 7.8). Many past projects were not economically viable and have placed both immediate and ongoing costs on taxpayers. The impost on tax-payers and the broader community can extend beyond the infrastructure's construction costs. For example:

- if governments borrow to fund projects, there is an ongoing interest cost that must be serviced. The interest cost on \$3.5 billion of Australian Government debt (the cost of headworks projects under consideration in 2014) would be over \$90 million per year⁵³
- supporting infrastructure, such as roads, may also be required — the cost of this infrastructure is typically borne by government.

Where the business cases for new irrigation are available (which is rare — appendix B, section B.3), they often include regional development and job creation as part of the reason to go ahead with a project. Some analyses include the jobs created during construction within their considerations.

While jobs are invariably created during the construction phase they are not sustained. For example, the jobs created by the Ord Stage 2 project peaked at 204 during construction but progressively declined to 61 ongoing permanent jobs in the two years after construction was completed (Western Australian Auditor General 2016). The available data shows that where ongoing jobs are created, they come at a high cost (table 7.7).⁵⁴

The business cases supporting irrigation infrastructure projects have often been found to be inadequate. Some of the more common shortcomings of irrigation infrastructure business cases include: overly optimistic estimates of a project's viability (NWC 2014c); invalid assumptions (GHD 2015); and inadequate sensitivity analysis (IA 2015). Another failing is completing the analysis only after a funding decision has been made and publicly committed to.

⁵³ Based on the yield (2.62 per cent) for 10 year Australian Government bonds on 23 August 2017 (RBA 2017).

⁵⁴ A lack of publicly available business cases and an absence of reporting on project outcomes means data on job creation is scarce. Hence, the limited sample in table 7.7.

Box 7.8 Sample of major irrigation infrastructure projects since 2005**Paradise Dam, Queensland (2002–2005)**

The construction of Paradise Dam was completed in 2005 at a cost of approximately \$240 million (in 2004-05 dollars) to the Queensland Government. The construction of Paradise Dam delivered 124 GL of medium priority water and 20 GL of high priority water to address the perceived excess demand for water in the area.

However, around 85–90 per cent of that water remains unsold (box 7.4). Given the low levels of water use, it is unlikely the benefits from irrigation underpinning the business case for the dam (NECG 2001) have been realised.

NECG (2001) estimated dam safety costs would be \$100 000 every 20 years. These estimates did not foresee changes in dam safety standards nor the damage from the 2013 floods. New dam works are now required to secure the safe operation of the dam during extreme weather events. The estimated total cost of those works is \$420 million (Building Queensland 2016b, 2016a).

Ord Stage 2, Western Australia (2008–14)

Funding for Ord Stage 2 was announced in 2008 and the project was completed in December 2014 (three years behind schedule). The project's construction works cost the Western Australian Government \$334 million (\$114 million over budget).

The initial stages of the project were rushed and key due diligence measures were not completed. Detailed project costings were not undertaken (Western Australian Auditor General 2016) and the Western Australian Legislative Assembly Public Accounts Committee (WALAPAC 2011, p. 3) took the view that it was difficult to justify the project on economic grounds following their review of the project's business case. WALAPAC (2011, p. 23) also noted that while there may have been reasons to proceed with the project:

What was not evident was any analysis of alternative projects to provide employment opportunities for local Indigenous people. We cannot judge whether or not spending \$220m would have produced better results if it had been spent creating jobs in other ways, such as land management, housing construction and maintenance or human services.

As at September 2016, only 20 per cent of the planned cropping area was being utilised and 61 ongoing jobs had been created (Western Australian Auditor General 2016). In its review of the project the Western Australian Auditor General concluded:

The sustained social and economic benefits underpinning the decision to proceed with this [investment] have not been realised (2016, p. 6).

Additional plantings of quinoa, chia and maize were announced for the irrigation area in March 2017 (Brann 2017). This will take the land under irrigation to over 40 per cent of the planned cropping area for Ord Stage 2.

(continued next page)

Box 7.8 (continued)

Tasmanian Irrigation schemes — tranche 1 and 2 (2010 onward)

The Australian and Tasmanian Governments provided \$229 million in capital subsidies over 2010–2015 for new water infrastructure to support industry development. A further \$140 million in subsidies is to be provided for tranche 2 projects over the period 2016–18 (Tasmanian Irrigation Pty Limited 2016b). In an early assessment of the tranche 2 projects, Infrastructure Australia noted:

The question here is one of striking a balance between, on the one hand, potential strategic development benefits for Tasmania as a state (and, indirectly, the nation as a whole) and, on the other, the argument that projects that provide significant private benefits would normally be funded on a commercial basis. The potentially marginal economics and commercial uncertainties associated with the schemes could explain the absence of a fully privately funded option, and whether it is therefore appropriate for government to be contributing funding (2015, p. 4).

The schemes completed thus far seem unlikely to have been economically viable as Governments were required to pay for the large majority of construction costs after users were unable or unwilling to fund the project through the combination of:

- their purchases of water entitlements which were priced according to their capacity to pay (Tasmanian Irrigation Pty Limited 2016b)
- infrastructure prices that do not provide for any recovery of construction costs.

Table 7.7 Sample of irrigation infrastructure project outcomes

	<i>Units</i>	<i>Ord Stage 2</i>	<i>Duck</i>	<i>Swan Valley</i>
Jurisdiction		WA	Tas	Tas
Cost to government	\$ million	334 ^a	24 ^b	14 ^b
Status of project		Completed 2014	In progress	In progress
Irrigators holding entitlements	number	1	26	19
Ongoing jobs created	number	61 ^c	58	32
Cost per job created ^d	\$ million per FTE	5.5 ^c	0.5 ^b	0.4 ^b

n/a not applicable. **FTE** Full-time equivalent. ^a Funding from the Western Australian Government for irrigation infrastructure works only. A further \$195 million was provided by the Australian Government for supporting social projects and infrastructure. ^b Forecast. ^c Job numbers exclude 10–15 seasonal workers. Cost per job excludes consideration of funding from the Australian Government. ^d Calculated by dividing the cost of the government subsidy by the number of jobs created.

Sources: Department of State Development (WA) (nd); DPIPWE (Tas), pers. comm. 2 June 2017; Tasmanian Irrigation Pty Limited (2015, 2017a); Western Australian Auditor General (2016).

As irrigation infrastructure are long-lived assets the associated costs and benefits accumulate over many years. For poorly chosen projects this means the net costs compound over time. For such projects there can be a tendency to look beyond the past and be overly optimistic in believing that, eventually, the project will come good. Experience shows that this is often a false hope (box 7.9).

Poor outcomes are not limited to new water storage and delivery projects. Commissioning new and upgraded infrastructure to deliver water savings has been rarely cost-effective in the past (PC 2010).

There appears to have been no improvement in the cost-effectiveness of more recent projects with the Commonwealth On-Farm Further Irrigation Efficiency Program reflecting a water recovery cost of \$3600 per megalitre for programs in Victoria between November 2009 and March 2015. This was a premium of at least 33 per cent to market prices through 2016, and double the price of government purchases of high reliability entitlements from the Goulburn region over the period 2012–14 (DAWR 2016a, 2016e; RMCG 2016). Cost-effectiveness is unlikely to improve over time as the ‘low hanging fruit’ has now been picked (Murray Irrigation Ltd 2017, p. 5; PC 2010). Water efficiency projects have also not had the intended effect when applied as part of a program to modernise and rationalise a distribution network (Victorian Ombudsman 2011) — this has been, in part, due to the unwillingness of distribution networks and government to use their collective powers to resolve hold out problems.

Box 7.9 Ord River Irrigation Area (Ord Stage 1)

Hassall and Associates (1993) found that over the 33 years from the commencement of the Ord Stage 1 in 1958, the Western Australian Government’s investment of \$613 million (1990-91 dollars) had produced benefits of just \$102 million (1990-91 dollars).^a

Hassall and Associates also completed a forward looking cost-benefit analysis. That analysis showed a net benefit of \$1.3–3.2 billion (1990-91 dollars) for the project by 2021. Unfortunately, those assumptions have proven to be overly optimistic as:

- production has significantly underperformed relative to forecast. Under the mid-range (or ‘continuity’) scenario, production in 2010-11 was forecast to be \$245 million (1990-91 dollars or about \$400 million in 2010 dollars). Actual production in 2010 was \$31 million (in 2010 dollars) plus an annuity value of \$91 million for unharvested sandalwood. Actual production in 2011-12 was estimated to be \$117 million.
- by 2013 there was 14 000–15 000 hectares of irrigated agriculture within Ord Stage 1 compared to the forecast of 48 550 hectares in 2014 under the Hassall and Associates mid-range (or ‘continuity’) scenario.

^a The analysis was based on a zero discount rate. Adjusting for inflation, the Western Australian Government had spent the equivalent of \$1150 million (2016-17 dollars) and the benefits produced were equivalent to about \$190 million (2016-17 dollars).

Sources: Bright (2011); DPIRD (WA) (2017); DRD (WA) (2014) Hassall and Associates (1993); Ord Irrigation Cooperative Limited (nd).

DRAFT FINDING 7.4

The past failure of governments to deliver new irrigation infrastructure projects that are financially viable, environmentally sustainable and economically efficient is due to a combination of factors, including:

- prices that do not reflect the full cost of infrastructure due to governments providing grants for what is essentially private infrastructure
- poor analysis of the viability of new infrastructure projects
- an absence of robust water entitlement and planning frameworks.

There is a clear need for change

Unviable projects and the high cost of jobs to deliver regional development have not deterred governments from commissioning new irrigation infrastructure. The marginal prospects for many new irrigation projects means that poor outcomes are likely to continue if government investment decisions on new infrastructure continue to be made as they have previously.

The marginal prospects of proposed projects (especially those in northern Australian) are driven by a number of factors including the declining marginal returns from dam construction,⁵⁵ the lack of security of returns for many commercial crops, limited market opportunities and uncertainty of land tenure (George et al. 2014; Petheram et al. 2014). More specifically, assessments of the Gilbert and Flinders catchments by Petheram et al. (2013b, 2013a) show that development is unlikely to deliver commercial returns and that any chance of viability relies heavily on repeated good seasons and maximum yields. They also found that significant water use in these catchments would amplify the environmental and social challenges associated with dry years.

Grant funding is part of the problem

The NWI Pricing Principles (box 7.3) direct that government grants for new infrastructure should not be recovered from users via prices. This approach has resulted in infrastructure pricing that does not seek to recover from users the capital cost of infrastructure funded by government grants. As a result an important check on the viability of grant funded projects — irrigators' preparedness to pay — has been missing.

The effectiveness of this viability check (and clear price signals) in preventing poor projects from proceeding is evident in the abandonment of new irrigation schemes using water from the proposed Nathan Dam in Queensland. These schemes were abandoned when it was found

⁵⁵ Declining marginal returns to dam construction arise for two reasons: first, because it is attractive to build the best dams first; and, second, because some new dams will 'compete' for water supply against existing dams.

that the price of water from the dam was likely to be several times what a viable irrigated agriculture business could pay (Coordinator-General (Queensland) 2017).

The use of grant funding for irrigation infrastructure, and the resultant prices that do not recover the cost of that infrastructure from users, can distort investment decisions. This detracts from the community's welfare as resources are drawn to subsidised areas rather than being applied to their highest value use.

Past irrigation infrastructure projects have been justified by private benefits captured by irrigators. The use of government grants to build such infrastructure results in the associated cost being borne by taxpayers even though they (as part of the broader community) receive little of the resultant benefits.

Bulk water infrastructure that also has other uses

The water storage and delivery infrastructure underpinning bulk water services can have uses in addition to the delivery of water for irrigated agriculture. As noted by Engineers Australia:

Dams often have multiple benefits, and it is important to consider the potential for such infrastructure to contribute to multiple aspects such as: [urban] water supply, flood mitigation, hydropower, aquaculture, and recreational/tourism/cultural opportunities. The water supply dam promoted just after a drought might be able to supply significant flood mitigation or hydropower benefits with a modest incremental cost. (sub. 34, p. 4–5)

Some of these other uses are incidental benefits of the infrastructure and do not add any cost to the infrastructure's construction or operation. For example, recreational uses (such as fishing and swimming) typically do not add to the cost of building or operating a dam.

In contrast, other uses create additional construction and / or operating costs. For example, a dam wall may need to be raised above that originally planned in order to provide flood mitigation to a downstream area. These additional costs should not be recovered from irrigators as to do so would detract from economic efficiency. Rather, the incremental cost should be recovered from the relevant beneficiaries to ensure the right scale and type of infrastructure is delivered. For example, residents in the areas protected from flooding should bear the additional cost created by raising the dam wall to deliver flood mitigation. This could be achieved by the relevant local council taking responsibility for the costs and passing those costs through to (protected) ratepayers.

However, where the benefits are widely shared and it is not cost-effective to recover the relevant costs from beneficiaries, there may be a role for government in co-funding the new infrastructure to ensure the additional benefits are not lost. Where this occurs, any grants for the construction of infrastructure should be limited to that required to deliver the additional benefits and uses and the relevant share of operating costs should be covered by a transparent community service obligation payment to the infrastructure operator.

Transparent cost-benefit analysis is key to delivering good outcomes

Any need for government grant funding should be demonstrated through a transparent cost-benefit analysis (PC 2014). A good cost-benefit analysis allows information to be analysed in a logical and consistent way and encourages decision makers to take into consideration all costs and benefits of a project, rather than making decisions based on selected impacts or beneficiaries only. The benefits of transparent cost-benefit analysis have been clearly set out by Forsyth:

Open and transparent evaluations can be critiqued, and errors found and addressed. The importance of key assumptions, which will affect the result of the evaluation, can be debated and the reliability of the evaluation can be assessed. ... Vested interests will be more apparent. (2014, p. 6)

The outputs of a cost-benefit analysis can also be used where a project delivers multiple benefits to inform the apportionment of costs between irrigators, other users / beneficiaries and governments. Under this approach the expected private benefits accruing to irrigators and irrigation infrastructure operators can be matched by their contribution towards the project. Such an approach also guards against the private benefits being overstated for the purposes of gaining project approval.

Delivering irrigation infrastructure without government grants

Some Australian Government programs provide finance rather than funding (box 7.10) for new irrigation infrastructure. Infrastructure financing can be an effective and efficient way for governments to elicit the social benefits and / or public good elements of infrastructure which would not be otherwise forthcoming. Aside from a good business case, government financing rests on a judgment that finance from the private sector will not be available, or not available at a price that allows social benefits and / or public good elements to be realised.

Box 7.10 Funding and financing infrastructure

The financing and funding of infrastructure are two distinct functions.

- 'Financing' is the manner in which capital is raised in the first instance to pay for infrastructure. Financing can take the form of debt or equity raised from either the public or private sector. An example of financing in the irrigation sector is the National Water Infrastructure Loan Facility (table 7.6) which provides loans for new water infrastructure.
- 'Funding' refers to who ultimately pays for infrastructure. In the case of water infrastructure this can be water users (such as irrigators), other beneficiaries of the infrastructure (such as towns protected from flood) and / or governments.

Caution needs to be exercised in financing projects where the private sector is unwilling to accept the same risks — that unwillingness may be a commercially and economically sound decision (PC 2014). For this reason, government finance for new irrigation infrastructure should only be provided once a robust decision-making framework for that financing is in place. Such a framework should include:

- an independent assessment of the project’s viability and its ability to provide a return on, and return of, the government’s investment on commercial terms
 - the assessment should also consider the level of water entitlements to be taken up by users and the viability of defraying operating and capital costs across those entitlement holders
- a selection of projects on merit without favour or bias
- ongoing monitoring against agreed performance measures and the implementation of remedial action should the investment underperform
- public reporting of investment performance.

There also needs to be sufficient expertise within government to make good decisions on the projects being financed. This is especially important given the questionable viability of some of the projects that will be brought forward for government financing.

Ensuring that projects are supported by NWI-consistent frameworks

Ensuring that NWI-consistent frameworks are in place before investing in major water infrastructure is important for ensuring that new infrastructure is environmentally sustainable and delivering investor certainty. As discussed in chapter 3, neither Western Australia nor the Northern Territory has enacted legislation to enable NWI-consistent water entitlements and planning arrangements. In the Commission’s view such arrangements need to be in place before progressing new irrigation developments in these jurisdictions. This view is supported by some participants, for example:

Northern Australia has been identified as a region of potential for the large-scale development of water resources for agriculture and industry. While the National Water Initiative already applies in principle to development in the north, the reality is that neither the Northern Territory nor the Western Australian governments have yet passed legislation to implement the 2004 reforms. (Wentworth Group of Concerned Scientists, sub. 40, p. 4)

History has shown that irrigators will invest in prudent development that provides the water products and services they require at reasonable cost. To inform investment decisions, it is critical that:

- ... the upfront investment in scientific analysis is made to ensure the long-term sustainability of the project.
- the policy settings that govern access to water from new developments is put in place. (National Farmers’ Federation, sub. 55, p. 2)

Water planning needs to be undertaken upfront

There is a clear role for governments in establishing an understanding of water resources to inform the water planning and management settings for new development areas. Without this understanding there is a heightened risk of excessive extraction of water and associated environmental damage. As the experience in the MDB has shown, remediating such damage is a costly exercise for governments, water users and communities. Put simply, to avoid costly environmental damage being left to future generations water planners need to set aside a share of water for the environment before assigning any water for consumptive use through the issue of water entitlements (chapter 3).

In the view of the CSIRO, the investment in scientific analysis required for good water planning has not always been forthcoming:

Ongoing interest in developing the water resources of northern Australia has not met with commensurate on-ground investment. On-ground investment in northern Australia requires both the investor and the regulator to have confidence in both opportunities and risks. In the absence of adequate information regulators tend to make conservative decisions that restrict resource allocation and, hence, opportunities for investment. One way to improve the confidence of regulators and investors is to provide information at a finer spatial and temporal scale than is currently available. (sub. 8, p. 8)

Governments face something of a ‘catch 22’ in this regard. It would be a poor use of resources to examine every possible development opportunity but, without such an examination and clear regulatory settings, investors are unlikely to give serious consideration to development. The two-stage process undertaken by the CSIRO in assessing water resources in northern Australia (box 7.11) has been a pragmatic approach to resolving this tension while supporting environmentally sustainable development.

Governments should review and evaluate the outcomes from the CSIRO’s assessments of northern Australia’s water resources before undertaking further resource assessments. Doing so will identify opportunities to improve the process and its application to new developments. It will also help ensure government investment in these activities is worthwhile.

Entitlement frameworks need to be in place

A lack of long-term certainty in the water entitlements for a new development will deter farmers and graziers from investing in new or expanded irrigation operations. This was recognised in the White Paper on Developing Northern Australia:

Statutory water planning arrangements provide a secure basis for water users by providing a legally defined entitlement that, in turn, provides business certainty regarding the available water resource and transparency about how the resource will be shared. (Australian Government 2015c, p. 46)

Box 7.11 CSIRO's assessments of northern water resources

Prior to 2014, most of northern Australia's land and water resources had not been mapped in sufficient detail to support reliable resource allocation or investment decisions. The CSIRO undertook a desktop appraisal of northern Australia's land and water resources to address this shortcoming. The information from the desktop assessment was then used to identify those catchments with the greatest potential for development.

The CSIRO's preliminary appraisal was undertaken using landscape information and detailed modelling to determine the water storage potential of sites across northern Australia. 11 catchments across Queensland and Western Australia and a number of small catchments around Darwin were identified as having the greatest potential for new irrigation development or expanded development.

The Northern Australia Water Resource Assessment (NAWRA) project entails an assessment of the feasibility, economic viability and environmental sustainability of three of the potential development sites identified in the preliminary assessment: the Fitzroy catchment (Western Australia), the Darwin catchments (Northern Territory) and the Mitchell catchment (Queensland). The NAWRA project is due for completion by June 2018 and will cost \$18 million.

Sources: CSIRO (nd); Petheram et al. (2014).

A system of water entitlements makes clear the primary beneficiaries of a piece of infrastructure and what rights those beneficiaries hold. It is from these entitlement holders that the costs associated with the infrastructure should be recovered and with whom infrastructure operators should consult on decisions about the maintenance, replacement and / or refurbishment of that infrastructure.

NWI compliance is already required in some places

Except for the Broken Hill Pipeline project where the benefits to irrigators are incidental, the jurisdictions have announced nine significant infrastructure projects since 2014 that will provide water for irrigated agriculture (appendix B, section B.3).⁵⁶ All nine require NWI compliance. The National Water Infrastructure Loan Facility (NWILF) and National Water Infrastructure Development Fund (NWIDF) also include NWI compliance within their eligibility criteria (table 7.6).

... but the Northern Australian Infrastructure Facility (NAIF) is an exception

In contrast to the NWILF and NWIDF, NWI compliance is not a requirement under the NAIF's investment mandate. This is despite the *White Paper on Developing Northern Australia* noting:

⁵⁶ All projects have a total cost in excess of \$5 million and include: Dungowan Dam (NSW); South West Loddon Rural Water Supply (Vic); Macalister Irrigation District Modernisation (1A) (Vic); Macalister Irrigation District Modernisation (1B) (Vic); Werribee Irrigation District Modernisation (Vic); Rockwood Weir (Qld); Southern Highlands Irrigation Scheme (Tas); Swan Valley Irrigation Scheme (Tas); and, Duck Irrigation Scheme (Tas).

New investments in water infrastructure will only go to projects where there is a commitment to accelerate water reform through securing water rights for farmers and other investors. (Australian Government 2015c, p. 47)

Projects should align with the National Water Initiative principles... (Australian Government 2015c, p. 51)

DAWR (2016b) is leading the delivery of the White Paper measures. Among its criteria for recommendations to the Australian Government on project financing is consideration of whether the project will be located in areas where NWI compliant water entitlements and planning frameworks are or *will be* put in place (emphasis added). As noted above, the water entitlements and planning framework for a development need to be in place *before* it commences in order to give the necessary certainty to investors.

Reducing a project's risk through the pre-sale of water entitlements

Tranches 1 and 2 of the Tasmanian Irrigation schemes (box 7.8) required (and achieved) the sale of 60–100 per cent of the available water entitlements prior to the commencement of project construction works. Under the presale agreements, purchasers paid a binding and non-refundable deposit upfront and the balance of the purchase price when the schemes were commissioned (Tasmanian Irrigation Pty Limited 2016b).⁵⁷ The deposits were usually for 10 per cent of the purchase price but differing structures could be employed depending upon the timing for the sale of the water entitlements. The decisions of purchasers were informed by an offer document that set out the proposed infrastructure charges, service standards and rules for trade (among other matters). The price of water entitlements was based on an assessment of what users could pay based on farm gate margins, while infrastructure charges were set to fully recover operating and maintenance costs and an allowance for infrastructure replacement and refurbishment.

Refinements to the sale process that would deliver greater economic efficiency include:

- using financing (rather than grant funding) for the project costs not covered by the sale of entitlements — this supports the full recovery of infrastructure costs from users
- auctioning water entitlements with a reserve price sufficient to secure the minimum level of equity required to finance the project on commercial terms. This also supports allocative efficiency by having water move to its highest value use in the first instance⁵⁸
- having proposed infrastructure charges reviewed and confirmed as cost reflective by an economic regulator.

⁵⁷ In most cases, commissioning occurred 12–18 months after the sale of the required level of water entitlements and the commencement of construction.

⁵⁸ As the proceeds from auctioning of water entitlements are applied to the funding of the project, the auction outcomes do not affect the total amount paid by users but simply when and how they make those payments.

Other benefits of the pre-sale process

The private sector has demonstrated a willingness to invest in infrastructure where it provides a commercial rate of return (IFWG 2012; PC 2014). Presales of water entitlements bring equity into a project and a committed long-term revenue stream (through infrastructure charges) that reduces a project's financial risks and should make it more appealing to the private sector.

The experience at Paradise Dam (box 7.4) shows that unsold water entitlements are a real risk for new projects. The risk of unsold water entitlements is significantly reduced if the presale of water entitlements is a condition of commencing construction. It also provides greater certainty that governments will not need to subsidise the ongoing costs of operation through their holdings of unsold entitlements (as has occurred with Paradise Dam and some Tasmanian schemes).

There are also other benefits that flow from the pre-sale process, including:

- requiring an NWI compliant entitlements framework be in place before construction starts (entitlements cannot be pre-sold unless the framework is in place)
- an in-built test of a project's viability — if irrigators are not prepared buy entitlements at a price (including responsibility for ongoing infrastructure charges) that reflects the cost of building, owning and operating that infrastructure, it is clearly unviable
- a means of recovering the upfront water planning costs for the new infrastructure.

Selling entitlements before construction (as Tasmanian Irrigation has done) rather than after construction (as has been the case elsewhere) simply brings forward that process and the associated cost. It should not create any significant new costs.

This means that, overall, there are broad benefits from the pre-sale of water entitlements and a low incremental cost of doing so. These are compelling reasons to include the pre-sale of water entitlements as a requirement to be satisfied before construction can commence on an irrigation infrastructure project.

Implications for the NWI

NWI-consistent water entitlements and planning frameworks should be in place *before* any new irrigation infrastructure is considered. Ensuring that NWI-consistent frameworks are in place before investing in major water infrastructure is central to ensuring new infrastructure is environmentally sustainable and delivering investor certainty.

Requiring new irrigation infrastructure to be financed (whether it be by the private sector or government) necessitates user charges sufficient to at least repay that finance and cover the operating costs of the infrastructure (that is, upper bound pricing).⁵⁹ This level of cost

⁵⁹ The payments from users could be from the purchase of water entitlements in the new scheme, charges to access and use the new infrastructure or both. Charges to access and use the new infrastructure would be

recovery provides assurance of the economic and financial viability of the infrastructure and, in turn, that there should be no need for taxpayers to subsidise infrastructure operated for private benefits.

All jurisdictions need to recommit to the principles and actions above. In doing so, they should consider revising the NWI's 'water storage and delivery pricing' requirements⁶⁰ to reinforce the need for upper bound pricing of new irrigation and outline approaches to ensure full costs recovery is addressed in the initial planning process for new irrigation infrastructure.

DRAFT RECOMMENDATION 7.3

Governments should not provide grant funding for irrigation infrastructure, or that part of infrastructure, that is for the private benefit of irrigators. Rather, Australian, State and Territory Governments should ensure that:

- a. National Water Initiative-consistent water entitlements and planning are in place before any new irrigation infrastructure is considered (including infrastructure being financed under the Northern Australian Infrastructure Facility)
- b. government grant funding is limited to those projects, or parts of projects, delivering a public good. Any grant funding should be subject to an independent analysis of the project being completed and available for public comment before any government announcements on new infrastructure are made. The analyses should establish that the project will be:
 - ... environmentally sustainable
 - ... economically viable and deliver public benefits that are at least commensurate with the grant funding being provided
- c. government financing (such as loans) for infrastructure generating private benefits should only be provided after:
 - ... an independent assessment has confirmed the finance can be repaid on commercial terms. The assessment should be released for public comment before any announcement on new infrastructure is made
 - ... robust governance arrangements have been put in place to deliver merit-based decision making and the ongoing monitoring of (and public reporting on) the government's investment
 - ... sufficient water entitlements have been sold to reduce the project's risk profile and provide assurance the finance will be repaid.

Australian, State and Territory Governments should enhance the National Water Initiative to align with recommendations 7.3 (a) to 7.3 (c).

based on the net investment — that is, the initial investment less any funds repaid through the sale of water entitlements.

⁶⁰ Paragraph 66.

8 Key supporting elements of the NWI

Key points

- There are three key elements of the National Water Initiative (NWI) that underpin water resource planning and management, and the provision of water services: water resource accounting; community engagement; and, knowledge and capacity building.
- While progress has been made on all three elements since the NWI was agreed, their importance to future reform efforts means they need to be an area of ongoing focus for all jurisdictions.
- Over the past 30 years, jurisdictions have implemented a range of water accounting measures (such as expanding metering, water accounts and state registers) to underpin clear and secure water rights. While these efforts have already delivered dividends, such as facilitating water trading, there is scope for improvement in areas such as implementation of the national non-urban metering framework.
- The cessation of funding of the National Framework for Compliance and Enforcement Systems will result in a less intensive approach to compliance and monitoring in some cases. The Commission is seeking further input on whether this development is a concern, and ways to improve current compliance and enforcement policy frameworks.
- New technology, innovation and advances in knowledge were critical to Australia's response to the Millennium Drought. Ongoing research and capacity building will also be central to Australia's ability to deliver sustainable management of water resources in the face of future challenges from climate change, population growth and evolving community expectations. Areas requiring particular focus include:
 - changes to water resource management in response to trends in climate change, water trade, environmental water holdings and the costs and benefits of integrated cycle water management approaches
 - building capacity for adaptive approaches to the management of environmental water holdings and the delivery of outcomes-based environmental regulation in urban areas
 - collaboration between governments, water utilities and research institutions to build better knowledge and capacity to deal with issues such as climate change and increasing urban populations.
- There may be a role for governments in assisting communities affected by significant and rapid structural change caused by water reform. The focus of that role should be on developing the capacity of communities to deal with the impact of structural adjustment. Doing so will require governments to avoid industry assistance measures and instead consider all factors impacting communities (not just water reform).

There are three key elements of the National Water Initiative (NWI) that underpin water planning and management, support the provision of water services and were essential in the implementation of the reform process.

- *Water accounting* to ensure adequate measurement, monitoring and reporting systems are in place.
- The development of the *knowledge and capacity* necessary to implement the NWI.
- *Community engagement* to deliver informed and transparent decision making and assistance measures for those severely impacted by water reform.

Inquiry participants see a need for greater investment in scientific research to improve water management, inform regulatory approaches and identify emerging issues and challenges (section 8.2). Participants have also raised the importance of effective community consultation to inform the next generation of water plans and improve urban water services (section 8.3).

This chapter examines these concerns, as well the three elements of the NWI outlined above. It also considers whether further action is needed to improve outcomes and better support future reform efforts.

8.1 Water accounting

All aspects of water resource management and the provision of water services rely on adequate information on water resources and water use. Under the NWI, parties agreed that that water resource accounting arrangements should 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.

The water reforms over the past 30 years (including under the NWI) have involved significant investment and effort by the Australian, State and Territory Governments to improve measurement, monitoring and reporting systems. As noted in appendix B these efforts have resulted in:

- publicly accessible State water registers, which underpin the integrity of entitlements and water markets (appendix B, section B.2)
- State and Territory water accounting processes, which can be used as a basis to produce national water accounts. For the most part, water accounts provide practical, credible and reliable information to assist water management decisions (appendix B, section B.5)
- improvements in the accuracy of metering and metering coverage in many parts of Australia, and the development of a national framework for non-urban metering, including national meter standards (appendix B, section B.5)

-
- the development of a national framework for compliance and enforcement systems for water resource management.

However, the assessment of progress against the NWI (and related documents) and participants to this inquiry have highlighted areas for improvement specifically relating to implementation of national frameworks for non-urban water metering, and compliance and enforcement systems for water resource management.

Water metering

In 2009, the Council of Australian Governments (COAG) agreed to a National Framework for Non-Urban Water Metering (the Non-Urban Metering Framework) to help meet NWI commitments to establish a consistent approach to metering across the country. The Non-Urban Metering Framework has a ten-year implementation period, requiring meters to comply with the national metering standards over time. Jurisdictions agreed to develop implementation plans to document priorities and targets for non-urban water metering and to report on implementation of the Non-Urban Metering Framework. All States and Territories (apart from Tasmania and the Northern Territory) have developed and submitted implementation plans under the Non-Urban Metering Framework.

Implementation of the Non-Urban Metering Framework has been subject to delays (initially due to difficulties associated with having meters certified to the required standard) and progress in rolling out compliant metering is generally taking longer than the timelines set out in the Non-Urban Metering Framework. Holley and Sinclair (2015) argue that water user buy-in has presented a major challenge and suggested a need to focus on better communication of the strategy and meter benefits to counter concern about the costs. Coleambally Irrigation Cooperative Limited (sub. 46) argued that progress has stalled under the national framework because too few practitioners were involved in the development of standards, the standards were set too high, and there has been an insufficient capacity in Australia to undertake the testing required for pattern (meter) approvals.

In 2015, jurisdictions advised the Australian Government that the Non-Urban Metering Framework per se was not necessary going forward, as jurisdictions had processes in place to manage metering as appropriate for their jurisdictions, based on risk and cost-benefit analysis (Department of Agriculture and Water Resources, pers. comm., 25 August 2017).

The Commission considers that policies guiding the implementation of non-urban metering and measurement should follow the principle of being risk-based (weighing the benefits of more accurate metering standards and faster roll out of meters with the costs). To the extent there are concerns that the original timeframes and / or approach to implementing Non-Urban Metering Framework are no longer consistent with this principle, it is important that the Australian, State and Territory Governments agree on a way forward with the Non-Urban Metering Framework that maximises the net benefits of rolling out new meters and clearly communicate this to affected water users.

Several participants to this inquiry highlighted opportunities to further extend effective metering and measurement of water use to enable more effective water management (Carmody et al., sub. 6; Queensland Farmers' Federation, sub. 61; Western Australian Government, sub. 80). For example, the Western Australian Government (sub. 80) noted it plans to significantly expand metering throughout the State, recognising that additional licensing tools are needed to effectively manage overallocation. The Queensland Farmers' Federation (sub. 61) highlighted further planned work required to implement metering and measurement for non-stock and domestic licenses under the Great Artesian Basin Plan. Transparent risk and cost benefit analysis should guide these efforts.

Compliance and enforcement

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 COAG 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 comprised six major components:

1. *water laws* — each jurisdiction has agreed to 'use (its) best endeavours to introduce and pass legislation to adopt consistent offence provisions to minimise unlawful water take'
2. *risk assessment* — all water resources are assessed according to a nationally consistent risk profile requiring minimum levels of compliance monitoring by the jurisdictions in line with increased risk
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* — more compliance officers in the field to 'carry out annual monitoring events equal to 10 per cent of the total number of water entitlement/licence holders of a water resource, using on ground officers'
6. *reporting* — water agencies publish annual reporting and compliance strategies and statistics.

The Australian Government’s funding for implementation of the National Compliance Framework ended, as planned, on 30 June 2016 (appendix B, section B.5).⁶¹ Most of the funding under the National Compliance Framework (78 per cent) was provided under the monitoring element (KPMG 2016, p. 4). Australian Government funding was to ‘assist the transition to adopting the new framework and increasing the compliance and enforcement effort’ (COAG 2012, p. 1).

Most elements of the National Compliance Framework are expected to be retained following completion of the program. However the cessation of funding for the program will result in a less intensive approach to compliance and monitoring in some cases (appendix B, section B.5). Given this, Carmody et al. (sub. 6, p. 3) suggested further measures are needed to improve compliance:

... although national compliance frameworks have led to improved regulator action, the federal funding for these reforms has largely come to an end and the gains will be squandered if further reform action and investment is not taken. These reforms will help to minimise risks of non-compliance (e.g. water users inadvertently failing to follow an ‘unknown’ requirement, despite a desire to comply with the law), provide a level playing field, build confidence in market systems and improve outcomes for the community and the environment alike.

Compliance is a significant issue and is of direct interest to all entitlement holders and those interested in environmental sustainability. Public confidence in water measurement, accounting and compliance processes is critical to maintaining the integrity of the entitlement system and the water market.

The Commission notes that a recent ABC Four Corners program — which raised issues about water management (including compliance) in the Barwon-Darling system in New South Wales — has generated considerable public interest. A number of reviews, at the State and Commonwealth level, have been announced in response to issues raised by the ABC Four Corners program. For example, the New South Wales Minister for Regional Water, Niall Blair announced the appointment of Mr. Ken Matthews to conduct an independent investigation into the issues raised by the ABC Four Corners program on 24 July 2017 and to provide the final report to Government by 30 November 2017. The Australian Government has initiated a *Basin-wide Compliance Review* by the Murray-Darling Basin Authority (MDBA) (pending agreement by the Basin States, findings will be presented to COAG on 15 December 2017) (MDBA 2017b).

The Commission will consider any broader lessons that come out of these investigations (to the extent the reports are available before the final report for this inquiry) and any further submissions.

⁶¹ The National Framework was a five year program which began in 2010-11 with the signing of the National Partnership Agreement. Overarching project management of the National Framework was undertaken by the Australian Government and their key role was to review the performance of each jurisdiction against the defined project milestones and ensure that any financial contributions were paid based on their performance and completion of milestones (KPMG 2016).

The National Farmers' Federation (sub. 55, p. 5) noted 'Resourcing of compliance efforts by the State Government could be increased and prioritised towards identified areas of high development'. EDOs of Australia (sub. 64, p. 3) were 'concerned that effective compliance and enforcement remains a significant issue in many catchments' and noted a 'lack of compliance and enforcement undermines community confidence in water regulation and has a negative impact on the environment and other users'.

Similar to metering, it is important that compliance and enforcement system are fit for purpose, risk based and, given improvements in technology, are open to innovation. The Commission invites participant views on ways to improve current compliance and enforcement policy frameworks.

8.2 Knowledge and capacity building

To support implementation of the NWI, the States and Territories agreed to identify key knowledge and capacity building priorities, and to identify and implement proposals to better coordinate the national water knowledge effort.

The NWI identified a number of significant knowledge and capacity building needs for its ongoing implementation, including:

- the assessment of water availability over time and across catchments
- changes to water availability from climate and land use change
- the interaction between surface water and groundwater
- ecological outcomes from environmental flow management
- improvements in farm, irrigation systems and catchment water use efficiency
- catchment processes that impact on water quality
- improvements in urban water use efficiency.⁶²

Relevant knowledge enables evidence-based decision making in the water sector, including in relation to: the development and review of water plans; the determination of an appropriate balance between consumptive and environmental uses of water; the management of environmental water; decisions on new infrastructure; and, service delivery in the urban and irrigation sectors. Building the capacity and capability of water planners and managers through education, training and collaboration will support their ability to put new knowledge to its best use and to help optimise the return on investments in knowledge building.

⁶² NWI paragraph 98.

Progress under the NWI

On one hand, the National Water Commission (NWC 2011c, 2014c) found that good progress had been made in addressing significant knowledge and capacity building needs in the water sector, chiefly through:

- considerable investment by the Australian, State and Territory Governments in research
- ongoing identification of knowledge and capacity gaps by the jurisdictions
- collaborative research and sharing of information between universities, research organisations, and national, State and Territory water agencies.

On the other hand, the NWC (2011c, 2014c) found that work on implementing proposals to coordinate research effort at a national level, such as the establishment of Centres of Excellence and the development of the National Water Knowledge and Research Platform (the Platform), was progressing slowly.

The Commission considers that since 2014, Australian, State and Territory Governments have largely met their NWI commitments by continuing to identify and address knowledge and capacity needs (including those identified in the NWI) and by coordinating their knowledge and capacity building efforts and initiatives (appendix B, section B.7). That said, there has been a significant reduction in water-related research efforts in recent years, with the closure of a number of key research initiatives — for example, the Australian Water Recycling Centre of Excellence, National Centre of Excellence in Desalination in Australia and eWater Cooperative Research Centre (AWRCE 2013; eWater 2012; NCEDA 2014). In addition, two key mechanisms supporting the coordination of knowledge and capacity building at a national level have ceased — the NWC (in 2015) and the Platform (in 2016).

Ongoing investment in research and development is important

The Millennium Drought saw water security and sustainability concerns rise to prominence as important national issues. To address these concerns, the Australian Government made considerable investments in furthering knowledge and capacity (box 8.1 and figure 8.1). Relative to the investments made in the early years of the Millennium Drought and the NWI, recent investments have been considerably smaller.

Box 8.1 A selection of major Australian Government initiatives since 2004 aimed at advancing knowledge and capacity

In 2004, the Australian Government committed \$2 billion over six years to establish the Australian Government Water Fund. The fund consisted of three programs, two of which focused on building knowledge and capacity in the water sector.

- \$1.6 billion for Water Smart Australia which focused on the development and uptake of smart technologies and good water use practices across Australia (including improving on-farm water use efficiency, irrigation infrastructure and recycling and reuse of stormwater).
- \$200 million for Rising National Water Standards which sought to improve Australia's capacity to measure, monitor and manage its water resources through: strategic assessments of groundwater resources; establishing a Water Efficiency Labelling Scheme; and, facilitating nationally-consistent water data collection and processing (Australian Government 2007).

The Australian Government also provided funding for numerous Cooperative Research Centres (CRCs) and Centres of Excellence (CoEs), including:

- the eWater CRC — the product of a 2005 merger of the CRC for Catchment Hydrology, the CRC for Freshwater Ecology and a number of other water-focused organisations. It sought to develop tools and products to support water managers in decision-making. The CRC transitioned to a not-for-profit organisation in 2012 (eWater 2012)
- the National Centre for Groundwater Research and Training — established in 2009. It works with universities, industry bodies, and Australian and State Governments to deliver research on Australia's groundwater systems. The CRC also runs programs aimed at increasing capacity of researchers and groundwater professionals (NCGRT nd)
- the National Centre of Excellence in Desalination Australia (NCEDA) — operated between 2009–2016. NCEDA was formed in response to the Millennium Drought and focused on research into energy efficient desalination technologies and building the capacity of the desalination industry (NCEDA 2014)
- the CRC for Water Sensitive Cities — established in 2012 and focused on research and solutions that deliver more water sensitive communities. It involves over 150 researchers along with 7 Australian and international universities and research organisations (CRCWSC 2016).

Since 2012, Australian Government has committed \$85 million to the Bioregional Assessment Programme (delivered through the Office of Water Science) which aims to further understanding in ecology, hydrology, geology and hydrogeology in particular geographic regions. In doing so it aims to provide decision makers in government and industry, as well as the community, with baseline information and an assessment of the potential cumulative impacts of coal seam gas and large coal mining developments on water-related assets at a regional scale (DOE 2015).

Figure 8.1 Australian Government investment in water research^a



^a The figure does not capture all Australian Government investment in water research. It is based on the funding provided to large research organisations for water research, including: the Australian Research Council; Bureau of Meteorology; CSIRO; and, Office of Water Science. Also included is the funding allocated under the Raising National Water Standards and Water Smart Australia programmes. It does not include government funding allocated to water-related Cooperative Research Centres or Centres for Excellence.

Data sources: Australian Government (2005); DEH (2005); DIIS (2016).

In 2014, the NWC highlighted the fall in the level of investment for water-related research across jurisdictions (NWC 2014c) and some participants in this inquiry have also expressed similar concerns (box 8.2).

New technology, innovation and advances in knowledge were critical to Australia's response to the Millennium Drought. It follows that ongoing research and capacity building will also be central to Australia's ability to deliver sustainable management of water resources into the future in the face of challenges from climate change, population growth and evolving community expectations.

The Commission has previously found that there is a strong rationale for governments to fund research and other knowledge and capacity building initiatives to 'improve the products and services they offer or to better discharge their functions' (PC 2007, p. xviii). For the water sector, governments play the dominant role in providing water services (mainly through corporatised water utilities) and fulfilling functions associated with water resource management and achieving environmental objectives. Accordingly, governments have a role to play (either directly or indirectly) in funding research and building capacity to enable and support the execution of these roles both now and in the future.

Box 8.2 Funding for water research — participant views

A number of submissions to this inquiry raised concerns over research funding. For example:

There has been a major reduction in research funding for water since the end of the millennium drought. We need to encourage continued innovation in the water industry through better continuity of research funding. At present this is very inconsistent — one CRC (Water Sensitive Cities) to which the Commonwealth contributes, and funding to support Water Research Australia from a limited number of utilities. (Australian Water Association, sub. 66, p. 5)

There needs to be considerably more investment in strategic research and science to support improved water management. Stable and adequate investment in strategic research that supports water management, planning and industry priorities is essential to solve Australia's many unique water challenges and to develop and maintain expertise and research capacity ... Continuity of research funding will help to drive innovation in the water industry. (Australian Academy of Technology and Engineering, sub. 20, p. 3)

Funding to improve our knowledge for decision-making on water related issues has been progressively reduced over the past 5 years. For example, the Sustainable Rivers Audit of river health in the Murray-Darling Basin was discontinued after 2012 without suitable replacement. This will leave us ill-equipped and without the information required to implement water reform. (Wentworth, sub. 40, p. 2)

Is there scope to improve knowledge and capacity further?

Participants to this inquiry have highlighted a number of areas where knowledge and capacity could be improved to better meet these challenges (box 8.3). The Commission has also identified areas where there is scope to improve knowledge and capacity in order to support the future reform priorities identified in chapters 3 through 8. These areas include:

- changes to water resource management in response to trends in climate change, water trade and environmental water holdings (chapter 3)
- the cultural value of water systems to Indigenous communities (chapter 3)
- building capacity to take an adaptive approach to the management of environmental water (chapter 5)
- investing in knowledge to support outcomes-based environmental regulation in urban areas and to better understand the costs and benefits of integrated cycle water management approaches — including alternative water sources to complement rainfall-dependent potable water supplies (chapter 6).

In addition to knowledge in these areas, improvements in technology will continue to assist in driving efficiency in water use and management.

The Commission has not undertaken a comprehensive review of the current or future knowledge and capacity needs of the water sector. However, the diverse concerns raised in submissions (box 8.3) and the knowledge and capacity needs for future reform (set out above) highlight the need for governments to engage with stakeholders to identify knowledge and capacity building priorities. A collaborative approach to building knowledge and capacity is needed.

Box 8.3 Knowledge and capacity needs — participant views

Submissions to this inquiry raised concerns around knowledge and capacity needs, including the need for a better understanding of: hydrology; groundwater in Northern Australia; effects of climate change at a catchment level across Australia; and, the interaction between water quantity and quality in environmental flows. There was also concern over the capacity of local governments to support innovation in the delivery of water services. For example:

ATSE's [Australian Academy of Technology and Engineering's] recent submission to the Standing Committee on Agriculture and Water Resources' Inquiry into Water Use Efficiency in Australian Agriculture discussed the need for environmental water management and planning to be informed by an improved understanding of the interactions between water extraction and use, and surface and groundwater systems, including the eco-systems that depend on them, at a regional-catchment and basin scale. Recognition of the interactions between water quantity and quality in environmental flows, and the effects of riverine and floodplain land use and management is critical. (Australian Academy of Technology and Engineering, sub. 20, p. 4)

VAFI [Victorian Association of Forrest Industries] believes that there is significant technical work still required to underpin the development of future decision making, including: [a]ssessment of the impacts of land use and management change on system hydrology for a broader range of land uses; [a]ssessment of actual impacts of land use change and management through empirical research and examination of the impact of management and site factors; [i]mproved hydrologic mapping of groundwater resources; and [i]mproved modelling of groundwater use by deep-rooted vegetation. (Victorian Association of Forest Industries, sub. 56, p. 6)

Progress with groundwater planning has been much slower. Limited availability of data for planning in some of the groundwater areas has made it difficult to implement a comprehensive water planning framework. The Great Artesian Basin Plan is a case example. (Queensland Farmers' Federation, sub. 61, p. 2)

With the lack of knowledge as to how climate variability will affect our water cycle at a local level, it is more imperative than ever that long term strategic thinking around water issues continues. Failure to do so might result in costly remedies that could have been prevented with better knowledge and planning. (Australian Water Association, sub. 66, p. 2)

For many local governments, attracting a workforce that can support innovation is another barrier. This is most evident in the challenges of acquiring and interpreting large volumes of data. Rural and remote local governments, already struggling to attract workers with basic skills, have a similar if not greater challenge. (Local Government Association of Queensland, sub. 71, p. 25)

A collaborative approach to building knowledge and capacity is needed

Collaboration plays an important role in increasing capacity and capability. The need to work together was identified by a number of inquiry participants. The Australian Water Association (sub. 66, p. 5) stated:

In Australia, we have numerous CRC's [Cooperative Research Centres], research institutes and universities promoting an expertise in water management. We need to continue the process of alignment of this expertise with the needs of the managers and operators of water infrastructure.

Likewise, Water Services Association of Australia (sub. 35, p. 13) noted:

... [t]he next big gains for the water industry are likely to come through integration. Government frameworks and processes that support collaboration between sectors will lead to co-investment, lower costs and better value outcomes for businesses and the community.

Governments, water utilities and research institutions have worked together in advancing knowledge, developing technology and devising innovative solutions. Examples of this collaborative approach include the establishment of several Centres of Excellence and Cooperative Research Centres (appendix B, section B.7). Climate change, increased population and other challenges will require similar collaboration in order to build the required knowledge, capacity and capability to successfully manage their impact on water resources and service delivery.

Collaboration and the coordination of knowledge and capacity building initiatives can:

- more effectively focus the research effort to derive maximum benefit from available resources and reduce the risk of duplication in research initiatives
- encourage co-investment in research and development across sectors and jurisdictions
- facilitate engagement and knowledge exchange between academia, policy, water management, private sector and jurisdictions to build overall capacity and capability
- aid in building capacity and capability in regards to adopting new products and technologies (box 8.4).

Box 8.4 Adoption and use of new technologies

In addition to the research and development activities and pilot programs undertaken by industry (and others), investment in capacity and capability building play an important role in bringing the benefits of new technology to fruition. For example, automatic reading systems for water meters along with digital and smart meters allow large amounts of water usage data to be collected. These data can be used to predict future water usage patterns and to inform decisions about more efficient water practices. Doing so requires water utilities to have access to people with data analysis capabilities and the capacity to interrogate the data collected.

Likewise, automated reading systems can aid in detecting leaks by analysing discrepancies in billing statement data — differences between the amount of water that goes into a water network and what the meter registers. This information can be analysed by water managers to inform the use of other technologies that are currently being developed such as sophisticated leak detectors (pin point leak locations) and pipe rovers (to repair the leaks).

DRAFT FINDING 8.1

Ongoing research and capacity building will be central to Australia's ability to deliver the sustainable management of water resources in the face of challenges from climate change, population growth and increasing community expectations.

What does all this mean for the NWI?

As noted above, chapters 3, 5 and 6 highlight areas where there will be a need to improve knowledge and capacity in order to support future reform priorities. Further, as experience through the Millennium Drought demonstrated, there will be a need to invest in knowledge and capacity building if water management regimes and service delivery models are to adapt to changing environmental and operating conditions. To achieve this, Australia governments will need to re-commit to identify, and work collaboratively to address, future knowledge and capacity needs.

DRAFT RECOMMENDATION 8.1

Australian, State and Territory Governments should:

- a. identify the key knowledge and capacity building priorities needed to support the ongoing implementation of the National Water Initiative (including the revisions and enhancements recommended in this report)
- b. develop mechanisms through which the jurisdictions can work cooperatively and share knowledge to build overall capability and capacity.

Australian, State and Territory Governments should update relevant provisions in the National Water Initiative to align with recommendations 8.1 (a) and 8.1 (b).

8.3 Engagement with communities and stakeholders

Under the NWI, the jurisdictions agreed to engage communities and stakeholders in achieving objectives of the NWI. More specifically, they agreed to open and timely consultation with stakeholders in relation to: pathways for returning overdrawn surface and groundwater systems to environmentally sustainable levels; the development and periodic review of water plans; and, any other significant decisions that may affect the security of water entitlements or the sustainability of water use. The States and Territories also agreed to provide timely and relevant information to all stakeholders as part of the consultation process.

Effective stakeholder engagement (box 8.5) helps Governments understand the implications of proposed reform on different parts of the community that may have competing needs and interests. Engagement also assists in bringing a common understanding of proposed reform to the community, in developing implementation programs that will work and in gaining acceptance of proposed reforms.

Stakeholder and community engagement have been essential in informing decisions and implementing reforms in several areas. For example, engagement has played an important role in developing water trading rules, considering how much water to provide to the environment in water planning and in informing water pricing decisions (Doolan 2016).

Box 8.5 **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 and 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.

Sources: Hart and Doolan (2017); Manwaring (2010).

Progress under the NWI

Since 2004, all jurisdictions have set in legislation the minimum requirements for consulting stakeholders when a water plan is being developed or reviewed. These requirements include publicly exhibiting a draft plan, and calling for and responding to submissions on a draft plan. While jurisdictions often go beyond the minimum requirements when consulting on water planning, their approaches vary (sometimes significantly (appendix B, section B.8)). Some variation in practice is appropriate, as the approach to stakeholder engagement and consultation needs to vary according to the nature of the issues under consideration and the potential consequences of decisions.

States and Territories also provide information to communities and stakeholders on the progress of water planning arrangements in their jurisdictions. For example, jurisdictions report progress on plan implementation and outcomes relative to the social, economic and environmental objectives set out in water plans (NWC 2014c). Progress is published through annual reports, evaluation reports, plan reviews and other documents, depending on the jurisdiction. The timing and the detail of the reporting also varies across jurisdictions (NWC 2011c).

As set out in appendix B (section B.8), the Murray-Darling Basin Authority has increased stakeholder consultation and engagement since 2011.

DRAFT FINDING 8.2

State and Territory Governments have delivered improved decision-making through open and timely consultation with stakeholders on water planning. This has been supported by the publication of relevant supporting information for consultation at key decision points.

State and Territory Governments have taken steps to document the outcomes from water plans and whether plan objectives have been achieved.

The Murray-Darling Basin Authority has increased stakeholder consultation and engagement since 2011.

Strong stakeholder engagement needs to be maintained

Stakeholder engagement will continue to play an important role in implementing future reform across the water sector in order to manage future challenges. This will be particularly the case for regional and urban communities dealing with the impacts of climate change. For example, during the Millennium Drought, the social dependence of both regional and urban communities on water and water environments became apparent — local lakes and streams dried up (particularly in regional communities) and urban communities had limited water use due to restrictions. Since that time, communities have developed a greater appreciation of the contribution that water management and water environments can make to amenity, liveability, recreation and regional tourism. Given this, strong stakeholder involvement will remain an imperative in water planning into the future.

Several inquiry participants highlighted the importance of engaging water users in the development of urban water policies.

Priority areas for urban water reform include ... Improving the relationships between urban planning and water policy, and driving community and stakeholder involvement in the development of local water plans. (Australian Academy of Technology and Engineering, sub. 20, p. 5)

There is a need for policy direction and potential changes in regulatory frameworks to encourage and facilitate greater customer centricity in water and wastewater services, to ensure the industry is delivering the outcomes customers want. (Sydney Water, sub. 36, p. 2)

Community engagement is required to agree the services standards expected by customers and communities, considering factors such as changes in climate, supply/demand balance, and community expectations on amenity levels and environmental quality. (Australian Water Association, sub. 66, p. 17)

The National Urban Water Planning Principles emphasise that urban water planning should be based on transparent and inclusive processes. In particular, the principles highlight that planning should be based on a partnership approach so that stakeholders are able to make an informed contribution to urban water planning (DAWR 2016c). Therefore, in developing

future policies, governments and utility providers should engage with water users and communities to understand the outcomes that consumers value — hence the outcomes that service providers should aim to deliver.

8.4 Structural adjustment assistance

Structural adjustment occurs when there is change in the nature, size and composition of communities due to natural, social, technological, economic and / or regulatory forces. It is brought about by the cumulative effect of decisions made by individuals and businesses in response to their changed environment.

While structural adjustment will create opportunities for some, it is challenging for others — especially those less capable of adapting to change. For those challenged by structural adjustment, the jurisdictions agreed under the NWI 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.⁶³ (emphasis added)

A detailed analysis of the role of government in helping individuals and communities respond to structural adjustment more generally is beyond the scope of this inquiry. Instead, this subsection focuses on whether there is scope to revise the structural adjustment provisions of the NWI to better serve its overall goals of optimising economic, social and environmental outcomes.

Progress under the NWI

Governments in Western Australia, Tasmania, the Northern Territory and the ACT have not reported to the Commission any significant adjustment issues due to water reform that have necessitated assistance for communities or water entitlement holders.

Assistance measures and programs have focused on irrigation dependent communities within the Murray-Darling Basin. The Australian Government has spent over \$8 billion to date ‘to minimise any adverse impact of water recovery as a result of the Basin Plan [Murray-Darling Basin Plan]’ (DAWR 2017b, p. 6). The Basin States have also undertaken a mix of projects focused on adjustment assistance and regional development but their spending has not been on the same scale as that of the Australian Government.

Communities and entitlement holders need time to adjust to structural change — the extended (seven year) timeframe for implementing the Murray-Darling Basin Plan has recognised this need. In addition:

⁶³ NWI paragraph 97.

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- the ability to trade water has enabled water entitlement holders to manage their water holdings and water use in response to both the opportunities and threats arising from structural change
 - risk assignment frameworks (chapter 3), where they are in place, should set the scope of government responsibilities to water entitlement holders when the value of their entitlements is diminished due to water reform
 - the purchase of water entitlements is usually the more equitable and efficient approach to recovering water for the environment (and dealing with the resultant structural change impacting water entitlement holders) compared with water efficiency programs (appendix B, section B.8).

The combination of the ability to trade water, water efficiency programs and the extended implementation time for the Murray-Darling Basin Plan has given entitlement holders the means to respond to water reform and accompanying structural change. The position is less clear for communities given the absence of program evaluations and the mix of views on what the approaches have delivered for communities (appendix B, section B.8).⁶⁴

The focus needs to be on communities

Past reviews of assistance for structural adjustment (box 8.6) agree that autonomous adjustment should be allowed to run its course wherever possible. However, as anticipated in the NWI and considered in some of the past reviews, there will be instances where structural change occurs rapidly and has a significant adverse impact on a community. Therefore, some form of government assistance may be warranted. The unique nature of communities and the factors affecting them need to be taken into account if programs designed to assist with the process of structural adjustment are to be successful.

Where a case has been made for assistance, governments should avoid industry assistance and subsidies (Aither 2014). Rather, they should focus on the needs of communities by:

- taking a strategic approach to assistance that is led by the community
- seeking to build on a community's relative strengths (and comparative advantage)
- removing barriers to people or businesses relocating within, or to, other regions
- targeting investment in developing the capacity of the people to deal with adjustment and the connectivity of the region to other regions or markets (PC 2017).

⁶⁴ A lack of reporting on outcomes is common across government structural adjustment assistance measures more generally with Aither (2014, p. 8) noting, '[a]ssessing outcomes was made difficult by a lack of monitoring or reporting on community and regional outcomes of adjustment and because outcomes depend on whose perspective they are assessed from'.

Box 8.6 Past reviews of assistance for structural adjustment

A common theme across past reviews is that attempts by governments to address structural adjustment can backfire (Aither 2014; McColl and Young 2005). Those reviews also agree that autonomous adjustment should be allowed to run its course wherever possible. Doing so allows market signals to incentivise change, encourages self-reliance and it often delivers the most efficient and equitable outcomes. Indirect assistance (such as that delivered through the welfare system) also appears to be an important factor in supporting adjustment.

There can be a case for direct government assistance to those individuals and communities severely affected by structural change (including that caused by water reform). But it cannot be assumed that an individual or community will be severely and adversely affected by water reform. The MDBA (2016b) has found that water recovery generally has a greater effect on smaller, irrigation-dependent communities compared to larger, more diverse communities. The MDBA also found that the effects will vary from community to community.

In implementing structural adjustment assistance, governments need to recognise that regional communities are being shaped by factors other than, or in addition to, the availability of water and the resultant impact on irrigated agriculture. These factors include (but are not limited to) the long-term trend of productivity improvements in the agricultural sector (and associated consolidation of regional townships and centres) and the slowing of the mining investment boom (PC 2017). Accounting for such factors is more likely to deliver effective assistance strategies compared with a singular focus on the impact of water reform. The Commission's initial report for the *Transitioning Regional Economies* study (PC 2017) provides some guidance for governments in this regard, as will the study's final report due in December 2017.

A community focused approach requires governments to have a good understanding of communities and the factors shaping them. Community consultation (section 8.3) will be a critical part of building this understanding.

Monitoring and evaluation is an essential (if often overlooked) part of the adjustment assistance process. Without an understanding of the outcomes of past assistance initiatives, and what drove those outcomes, it is difficult to improve future initiatives. Evaluation information is also useful for community consultation as it allows stakeholders to have more informed input into the decision making process. Finally, project evaluations serve an important transparency and accountability function that can deter future poor decisions on structural adjustment assistance.

DRAFT RECOMMENDATION 8.2

Where Governments consider there are significant and rapid adjustment issues affecting communities as a consequence of water reform, the response should:

- a. avoid industry assistance and subsidies
- b. consider all the factors impacting on the community (not just water reform)
- c. target investment to developing the capacity of the community to deal with the impacts of structural adjustment
- d. be subject to monitoring and publicly reported evaluation of outcomes.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendations 8.2 (a) to 8.2 (d).

9 Progressing reform

Key points

- The Commission has found considerable scope to improve the efficiency of water resource management and service provision in Australia through policy, regulatory and institutional reform. Some of the Commission's draft recommendations relate to 'unfinished business' under the National Water Initiative (NWI) and others represent new reform proposals.
- The reform proposals contained in this draft report will equip Australia to meet the challenges facing the water sector that have emerged or intensified over recent years. These challenges include maintaining water security in the face of population growth, climate change and changing community expectations.
- Governments should take action to complete unfinished business under the NWI without delay. Individual governments can, and should, also progress new reform proposals through independent action, but better outcomes will be achieved if these efforts are complemented by a renewed NWI.
- To build on the strengths of the current agreement, a renewed NWI should:
 - maintain the key foundations of water management
 - include revisions to policy settings in a number of areas
 - include significant enhancements for urban water, environmental management and irrigation infrastructure investment.
- Australian, State and Territory Governments should negotiate a renewed NWI through COAG by 2020.
- Parties to the NWI should consider developing the NWI as a twelve year work program with reviews at the mid-point and at the end. They could include a six year work program as a schedule to the renewed NWI, which would be revised and updated at the mid-term to cover the remaining six years. Triennial assessment of progress against reform commitments and work programs should continue under a renewed NWI.
- In developing a renewed NWI, Australian, State and Territory Governments should consult closely with relevant stakeholders, including establishing an Indigenous working group to provide advice on the development of provisions for Indigenous economic development and cultural benefits.
- Implementing the Commission's reform recommendations is not contingent on, and should not be held up by, the development of a renewed NWI.

This report sets out a series of draft recommendations that are designed to benefit the community by improving the management of water resources and the provision of urban and irrigation water services in Australia. This chapter considers how these reforms should be progressed, including the role that a renewed National Water Initiative (NWI) should play.

9.1 Further reform is needed

The NWI has served Australia well and is widely regarded as a successful reform initiative, both within Australia and internationally. It has spurred difficult and lasting reform across all parts of the Australian water sector, and the large majority of outcomes and actions outlined in the NWI have been achieved. The reforms pursued under the NWI have benefited water users and the broader community through more secure water rights, more open water markets, improved environmental outcomes (relative to what would have occurred otherwise) and improved water services. Due to the NWI, and other national, State and Territory reform processes, the foundations for sustainable water resource management and efficient water delivery are in place.

Notwithstanding the progress that has been made, the Commission's view is that further policy, regulatory and institutional reforms are needed to improve the efficiency of water resource management, and urban and irrigation water service provision throughout Australia. Some of the draft recommendations in this report relate to 'unfinished business' from the NWI. That is, outcomes and actions that have not yet been met by one or more jurisdiction, but remain relevant and worthwhile. For example, legislative reform is needed in Western Australia and the Northern Territory to support statutory water access entitlement and planning arrangements that provide for water access entitlements that are long term, not tied to land, and tradeable.

Other draft recommendations go beyond what is in the NWI. Many of these encapsulate lessons that have been learnt since the NWI was introduced. While the NWI was developed during the beginnings of the Millennium Drought, this was before the worst effects of the prolonged period of water scarcity had set in. In some respects, the experience of the Millennium Drought reinforced the importance of the reforms contained in the NWI. For example, the value of further developing water markets was highlighted by the critical role that water trading played in giving irrigators greater flexibility to respond to reduced water availability. In other cases, this experience revealed some gaps and limitations in the NWI. For example, the NWI contains little guidance on roles and responsibilities for decisions on augmenting urban water supplies, and lack of clarity about this contributed to inefficient investments in the 2000s.

More broadly, the reform proposals contained in this report would better equip Australia to successfully meet the challenges facing the water sector that have emerged or intensified over recent years. As discussed in chapter 2, these challenges include the following.

- Population growth and urbanisation — by 2050, there is expected to be an additional 8.3 to 13.3 million people living in Australia's capital cities (ABS 2013b) and the

Australian population is expected to be between 34.3 and 41.9 million people (ABS 2013).

- Climate change — rainfall and runoff have already declined in some regions and CSIRO projections are for future decreases in runoff in south-western Western Australia and southern South Australia and in far south-eastern Australia. There is also expected to be an increase in the frequency of extreme droughts (CSIRO 2015).
- Changing community expectations — the Millennium Drought highlighted the social dependence of both metropolitan and regional communities on water and water environments when many of these environments dried up and the related services ceased. As a result, there is now far more appreciation of the contribution that water management and water environments can make to amenity, liveability, recreation and regional tourism, and a greater expectation that these will not be lost again in the future.

Taken together these challenges mean that water managers will have to manage a potentially reducing water resource in key parts of Australia to meet the demands of a rapidly increasing population for a wider range of water services.

9.2 There are advantages in taking a national approach

Some of the Commission’s draft recommendations relate to unfinished business from the NWI — these are government commitments made over a decade ago that are yet to be implemented. The governments concerned should take action to complete this unfinished business without delay.

There are a number of ways to progress the draft recommendations that go beyond what is in the NWI. They could be progressed through independent action by each government, a renewed NWI or some combination of the two. Bilateral agreements could also play a role as could research collaboration and regulatory information sharing. In deciding on the best approach, the arguments for and against the different approaches need to be weighed up.

Arguments for progressing reform based on independent action include:

- water is a State and Territory responsibility and the benefits of reform will predominately accrue to the people within each jurisdiction
- it would take time and resources to negotiate a renewed national agreement
- as with any agreement requiring the consent of multiple parties, there is a risk that commitments under a renewed NWI would be set at ‘the lowest common denominator’, or not be well aligned with the specific circumstances of individual parties
- national reform can lead to a loss of ‘competitive federalism’ — that is, the incentive for States and Territories to compete to achieve the best water management arrangements at the lowest cost.

On the other hand, experience with the NWI has shown that taking an agreed national approach can:

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- promote an ongoing national dialogue between government leaders on an issue of national importance and demonstrate commitment on issues of national importance
 - provide a clear, coherent and credible blueprint for water reform that outlines the goals and outcomes for reform, which encourages accountability
 - enable lessons learned from developing water resources to be applied to other areas, to avoid past mistakes being repeated
 - allow best practice approaches to be developed and applied across all jurisdictions (this is particularly relevant in areas, such as water entitlements, where there is a broad consensus on best practice backed by comprehensive literature, research and experience)
 - establish supporting structures and forums where water managers across the country can share information and experience and develop further detailed policies.

In addition, since the NWI was agreed, a range of national strategies and sets of principles have been developed (such as the National Urban Water Planning Principles), and taking a national approach to future water reform would allow these elements to be consolidated.

Taking all of these factors into account, it is the Commission's view that, while independent action is important, better outcomes will be achieved if it is complemented by renewing the NWI. Moreover, continuing with a national approach would allow governments to capitalise on the considerable good will and buy-in associated with the NWI.

Much of the NWI's success can be attributed to the design and implementation of the agreement itself. The objectives, outcomes and actions are generally clear and measurable, and progress against them has been independently monitored and scrutinised on a regular basis (first by the National Water Commission and now by the Productivity Commission), holding governments publicly accountable. The agreement is not overly prescriptive, providing jurisdictions with sufficient flexibility to progress reform in least-cost ways, given local conditions.

Progressing new reforms through a renewed NWI would preserve and build on these strengths. It would also assist with maintaining the foundations for sustainable water resource management and efficient water delivery. Renewing the NWI would ensure existing reform commitments remain on the agenda, while providing an opportunity for new reforms to gain traction (and outdated provisions to be removed). As such, the NWI could continue to provide relevant and contemporary national reform direction for the next decade or more.

Given this, the Commission considers that Australian, State and Territory Governments should recommit to a revised and enhanced NWI.

9.3 Maintaining, revising and enhancing the NWI

To build on the strengths of the current agreement, a renewed NWI should:

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- maintain the key foundations of water management
 - include revisions to policy settings in a number of areas to deal with contemporary issues
 - include significant enhancements in the areas of environmental management, urban water and irrigation infrastructure investment.

Maintaining the key foundations

The overarching objective of the NWI — to ensure that ‘a nationally-compatible, market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes’ is in place — still remains broadly relevant as the overarching objective for pursuing reform today. Given this, the NWI needs to be renewed, not rewritten.

Many of the objectives and outcomes, and some actions, remain relevant and should be explicitly retained in a renewed NWI because they provide the key foundations underpinning sustainable water resource management and efficient infrastructure service delivery in Australia. Recommitting to these foundational elements would help ensure that key achievements in areas such as water entitlements and planning, water markets, water accounting, and water pricing and governance are maintained. The Commission also recognises that water sector policy has been enabled by a strong commitment to community and stakeholder engagement, and knowledge and capacity building in all areas of water management. This will need to be maintained to deliver on the new priorities for reform.

Revising policy settings

The Commission proposes that some elements of the NWI be revised to deal with contemporary issues. The water entitlements and planning element of the NWI should be revised to:

- ensure that water entitlement and planning arrangements explicitly incorporate extractive industries (draft recommendation 3.1b)
- provide contemporary guidance on water planning to underpin second and third generation water plans, by:
 - specifying a process to regularly assess the impact of climate change on water resources (draft recommendation 3.1c)
 - providing guidance on water plan reviews aimed at allowing optimisation of water use and system operation across all users (draft recommendation 3.1d)
- ensure that entitlement frameworks can include alternative water sources, such as stormwater, wastewater, and managed aquifer recharge (draft recommendation 3.1e).

Revisions should also be made to more fully recognise the water requirements of Indigenous people, taking into account the distinction between the provision of water for cultural

purposes and for economic development. A renewed NWI should include commitments relating to the way that State and Territory Governments provide access to water for economic development for Indigenous people. Specifically, they should:

- source water in a direct, efficient and transparent way, such as by purchasing it on the market or as part of a transparent process for releasing unallocated water (draft recommendation 3.3a)
- ensure adequate supporting arrangements are in place to enable Indigenous communities to maximise the value of the resource (draft recommendation 3.3b)
- involve Indigenous communities in program design (draft recommendation 3.3c)
- ensure future governance arrangements are specified and implemented (draft recommendation 3.3d).

Currently, it is an objective of the NWI to establish open water trading markets and, to this end, trade restrictions designed to protect production, water infrastructure utilisation or employment in particular locations or industries are not permitted. The commitment to open markets should be strengthened through a commitment to remove policies and other barriers that prevent water being traded, or otherwise transferred, between the irrigation and urban sectors (draft recommendation 4.1a).

Finally, a renewed NWI should specify that where governments respond to adjustment issues arising from the recovery of water for the environment, this response should avoid industry assistance and subsidies and should consider all factors impacting on the community (draft recommendation 8.2).

Enhancing key elements

The Commission's view is that there are three key areas where the NWI will need significant policy enhancements to ensure that the Australian water sector can deal with the challenges of the future.

Urban water

The urban water provisions of the NWI should be enhanced in light of the pressures on urban water supplies as a result of population growth and increased urbanisation, climate change, and community expectations for improved amenity and liveability of cities.

A renewed NWI should reflect the need for State and Territory Governments to:

- have clear supply augmentation planning arrangements and decision-making processes in place to support efficient investment decisions. Roles and responsibilities should be clearly allocated, all supply options transparently considered and processes should be adaptive in response to new information (draft recommendation 6.3).

-
- ensure that integrated water cycle management (IWCM) approaches are considered on an equal footing alongside other water supply and management approaches. IWCM plans should be developed for major growth corridors and infill developments and the role developer charges play in planning for new developments should be reviewed (draft recommendation 6.4).

Environmental management

At the time the NWI was developed the focus was on establishing the environment as a legitimate water user and providing water for the environment, including by recovering water in overallocated systems. Much of this has occurred, with environmental water managers now holding significant volumes of entitlements in some states. Given this, the focus needs to shift to managing this water to get the best possible environmental outcomes and where possible, provide additional community and cultural outcomes. A national approach to improving areas such as the integration of water and waterway management, institutional arrangements for managing held (or ‘entitlement-based’) environmental water and adaptive management has the potential to assist with this.

A renewed NWI should reflect the need for:

- State and Territory Governments to better integrate the management of environmental flows with complementary waterway management at the local level, including by making objectives consistent and coordinating planning processes (draft recommendation 5.2)
- Australian and New South Wales Governments to review current governance arrangements for held environmental water with a view to ensuring holdings are managed independently and at arm’s length from governments (draft recommendation 5.3)
- Australian, State and Territory Governments to devolve the use of held environmental water to the lowest practical level (draft recommendation 5.5)
- Australian, State and Territory Governments to improve monitoring, evaluation, auditing and reporting for environmental water. Managers of held environmental water should use the results of monitoring, evaluation and research consistently and explicitly to improve water use as part of an adaptive management cycle (draft recommendation 5.6e).

New infrastructure investment

The Australian Government currently has over \$4 billion available in grants and loans for irrigation infrastructure projects and money is also available from the states. There is an opportunity to enhance the NWI in ways that will make it more likely that those projects that proceed are environmentally sustainable and financially viable.

Through a renewed NWI, Australian, State and Territory Governments should agree that the role of governments in new irrigation infrastructure should be to deliver cost-reflective

pricing, independent assurance of project viability, investor confidence and environmental sustainability. Specifically, as set out in draft recommendation 7.3:

- NWI-consistent entitlement and planning frameworks should be in place before any new infrastructure is considered.
- Government grant funding should be limited to those projects, or parts of projects, that deliver a public good. Any grant funding should be subject to an open and independent analysis of the project's environmental sustainability and economically viable.
- Government financing for infrastructure generating private benefits should only be provided after:
 - an independent assessment has confirmed that the finance can be repaid on commercial terms
 - robust arrangements are in place to deliver merit-based decision-making and monitoring of the government's investment
 - sufficient water entitlements have been sold to provide assurance that that the finance will be repaid.

DRAFT RECOMMENDATION 9.1

Australian, State and Territory Governments should recommit to a renewed National Water Initiative through COAG by 2020. This should:

- a. maintain the achievements in water entitlements and planning, water markets, water accounting, water pricing and governance, knowledge and capacity building, and community engagement delivered by the current National Water Initiative as the key foundations underpinning sustainable water resource management and efficient infrastructure service delivery
- b. revise a number of policy settings:
 - ... incorporating extractive industries and alternative water sources into water entitlement frameworks
 - ... water planning to take account of climate change and enable ongoing optimisation
 - ... Indigenous access to water for economic purposes
 - ... arrangements for water trading between irrigation and urban sectors
 - ... better targeted adjustment assistance
- c. significantly enhance policy settings relating to:
 - ... urban water management to ensure innovative and efficient provision of services in the future under the combined pressures of population growth and climate change
 - ... environmental water management to ensure maximum return on government investment in this area
 - ... decision making on building and supporting new infrastructure for agriculture.

In addition to the areas discussed above, in developing a renewed NWI, attention should be given to updating commitments relating to:

- the key supporting element of knowledge and capacity building
- ongoing audit and assessment of progress.

Ongoing research and capacity building will be central to the ability of Australian, State and Territory Governments to deliver on the priorities for reform identified in this report. In developing a renewed NWI, key research and capacity building priorities should be identified and included (as was done for the priorities that existed in 2004). Thought should also be given to mechanisms through which the jurisdictions can work co-operatively and share knowledge to build overall capability and capacity (draft recommendation 8.1).

The NWI assigned the role of periodically assessing progress with the NWI to the National Water Commission. The *Water Act 2007* (Cwlth) now assigns this role to the Productivity Commission. Ongoing audit and assessment of progress against reform commitments is critical for holding governments to account and driving reform efforts. Triennial assessment of progress against reform commitments and work programs should continue under a renewed NWI.

In addition, the Commission suggests that the NWI could be structured as a twelve year program with reviews at the mid-point and at the end. Parties to the NWI could include a six year work program as a schedule to the renewed NWI at the outset, which would be revised and updated at the mid-term review to cover the remaining six years. This would enable the NWI to remain up-to-date throughout the period.

9.4 Negotiating a renewed NWI

The Commission has identified areas of the NWI that should be revised and enhanced to embed a range of reform proposals set out in this draft report. However, it is ultimately for NWI parties to negotiate and draft revised reform commitments — including objectives, outcomes and actions in detail.

While water management is the business of the States and Territories, it is also an issue of significant national interest. As such, COAG — the members of which include the Prime Minister, and state and territory First Ministers — is likely to be the most appropriate forum through which the Intergovernmental Agreement for the NWI is renewed.

In developing a renewed NWI, Australian, State and Territory Governments should consult with relevant stakeholders, including by establishing an Indigenous working group to provide advice on the development of provisions for Indigenous economic development and cultural benefits.

As the vast majority of the expected benefits of water reform will accrue to the states and territories, it is generally not necessary (or efficient) to use Australian Government funds to

increase the incentive for reform. However, the Australian Government does have a role in providing leadership on national water reform, and assisting coordination of policy efforts (as well as facilitating co-operative management of cross-jurisdictional water resources). In this context, there may be a case for the Australian Government to provide funding support toward activities that encourage and facilitate reform in areas of national interest — for example, by funding pilot programs of IWCM approaches (supporting more liveable cities), or building the capability of States and Territories to fulfil Indigenous water commitments through skills development and knowledge sharing.

Using Australian Government funds in these ways has the potential to accelerate reform, but also has costs, not least of which is the opportunity cost of any funds provided. The Commission intends to consider the case for Australian Government support of this kind more fully ahead of the final report.

The next inquiry into progress towards achieving the objectives and outcomes of the NWI is scheduled to take place in 2020. The Commission considers that this provides a reasonable timeframe within which a renewed NWI could be developed. However, implementing the Commission’s reform recommendations is not contingent on, and should not be held up by, the development of a renewed NWI. In 2020, the Commission will assess progress against all of the recommendations set out in its final inquiry report (due in December 2017), regardless of whether a renewed NWI is developed.

DRAFT RECOMMENDATION 9.2

In developing the renewed National Water Initiative, Australian, State and Territory Governments should:

- a. consult with relevant stakeholders, including by establishing an Indigenous working group to provide advice on the development of relevant provisions
- b. ensure that progress with implementing a renewed National Water Initiative continues to be independently monitored and reported on every three years.

A Inquiry conduct and participants

This appendix describes the stakeholder consultation process undertaken for the inquiry and lists the organisations and individuals that have participated.

The terms of reference for the inquiry — reproduced in the preliminary pages of this report — was received from the Treasurer on 1 February 2017. An initial circular advertising the inquiry was distributed to industry organisations and individuals and the inquiry was advertised in national newspapers.

The Commission received 83 public submissions (table A.1) prior to the release of this draft report. All public submissions are available on the inquiry website.

In addition, the Commission held separate discussions with businesses, business groups, academics, government agencies and individuals (table A.2), as well as a roundtable and workshops (table A.3). The Indigenous roundtable discussion was organised with the assistance of Phil Duncan (a member on the Stakeholder Working Group).

In accordance with section 89 of the *Water Act 2007*, the Commission has established a stakeholder working group. The stakeholder working group (SWG) is an important avenue for consultation. It provides a forum to exchange information and views on issues relevant to this inquiry. The SWG members are listed in table A.4. The SWG held the first meeting on 23 February 2017 and the next on 23 May 2017.

The following public documents have been prepared by the Commission so far in this inquiry:

- Issues paper — released 18 April 2017
- Draft report — released 15 September 2017

The inquiry final report will be provided to Government by the 31 December 2017 and is to be released publicly within 25 parliamentary sitting days from that date.

The Commission welcomes further contributions to the inquiry from interested individuals or groups. Public hearings will be held in Canberra, Sydney, Brisbane, Melbourne and Perth (details in Preliminaries).

Submissions and comments on this draft report close on 19 October 2017. Further details on registering for hearings and making submissions can be found on the inquiry website.

Table A.1 Public submissions received

<i>Participant</i>	<i>Submission no.</i>
Energy and Water Ombudsman	1
Strategic Environmental Solutions	2
Environment Victoria	3
Sarah Moles	4
Bureau of Meteorology	5
Drs Emma Carmody, Janice Gray, Bruce Lindsay, Liz Macpherson, Rebecca Nelson, Lily O'Neill, Kate Owens, Darren Sinclair, Professors' Barbara Cosens, Alex Gardner, Lee Godden, Associate Professor Cameron Holley, Erin O'Donnell	6
UNSW School of Civil and Environment Engineering	7
CSIRO	8
Institute for Land Water and Society Charles Sturt University	9
Bruce Walker and Robyn Grey-Gardner	10
Irrigation Australia Limited	11
Sustainable Population Australia	12
National Irrigators' Council	13
Madjulla Association	14
WWF Australia	15
Murray Irrigation	16
Inland Rivers Network	17
IPART	18
Infrastructure Partnerships Australia	19
Australian Academy of Technology and Engineering	20
Triple BL Legal	21
Eastern Metropolitan Regional Council	22
University of Melbourne, School of Engineering	23
NRM Regions Australia	24
Southern Riverina Irrigators	25
Dr Katie O'Bryan	26
Soils for Life	27
Australian Competition and Consumer Commission	28
Stormwater Australia	29
Brian Bycroft	30
Nature Conservation Council of NSW	31
SunWater Limited	32
Lachlan Valley Water Inc	33
Engineers Australia	34
Water Services Association of Australia	35
Sydney Water	36
Federation of Victorian Traditional Owner Corporations	37
Sustainable Business Australia	38
John Pettigrew	39
Wentworth Group	40
qldwater	41

(continued next page)

Table A.1 (continued)

<i>Participant</i>	<i>Submission no.</i>
NSW Irrigators' Council	42
The City of Newcastle	43
Flow	44
Queensland Government	45
Coleambally Irrigation Cooperative Limited	46
VicWater	47
Alison Walpole	48
Alistair Watson	49
Infrastructure Australia	50
Monash Sustainable Development Institute	51
Cairns Regional Council	52
Ricegrowers' Association of Australia	53
Urban Water Cycle Solutions	54
National Farmers' Federation	55
Victorian Association of Forest Industries	56
Department of Primary Industries, Parks, Water & Environment (Tasmania)	57
Macquarie River Food and Fibre	58
ACT Government	59
Murray Lower Darling Rivers Indigenous Nations	60
Queensland Farmers' Federation	61
Northern Australia Environmental Resources Hub	62
Commonwealth Environmental Water Holder	63
EDOs of Australia	64
Business Council of Australia	65
Australian Water Association	66
National Health and Medical Research Council	67
Living Utilities	68
National Environmental Law Association	69
Central NSW Councils	70
Local Government Association of Queensland	71
Local Government NSW and the Water Directorate	72
Department of Agriculture and Water Resources	73
Institute of Sustainable Futures	74
Rainwater Harvesting Association of Australia	75
Australian Forest Products Association	76
Jim Galletly	77; 78; 79
Western Australian Government	80
Murray-Darling Basin Authority	81
Alison Joseph	82
University of Melbourne	83

Table A.2 **Consultations**

ACT Government - Environment and Planning Directorate
AgForce
Aither
Australian Bureau of Agricultural and Resource Economics and Sciences
Australian Bureau of Statistics
Australian Competition and Consumer Commission
Australian Conservation Foundation
Australian Petroleum Production and Exploration Association
Australian Water Brokers Association
Australian Water Association
Bundaberg Regional Irrigators Group
Bureau of Meteorology
Centre for Global Food and Resources – University of Adelaide
Coleambally Irrigation Limited
Commonwealth Environmental Water Office
CSIRO
Department of Agriculture and Water Resources
Department of Environment
Department of Environment, Land, Water and Planning (Victoria)
Department of Industry, Innovation and Science
Department of Primary Industries, Water (New South Wales)
Economic Regulation Authority
Engineers Australia
Environmental Defenders Office of New South Wales
Essential Services Commission
Essential Services Commission of South Australia
Frontier Economics
Grafton, Quentin
Harvey Water
Horne, Avril – University of Melbourne
Infrastructure Australia
Inside Infrastructure
IPART
Jackson, Sue – Griffith University
Local Government Association of Queensland
Lower Murray Water
Macquarie Franklin
Maywald, Karlene
Minerals Council of Australia
Murray-Darling Basin Authority
National Farmers' Federation
National Irrigators' Council

(continued next page)

Table A.2 (continued)

Northern Australia Development Office
NRM North
NRM Regions Australia
NSW Natural Resources Commission
NSW Office of Environment and Heritage
NSW Treasury
NT Cattlemen's Association
NT Department of Environment and Natural Resources
NT Department of Land Resource Management
NT Department of the Chief Minister
NT Farmers' Federation
NT Power and Water Corporation
O'Donnell, Erin, University of Melbourne
Office of Northern Australia
qldwater
Queensland Competition Authority
Queensland Department of Energy and Water Supply
Queensland Department of Natural Resources and Mines
Queensland Farmers Federation
Queensland Productivity Commission
Queensland Urban Utilities
Department of Environment, Water and Natural Resources (South Australia)
SAWater
Sapere Research Group
Schirmer, Jacki – University of Canberra, Health Research Institute
Schott, Kerry
SunWater
Synergies Economic Consulting
Riverina Local Land Services
Tasmanian Department of Primary Industries, Parks, Water and Environment
Tasmanian Irrigation
TasWater
University of South Australia
Urban WaterCycle Solutions
Victorian Environmental Water Holder
VicWater
Department of Water (Western Australia)
WA Farmers
WaterNSW
WA Water Corporation
Water Services Association of Australia
Water West

Table A.3 Workshops and Roundtables

20 June 2017 – Liveability Workshop

Cooperative Research Centre for Water Sensitive Cities	Ben Furrage
Cooperative Research Centre for Water Sensitive Cities	Jamie Ewert
Cooperative Research Centre for Water Sensitive Cities	Lara Werbeloff
Institute for Sustainable Futures	Joanne Chong
Melbourne Water	Rob Considine
Monash SDI and Melbourne Water	John Thwaites
Monash Sustainable Development Institute	Rob Skinner
Sydney Water	Kathryn Silvester
Sydney Water	Emma Pryor
Water Services Association of Australia	Stuart Wilson
Yarra Valley Water	Grace Rose-Miller
Yarra Valley Water/ Water Services Association of Australia	Pat McCafferty

10 July 2017 – Indigenous Roundtable

Brad Moggridge
Jason King
Joe Morrison
Murray Radcliffe (Northern Land Council)
Phil Duncan

11 July 2017 – Regional Workshop

Balmoral Group Australia	Grant Leslie
Cairns Regional Council	Graham O'Byrne
Dubbo Shire Council, Lower Macquarie Water Utilities Alliance	Stewart McLeod
Local Government Association of Queensland	Arron Hieatt
Local Government NSW	Shaun McBride
North Burnett Regional Council	Trevor Harvey
NSW Water Directorate	Gary Mitchell
Parkes Shire Council, Centroc Alliance	Andrew Francis
qldwater	Rob Fearon
TasWater	Mike Brewster
Western Water	Neil Brennan

Table A.4 Stakeholder Working Group members

Australian Conservation Foundation
Australian Local Government Association
Australian Network of Environmental Defenders Offices
Australian Petroleum Production and Exploration Association
Australian Water Association
Australian Water Brokers Association
Minerals Council of Australia
National Farmers' Federation
National Irrigators' Council
Phil Duncan, Traditional Owner, Gomeroi Nations
Water Services Association of Australia.

B Assessment of progress

This appendix assesses jurisdictions' progress towards achieving the objectives and outcomes of the National Water Initiative (NWI). In particular, the appendix:

- broadly describes the actions jurisdictions agreed to under the NWI and subsequent agreements, and the extent they have completed these actions
- provides the Commission's view on the extent that current progress in water reform is meeting the outcomes and objectives of the NWI and identifies specific areas for further policy development.

The assessment of progress is structured around the eight elements of the NWI.

- Water Access Entitlements and Planning Framework (section B.1)
- Water Markets and Trading (section B.2)
- Best Practice Water Pricing and Institutional Arrangements (section B.3)
- Integrated Management of Water for Environmental and Other Public Benefit Outcomes (section B.4)
- Water Resource Accounting (section B.5)
- Urban Water Reform (section B.6)
- Knowledge and Capacity Building (section B.7)
- Community Partnerships and Adjustment (section B.8).

In many areas the NWI sets out precise actions, objectives and outcomes that can be objectively assessed against the facts. For example, 'States and Territories will prepare water plans along the lines of the characteristics and components at Schedule E'.⁶⁵ In other areas, the assessment of progress has presented some challenges as the NWI requirements are qualified in some way (such as 'where practicable') or are ongoing in nature (and so will never be achieved). In these instances, the Commission has had to define what it considers the main conditions for meeting the NWI requirements. The terminology for the Commission's assessment of progress is set out in box B.1.

⁶⁵ NWI Paragraph 39.

Box B.1 Assessment of progress ratings

The Commission has adopted the following terminology to indicate progress in meeting the outcomes and objectives of the NWI in different areas of water reform:

- **Achieved:** All requirements to achieve the relevant outcomes and objectives of the NWI have been met.
- **Largely achieved:** Requirements to achieve the relevant outcomes and objectives of the NWI have generally been met, with some exceptions (for example, there is one or two non-compliant jurisdictions or reforms do not extend to all water users or sectors).
- **Partially achieved:** 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, such as public reporting).
- **Not achieved:** None of the requirements to achieve the relevant outcomes and objectives of the NWI have been met.

Some requirements in the NWI are one-off actions (such as removing legislative barriers to water markets) while others require ongoing effort (such as monitoring). Hence, 'achieved' does not indicate that no further action is required in the future.

Information and data sources

To inform the assessment of progress, the Commission collated publicly-available information on current arrangements and key developments in each jurisdiction since 2014. The Commission also conducted a series of initial consultations with NWI parties and sent them information requests in late April 2017 to confirm key developments since the 2014 assessment and to fill information gaps. The Commission followed up with NWI parties for updates on specific matters as needed. Unless otherwise indicated, factual information presented in this appendix draws on NWI parties' responses to the Commission's information requests and subsequent correspondence. The Commission's assessment of progress draws on various other sources including academic and policy papers, input from the stakeholder working group, roundtables, and submissions to this inquiry.

Overview of progress

Most jurisdictions have made good progress in meeting the objectives and outcomes of the NWI. A summary of progress with reform is in table B.1.

Table B.1 Summary of progress

1. Water access entitlements and planning frameworks

- All jurisdictions, except Western Australia and the Northern Territory, have created statutory-based, clear and secure long-term water rights for consumptive uses.
- Water planning arrangements have been established for the majority of areas of intensive water use across Australia. Most jurisdictions have more than 80 per cent of water use managed under water plans. This means the sharing of water resources between consumptive uses and the environment has been established in consultative processes, informed by scientific and other assessments.

2. Water markets and trading

- Water markets have been established that have allowed water to be traded to higher value uses and other steps have been taken to improve the efficiency of water markets, most notably in the MDB.

3. Best practice water pricing and institutional arrangements

- Urban service providers are generally pricing at the levels required by the NWI, despite some instances of underpricing.
- Independent economic regulators set prices or revenues for major urban water suppliers in New South Wales, Victoria, South Australia, Tasmania and the ACT. Western Australia, the Northern Territory, Queensland and regional New South Wales are exceptions in various forms.
- Cost-reflective pricing outcomes are generally being achieved for most *existing* irrigation infrastructure, but *new* irrigation infrastructure has tended to be underpriced. Queensland, Western Australia and Tasmania could make better use of economic regulation.
- There is inconsistent recovery of water planning and management costs from users across Australia.

4. Integrated management of water for environmental and other public benefit outcomes

- Environmental sustainability has been supported by formal provisions of water for the environment and progress has been made on rebalancing overallocated systems.
- All jurisdictions have managers with responsibility for environmental flows, and some arrangements are in place to coordinate water use in shared resources.

5. Water resource accounting

- Water metering, accounting and compliance systems are in place in all jurisdictions.

6. Urban water reform

- Water reuse, water use efficiency, water sensitive urban design and innovation has improved since the introduction of the NWI.
- Jurisdictions have taken action to address water quality issues, with some evidence of success.

7. Knowledge and capacity building

- There have been advances in knowledge and capacity across areas identified in the NWI.

8. Community partnerships and adjustment

- All jurisdictions have set in legislation, or policy, minimum requirements for stakeholder engagement and consultation when developing and reviewing water plans.
 - State and Territory Governments have delivered improved decision making through open and timely consultation with stakeholders. This has been supported by the publication of supporting information at key decision points.
-

B.1 Water access entitlements and planning frameworks

This section assesses progress against outcomes and objectives of the NWI related to water access entitlements and planning frameworks. It uses the following headings:

- water access entitlements
- water planning
- environmental and other public benefit outcomes
- addressing overallocated and overused systems
- assigning risks for changes in allocation
- Indigenous access
- interception
- integrating surface water and groundwater management.

Water access entitlements

Under the NWI, parties agreed that entitlements and planning frameworks would provide for statutory-based entitlements to create secure property rights to water. The NWI requires that water access entitlements be separate (‘unbundled’) from land, exclusive, mortgageable, tradeable, and defined as a perpetual or open-ended right to a share of the water available for consumption in a given system.⁶⁶

Progress to date

All States and Territories (other than Western Australia and the Northern Territory) have enacted legislation required to create secure, NWI-consistent water access entitlements (NWC 2014c). However, the extent to which jurisdictions have implemented NWI-consistent entitlements varies across States, regions and types of water source.

- Surface water rights in regulated surface water systems are generally unbundled from land. New South Wales, Victoria, Queensland and South Australia have also unbundled water rights into tradeable water access and delivery components (ACCC 2017).
- Water rights in groundwater and some unregulated surface water systems often remain tied to land. For example, apart from the Southern Basin and Musgrave Prescribed Wells area on Eyre Peninsula, groundwater rights in South Australia are still bundled, with a water licence that includes a volumetric allocation and conditions for take from specific sources and use on specific land parcels (though, as discussed below, there has been some recent progress in this area).

⁶⁶ NWI Paragraph 25, 28-34.

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- In some cases, water rights are defined for a limited term, rather than as a perpetual or open ended share of the consumptive pool. For example, entitlements in the Northern Territory and Western Australia are commonly issued for 10 years at a time.
 - In some cases, entitlement systems do not cover major water uses. For example, mining and petroleum operations in the Northern Territory are exempt from entitlement requirements under the *Water Act 1992* (NT) (the Northern Territory Government has announced that that it intends to remove these exemptions; however, the required amendments have not yet been passed).

In Western Australia and the Northern Territory, Governments have adopted a licensing policy of ‘use it or lose it’. These policies require entitlement holders to use their water allocation over a specified period, or the entitlement can be reduced or forfeited (NWC 2014c; Responses to State and Territory information requests; Western Australian Government 2003).

Developments since 2014

Since the 2014 NWI assessment, Western Australia has further developed and consulted on a proposed water reform framework that provides for statutory water plans and allocation limits. The framework also provides for the introduction of perpetual and tradeable water access entitlements in areas covered by statutory water plans. In February 2015, the (former) Western Australian Government approved drafting of the *Water Resources Management Bill* to implement the proposed framework. Following a change of government in Western Australia in March 2017, the new government is currently considering progressing new water resources legislation, of which statutory plans are a component. A Bill to implement reforms is not yet in place.

Several jurisdictions have also taken steps to extend the coverage of unbundled entitlements, including for unregulated surface water and groundwater systems.

- In New South Wales, the 11 new coastal water sharing plans that commenced since 1 July 2016 mean water sharing plans now almost cover the entire State. Upon commencement of water sharing plans, water licences held under the *Water Act 1912* (NSW) are converted to water access licences under the *Water Management Act 2000* (NSW), which separates water licences from land tenure, provides perpetual ownership of water licences and facilitates trades (NWC 2014c).⁶⁷
- In Victoria, the Government’s 2016 *Water for Victoria* plan includes an action to investigate the merits of converting take and use licences in unregulated surface water and groundwater systems into water shares and other related products (by the end of 2017) (DELWP (Vic) 2016). Victoria advised that it is on track to complete this action on time.

⁶⁷ New South Wales also introduced legislative changes to increase certainty for holders of regulated river supplementary licences by making these licences perpetual and establishing rights to compensation.

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- In Queensland, the Government has converted water licences to unbundled, tradeable water access entitlements⁶⁸ in the Barron, Fitzroy, Callide, Pioneer Valley, Wet Tropics, and Gowrie and Oakley Creek water plan areas, which together cover regulated and unregulated surface water systems and groundwater systems. For example, it granted 470 groundwater entitlements in the Pioneer Valley in July 2015.
 - In South Australia, the water allocation plan for the Southern Basins and Musgrave Prescribed Wells Areas (Eyre Peninsula) provides for unbundling of groundwater rights from land — a first for groundwater in South Australia. South Australia is also updating its *Policy Statement: Implementation of Unbundling Water Rights in South Australia* to identify opportunities to ensure the implementation of unbundled water rights supports quicker, simpler and more pragmatic water allocation planning.⁶⁹

Some jurisdictions have sought to remove exemptions under existing water access entitlement arrangements.

- In July 2016, the Northern Territory Government amended the Declaration of Exemptions under the Northern Territory *Water Act 1992* (NT), removing the exemption for bores pumping less than 15 L per second from licencing requirements. This means people using water through bores, other than for stock and domestic use in the Darwin Rural Water Control District, must obtain a water extraction licence. As noted, the Northern Territory Government has announced amendments to the *Water Act 1992* (NT) to require all new and increased water use by mining and petroleum activities to be subject to the licensing requirements of the *Water Act 1992* (NT) from 2018 onwards.
- In December 2016, the Queensland Government introduced legislative changes to implement a more consistent approach to managing the underground water impacts of both the mining and petroleum and gas sectors. The changes introduced a requirement for petroleum operations to obtain a water access entitlement before extracting ‘non-associated’⁷⁰ water in a regulated area. However, mining operations do not have to obtain a water access entitlement for ‘associated water’⁷¹ — the requirement to do so was removed; instead mining operations are now able to take associated water under a limited statutory right subject to ‘make good’ obligations (as applies to associated water taken by petroleum and gas operations in Queensland).

⁶⁸ A water access entitlement is referred to as a ‘water allocation’ in Queensland.

⁶⁹ The Commission understands that the Policy Statement will be updated and released once the South Australian Government has fully considered issues, such as how unbundling affects different water resources management, and identifies any opportunities for legislative change. South Australia has adopted the *Natural Resources Management (General) Variation Regulation 2015* (SA). This allows a water allocation plan to determine whether site use approvals are required, depending on the management issues in the particular water resource. This regulatory power was used to exempt licensees in the Southern Basins and Musgrave Prescribed Wells Area from requiring a site use approval.

⁷⁰ Non-associated water is underground water taken to be used for tenure related purposes. For example, water taken from a water bore.

⁷¹ Associated water is underground water taken in the course of, or as a result of, exercising underground water rights. For resource tenure holders it includes extracting water in the course of extracting petroleum or gas, and mine dewatering to the extent necessary to achieve safe operating conditions.

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- The Queensland *Water Act 2000* (Qld) also now provides a process to transition water rights that have been afforded under special agreement acts into contemporary water access entitlements under the Act.

Some recent reforms aim to streamline water licensing. For example:

- On 6 December 2016, Queensland introduced legislative changes that allow fast tracked conversion of water licences to water allocations (entitlements). New water entitlement notices are expected to enable faster conversion, granting and amending of entitlements during the water planning process because they are separate statutory instruments that are able to function independently of the development of other instruments (DNRM (Qld) 2014g). Changes also include provisions to fast track routine administrative dealings for existing water licences and allowing applicants to make multiple changes through one application (DNRM (Qld) 2014d).
- In New South Wales, Parliament passed the *Water Management Amendment Act 2014* (NSW), which included changes to simplify licensing and trading processes (DPI (NSW) 2015).

The Commission's view

The NWI sought to promote clear property rights to water by ensuring water access entitlements:

- are legally defined (statutory-based)
- are unbundled (into access, use, and delivery rights) where cost-effective
- apply to all major consumptive water uses (to the extent practical).

These features promote the integrity and efficiency of the water rights system in allocating water and help prevent arbitrary changes or attenuation of water rights.

Not all States and Territories have met their NWI commitment to enact robust statutory-based entitlements and planning frameworks — Western Australia and the Northern Territory have not enacted legislative changes to enable NWI-consistent entitlements and planning. This is a major impediment to these jurisdictions realising the intended outcomes and objectives of the NWI. However, enacting new legislation does not mean fully NWI-consistent entitlements and plans will, or have to, apply to all areas in the State. As with other jurisdictions, Western Australia and the Northern Territory can apply discretion and adopt alternative entitlement arrangements in areas where demands on the resource are limited or scientific understanding is low. However, increased competition for some water resources in both Western Australia and the Northern Territory and the prospect of further development in northern Australia mean it is imperative to progress legislative reform to enable more robust water management arrangements and establish efficient water trading markets. Such reforms would eliminate the need for 'use it or lose it' policies, which are not compatible with the NWI. For example, in fully allocated resources that support trading, buyers can purchase water on the market from willing sellers. As the market value

of entitlements or allocations increases, people not using their entitlement will have a strong financial incentive to either use the water or sell (NWC 2011c). Chapter 3 discusses legislative reform in Western Australia and the Northern Territory in more detail.

There are some cases where extractive industries (such as mining, petroleum and unconventional gas operations) continue to access water outside of water entitlements and planning frameworks (such as mining and petroleum operations the Northern Territory and Queensland). Several participants to this inquiry expressed concerns that failure to incorporate extractive industries into water access entitlements and planning frameworks poses risks to the environment and other consumptive water users, and undermines confidence in the integrity of the entitlement system. Chapter 3 discusses incorporating extractive industries into entitlements and planning frameworks.

The issue of whether jurisdictions have made sufficient progress implementing NWI consistent entitlements (particularly in terms of the coverage of unbundled entitlements in the State) requires detailed case by case analysis. The Commission agrees with the National Water Commission's (NWC's) view that further unbundling of entitlements in unregulated surface and groundwater systems should occur where cost effective.

The Commission has not identified any major risks associated with recent efforts to streamline licensing processes in Queensland and New South Wales that would offset the benefits.

Water planning

Under the NWI, parties agreed to prepare statutory water plans for surface water and groundwater management units in which entitlements are issued. They agreed that it is up to each State to determine the need for water plans for specific areas based on an assessment of the level of development of water systems, projected future consumptive demand and the risks of not having a detailed plan. Parties also agreed on specific characteristics and components that would guide States in preparing water plans.⁷²

The NWI stipulates that, 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.⁷³ Section B.8 discusses community engagement in more detail.

Progress to date

Each State and Territory has adopted its own particular approach to water planning. For example, in most States and Territories statutory water plans are the main instrument that defines how water is shared between consumptive uses and environment. In Victoria, the

⁷² NWI Paragraphs 36 to 39, Schedule E.

⁷³ NWI Paragraph 40.

entitlement system is the main statutory basis for determining how water is shared (NWC 2012d, 2014d).

All jurisdictions have dedicated considerable resources and effort to water planning. There are over 150 water plans in place across Australia. Most jurisdictions have more than 80 per cent of water use managed under water plans (table B.2) and broadly NWI-consistent water planning arrangements had been put in place for the main areas of intensive water use (box B.2) (NWC 2012d, 2014c).

Table B.2 Coverage of water plans^a in Australia, as at June 2017

<i>Jurisdiction</i>	<i>Coverage (%)</i>	<i>Comment</i>
NSW	99	Percentage of water extractions covered by water sharing plans. ^b The NWC's 2014 assessment reported that water sharing plans covered 98 per cent of water extractions.
Vic	~90	Percentage of water extraction managed under agreed plans or equivalent statutory instruments that define how water will be shared. ^c
Qld	>90	Percentage of State covered by water plans. Lower bound estimate inferred from NWC 2011 assessment and plans completed since then (for example, the Wet Tropics Plan was finalised in 2013)
WA	>80	Percentage of total licences covered by plans. ^d In 2011, the NWC estimated water allocation plans covered 80 per cent of consumptive use.
SA	>70	Percentage of extracted water from systems managed under agreed plans.
Tas	22	Percentage of water allocated in statutory plans areas. ^e
NT	35	Percentage of licences managed under a declared plan. ^f
ACT	100	Percentage of water resources 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. ^b Provided by DPI (NSW) (estimate includes Hastings River Unregulated and Alluvial water sources, which are expected to have a new plan in late 2017). ^c Approximate figure provided by the DELWP (Vic). DELWP advised further analysis would be required to provide an exact figure. ^d Provided by DOW (WA). ^e DPIPWE (Tas) estimated approximately 377 GL is allocated in statutory plan areas and a total of 1684 GL is allocated statewide. ^f The DENR (NT) advised there are 225 groundwater extraction licences in the Territory, including 101 managed under a declared plan. There are 62 surface water licences, none of which are managed under a declared plan.

Sources: NWC (2011d, 2014c); Responses to State and Territory information requests.

Box B.2 Findings from National Water Planning Report Cards

Previous NWI assessments drew on the NWC's National Water Planning Report Cards (prepared for 2011 and 2013). The reports cards aimed to provide a consolidated summary of the progress of water planning across Australia against an evaluation framework based on key elements of the NWI and its associated Water Planning Guidelines. The purpose of the report cards was to 'facilitate a national discussion on the quality of water plans and planning frameworks, as well as identify areas of better practice and those for improvement'. Based on these report cards, the NWC identified a range of achievements in water planning. These include:

- in most cases, legislation governing water planning requires community engagement, the transparent development of water management arrangements and water plans that incorporate the best available information
- water plans draw on community input, socioeconomic analysis and scientific information to establish the size of the consumptive pool and rules for extractive and environmental use
- water plans articulate the trade-off decisions made between economic, social and environmental values
- hydrological, environmental, social and economic assessments are now undertaken routinely at the plan development stage to inform water planning arrangements
- engagement processes ensure stakeholders have the opportunity to provide informed input to planning arrangements, and this is considered in the development and review of planning objectives and arrangements to meet those objectives.
- more recent water plans generally contain clearer and more measurable objectives and there has been a marked improvement in knowledge of water system function and response.

The Commission has not sought to update the water planning report card for 2016, which covered over 150 plans across Australia and associated policy documents, and was a major undertaking in and of itself. However, it has drawn on the report cards to identify areas for improvement previously identified by the NWC and documented relevant developments since then.

Sources: NWC (2011b, 2012d, 2014d).

Developments since 2014

In the 2014 NWI assessment, the NWC found that a robust statutory-based entitlements and planning framework was in place in most jurisdictions. However, it identified some specific areas in planning where further progress was required. In particular, it found:

- many jurisdictions had plans which had not been reviewed despite being many years past their original intended life. The 2013 water planning report card highlighted delays in plan reviews in South Australia and Tasmania (NWC 2014d).
- monitoring, evaluation and reporting on progress in achieving stated social, cultural and environmental water planning objectives was rarely done well in practice. For example, the NWC highlighted that evaluation of and reporting on progress towards high level social, economic and environmental plan objectives was lacking in New South Wales (NWC 2014d).

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- while there were relatively few areas that were experiencing intensive use of water and lacked adequate water planning arrangements, governments needed to address planning in those areas as a matter of priority. The NWC highlighted the Darwin rural area and the Oolloo and Tindall (Mataranka) aquifers in the Northern Territory, where plans had remained in draft form since 2011-12 (NWC 2014c).

The NWC also argued efforts to streamline water planning arrangements — such as increasing the maximum intervals for public reporting and review — would require plans to be designed with adaptable management in mind, using sound monitoring arrangements and the use of review triggers (NWC 2014c)(chapter 3).

Since 2014, the coverage of water plans has increased in several jurisdictions. For example:

- Since 1 July 2016, New South Wales has created 11 new coastal water sharing plans (taking the coverage of water plans from 98 per cent of water extracted in New South Wales in 2014 to 99 per cent).
- In the Northern Territory, the Government declared the water allocation plan for Berry Springs (within the Darwin Rural Water Control District) in August 2016.⁷⁴
- In Western Australia, the Department of Water finalised (non-statutory) water allocation plans for Gingin groundwater, Peel Coastal and Lower Collie.
- In Tasmania, the Ringarooma Water Management Plan took effect on 3 December 2014.

Most jurisdictions have also made progress in undertaking scheduled reviews of water plans; however, there are still some plan reviews that have been subject to delays (table B.3). For example, the review of River Clyde water management plan in Tasmania has commenced and is planned for completion in September 2017.

Some jurisdictions have also sought to enhance monitoring, evaluation and public reporting underpinning water planning. For example:

- In New South Wales, the Government has developed guidelines for setting and evaluating water sharing plan objectives for water management. The guidelines cover setting and documenting evaluable plan objectives, strategies and performance indicators and the process for evaluating plan success.⁷⁵
- In Tasmania, the Department of Primary Industries, Parks, Water and Environment is finalising a process and content for annual reporting on water management plans.
- In South Australia, the Department of Environment, Water and Natural Resources' inaugural Five Year Forward Work Plan for water resource management has taken effect.

⁷⁴ The Howard Allocation Plan is currently under development. Following the declaration of this plan, water plans will cover approximately one third of the Darwin Rural Water Control District.

⁷⁵ The New South Wales Department of Primary Industries (Water) advised that the guidelines also cover related information such as external drivers, contextual information and factors that may limit plan success. The information collated in these steps will be required for conducting reviews and evaluations through the life of a plan. The process is being adopted in the Water Resource Plans currently being developed for the Basin Plan.

The work plan prioritises water resource management tasks for all of the major water resources in South Australia based on a risk assessment methodology that considers criteria such as resource condition, social and economic factors, effectiveness of current controls, financial risks and reputational risk. The Department of Environment, Water and Natural Resources has prepared an internal annual review and update for this work plan for 2014-15.

Following changes to water laws on 6 December 2016, a new water planning framework is now in place in Queensland. The new framework seeks to establish:

a clear separation between strategic (formerly in a Water Resource Plan) and operational (formerly in a Resource Operations Plan) elements of the water planning framework, with greater flexibility to amend operational documents without reducing the certainty that strategic water plans are based on robust science and stakeholder consultation. (DNRM (Qld) 2016c, p. 1)

The new framework aims to significantly reduce the amount of time taken to undertake planning activities (Queensland Parliament 2014) (box B.3).

In August 2015, the Australian Government completed a review of the Great Artesian Basin Strategic Management Plan, in consultation with the State and Territory Governments and the Great Artesian Basin Coordinating Committee. The review covered key achievements in Basin water management since 2000, the status of ongoing issues, emerging issues and an assessment of the effectiveness of institutional and governance arrangements. These outcomes are being considered in the development of the new Strategic Management Plan. A draft new Strategic Management Plan has been developed for the Great Artesian Basin for 2017 to 2032. An online consultation process, regional meetings and stakeholder discussions will occur in late 2017, as part of the consultation process on the new draft plan (DAWR 2017a).

Table B.3 Examples of recent water plan reviews

	<i>Recent plan reviews</i>	<i>Comments</i>
NSW	Review of water sharing plans due to expire in 2017 or 2018.	The Natural Resources Commission and Department of Primary Industries Water have completed reviews of six inland alluvial aquifer water sharing plans and the Paterson Regulated River Water Sharing Plan (2007 Plans). The Natural Resource Commission prepared a report recommending that all seven plans be replaced. Department of Primary Industries Water supported this recommendation. In response to this report, the Minister decided all seven plans will be replaced.
Vic	10 year review for Central Region Sustainable Water Strategy(SWS)	SWSs are regionally focused and identify and manage threats to the supply and quality of water resources. Each of the four SWSs must be reviewed and renewed ten years after its release. The first of these reviews, for the Central Region SWS, commenced in late 2016 and will be progressed throughout 2017.
Qld	Water resource plan reviews for: <ul style="list-style-type: none"> • Condamine and Balonne • Moonie River • Border Rivers 	Following changes to water laws on 6 December 2016, a new water planning framework is now in place in Queensland. Water plans retain several of the features of the former water resource plans (for example, a finalised water plan applies for 10 years after which the plan must be reviewed and either replaced or extended for up to 10 additional years if the review finds the outcomes of water plan remain appropriate).
WA	Evaluation statements for: <ul style="list-style-type: none"> • Cockburn groundwater • Gnangara groundwater • Kemerton groundwater • South West groundwater • Warren-Donnelly surface water 	The Department of Water has completed evaluations for several other areas but is yet to finalise and publish the evaluation statements.
SA	Water allocation plans (WAPs) for Padthaway, Tatiara, and Tintinara-Coonalpyn	In 2016 the South East Natural Resources Management (SE NRM) Board commenced a review of the Padthaway, Tatiara, and Tintinara-Coonalpyn WAPs. The initial round of consultation by the SE NRM Board with water licensees, key stakeholders and the community was completed in December 2016. A number of plan reviews have experienced delays.
Tas	Review of River Clyde water management plan	The review of the River Clyde water management plan has commenced and is planned for completion in September 2017. Other reviews will be committed to and commenced based on availability of planning resources in line with the government water planning priorities that are focused on water management planning in Tranche 1 and 2 scheme areas. Plans which have not been reviewed despite being several years past their original intended life include Great Forester, Lakes Sorrel and Crescent, and Little Swanport.
NT	Mid-term review of Western Davenport Water Allocation Plan.	Due to be completed in 2017-18
ACT	Think Water Act Water review	A new ACT Water Strategy (The ACT Water Strategy 2014-44: Striking the Balance) was released in August 2014 (following the review of the Think Water Act Water 2004 policy).

Sources: DPI (NSW) (2016b); NWC (2014c); Responses to State and Territory information requests.

Box B.3 Queensland's new water planning framework

Under Queensland new water planning framework, which commenced 6 December 2016:

- the functions of a resource operations plan are divided across four new instruments (water plans, water management protocols, water entitlement notices and resource operations licences and distribution operations licences). Operational matters such as water sharing rules will be contained in either a water management protocol (un-supplemented water) or an operations manual (supplemented water for water supply schemes)
- water plans retain several of the features of the former water resource plans (for example, a finalised water plan applies for 10 years after which the plan must be reviewed and either replaced or extended for up to 10 additional years if the review finds the outcomes of water plan remain appropriate for the plan area. A water plan may be replaced if its outcomes are not being achieved, or its outcomes, measures, strategies and objectives are no longer appropriate for the plan area). Like water resource plans, water plans define the amount of water available for consumptive purposes (identifying the amount of water available for town water supply, industry and agriculture) and specify economic, social and economic outcomes.
- Amendments to operational manuals by operation licence holders must be consistent with the water plan and changes to operational manuals must be approved by the Department of Natural Resources and Mines (Qld). This means changes in water management and operations proposed by an operations licence holder cannot alter water shares or affect water entitlements and their reliability. Compliance with this requirement is through the holder demonstrating hydrologic modelling, prior to their approval. Proposals also need to be supported by appropriate consultation. If there are disputes about an operations manual, the matter can be referred to an independent panel for advice.

While provisions in a water resource plan and resource operations plan are now in different documents, the rules and requirements themselves have not changed.

Sources: DNRM (Qld) (2016d), Queensland Parliament (2014), Response to State information request.

The Commission's view

The NWI sought to implement water plans (or equivalent instruments) that:

- are statutory (to provide a clear and secure basis for water access entitlements and allocations)
- articulate trade-off decisions between economic, social and environmental considerations, drawing on and using the best available science, socioeconomic analysis and community input
- clearly establish how to deal with currently overused and / or overallocated systems (discussed separately below)
- provide for adaptive management of surface and groundwater systems.

The Commission considers that jurisdictions have largely achieved these outcomes and coverage of NWI consistent water plans is increasing. Despite these achievements, however, there are opportunities to better achieve the intent of the NWI. Some of these opportunities relate to completing unfinished business, such as the introduction of statutory water plans in

Western Australia. Further, States should continue ongoing efforts to ensure fit-for-purpose monitoring, reporting and timely review of plans.

The Commission notes that the National Farmers' Federation (sub. 55) has expressed disappointment with the level of consultation on recently revised inland water sharing plans in New South Wales (section B.8).

The Commission has not identified any specific concerns arising from Queensland's new water planning framework.

Agreed actions and guidance relating to water planning under the NWI reflect the conditions and water management priorities when the agreement was signed in 2004. Since then, new challenges and priorities in water planning and management have emerged. The NWI parties always intended that, where necessary to achieve the objectives of the Agreement, the specified actions may be modified on the basis of further information or analysis. These new priorities and challenges are discussed in chapters 3.

The following sections consider progress in addressing specific aspects of water planning.

Environmental and other public benefit outcomes

The NWI specifies that water for the environment and other public benefit outcomes, as defined in water plans, is to be given statutory recognition and afforded at least the same level of security as water access entitlements for consumptive use. Parties agreed that environmental water could be provided on a 'rules-basis' or held as water access entitlements. They also agreed that water for the environment held as a water access entitlements may be traded on the temporary market (where doing so does not conflict with environmental outcomes).⁷⁶

The NWI also includes actions relating to the management, and where necessary the recovery, of water to achieve environmental and other public benefit outcomes (section B.4 discusses these issues in more detail).

Progress to date

Nearly all major water extractions in Australia occur within areas covered by water plans that specify extraction limits and environmental flow provisions. Rules-based provision (also known as planned environmental water) is the primary means of implementing environmental water objectives across Australia. Rules-based provisions include cease-to-pump rules, flow sharing arrangements, passing-flow releases from water storages and environmental water allowances. States often set allocation limits and access rules to 'leave behind' water to meet environmental outcomes (NWC 2014b).

⁷⁶ NWI Paragraph 35.

Rules-based water generally has statutory recognition under water plans or equivalent instruments (an exception is Western Australia where water allocation plans and extraction limits are non-statutory) (NWC 2014b). During extremely dry periods, some jurisdictions may apply alternative water sharing arrangements to what is specified in water plans to protect critical human needs.

Some jurisdictions supplement planned environmental water provision with environmental water entitlements to provide water to meet environmental outcomes. In New South Wales, Victoria, and South Australia, state agencies — or in the case of Victoria, a statutory environmental water holder — manage entitlements for environmental benefit. The Commonwealth also holds entitlements within the Murray-Darling Basin (including parts of New South Wales, Victoria, Queensland and South Australia).

Environmental water entitlements generally have the same security as consumptive entitlements. The Commission notes there is a lack of ‘shepherding arrangements’ in New South Wales that would enable environmental entitlements to be passed through the system⁷⁷. (The Commission may examine this issue in next year’s inquiry into the Basin Plan). All environmental water holders (Commonwealth, New South Wales, Victoria, and South Australia) are legally able to trade water allocations and entitlements.

Developments since 2014

In 2014, the NWC found that the security of environmental water had improved under the NWI, demonstrated by rules in water plans, the creation of environmental entitlements with the same level of security as that for most consumptive purposes, and through the recovery of substantial quantities of water for the environment (NWC 2014c).

There have been relatively few changes in how jurisdictions allocate water to achieve environmental and other public benefit outcomes since 2014. In November 2015, Tasmania released its *Managing Water in Extremely Dry Conditions* policy. The objectives of the policy are to provide a set of management procedures that: ensure an appropriate balance between consumptive water needs and environmental water needs during extreme dry conditions; provide for transparent, consistent decision making in regard to management of water resources during extreme dry conditions; and minimise hardship for farming enterprises and regional Tasmania while protecting water for critical human and stock requirements and significant environmental assets during extreme dry periods. Tasmania implemented the policy between 4 November 2015 and 24 July 2016. It subsequently released a review in 2017 with recommendations to support future implementation of the policy as well as potential amendments (DPIPWE (Tas) 2016a).

⁷⁷ In June 2013, the Australian Government and Basin jurisdictions agreed to work to protect environmental water by implementing measures such as water shepherding. (COAG 2013)

The Commission's view

The intent of the NWI was that water for environmental and other public benefits outcomes would:

- have statutory recognition
- be afforded the same level of security as consumptive uses
- be tradeable on the temporary market (where held as an entitlement).

Together these features seek to ensure supply security for identified environmental and other public benefit outcomes and support the efficient allocation of water over time (that is, via trade). While jurisdictions have largely met these commitments, Western Australia has not yet enacted legislation to provide for statutory water plans and extraction limits (chapter 3).

Addressing overallocated and overused systems

Under the NWI, parties agreed to provide a better balance in water resource use in systems that had been overallocated or deemed to be stressed and identified in National Competition Council endorsed implementation programs. They were to substantially complete this action by 2005. Parties further agreed — for any other systems found to be overallocated and overused through the water planning process (box B.4) — to determine the precise pathway by which any of those systems will be adjusted to address the overallocation or overuse, and meet the environmental and other public benefit outcomes.⁷⁸

Box B.4 What do overuse and overallocation mean?

The NWI 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).

Progress to date

There are no systems in Tasmania, the Northern Territory or the ACT identified in water plans as overallocated or overused (NWC 2014d). In Victoria, planning instruments generally do not identify overuse (NWC 2014d). However, Victoria has put in place arrangements to address long-term decline in groundwater level in the Yarram water supply

⁷⁸ NWI Paragraph 41-44.

protection area (the only groundwater management unit in Victoria identified as exhibiting long-term decline as at June 2017)(DELWP (Vic) 2017e) and for flow-stressed surface water areas identified in Regional Sustainable Water Strategies or other water planning instruments. Remedial actions include flow rehabilitation plans and creation of environmental entitlements from water recovered through infrastructure projects and other means (NWC 2014d).

In the systems that jurisdictions have identified as overallocated or overused, jurisdictions are establishing and implementing pathways to recover water.

- In the Murray-Darling Basin (MDB), the Basin Plan sets sustainable levels of extraction and (where required) the intended timeframes for achieving reductions in water use, for all catchments in the Basin as well as for the Basin overall. Enforceable Sustainable Diversion Limits will take effect from 2019. The Australian Government has thus far recovered water in all Basin States through entitlement purchases and water saving investments (NWC 2014c).
- In New South Wales, the Government has identified overuse in several groundwater systems and established pathways that implement water recovery mechanisms through water plans (for example, Upper and Lower Namoi, Lower Murrumbidgee, Lower Gwydir, Lower Lachlan, Lower Macquarie, and Lower Murray). The New South Wales and Australian Governments are supporting a reduction of entitlements in overallocated groundwater systems over 10 years (2009 to 2018) under the *Achieving Sustainable Groundwater Entitlements program* (NWC 2014c). The last year for supplementary access under these reduction pathways is 2016-17 for the Lower Lachlan groundwater source.
- In Western Australia, water allocation plans developed for overallocated systems (category 4 resources) include provisions to return those systems to a sustainable extraction regime, including increased licence compliance, water use efficiency measures and recovery of unused or under-used allocations (so called, ‘use it or lose it’ provisions) (NWC 2014c). As of May 2017, there were 1028 water resources across the State (both groundwater and surface water) and 145 of them, primarily in the south-west, are overallocated. The 2009 Gngangara groundwater areas plan has started the process of water recovery.
- In South Australia, recovery pathways are set out in water allocation plans (where relevant). For example, the water allocation plan for the Lower Limestone Coast Prescribed Wells Area maps a series of reductions.
- In Queensland, over allocation or overuse, where identified, is addressed through the planning process. Examples of water plans that address overuse are Pioneer Valley and Fitzroy.

Governments (Australian and State) have often implemented arrangements outside existing water plan processes, such as infrastructure or water buy-back programs, to achieve more acceptable social and economic outcomes than would otherwise result from a direct reduction in the consumptive pool (NWC 2014c).

Developments since 2014

In 2014, the NWC noted that — in systems identified as overallocated or overused — pathways are being established and implemented, and there is evidence of extraction returning to more sustainable levels. However, it identified several areas where States could make further progress in establishing firm pathways to address overallocation and overuse. These included:

- establishing clearer timelines for returning systems to sustainable levels of extraction (for example, some overallocated systems in Western Australia lacked timeframes for returning the system to balance)
- lack of water plans and / or management arrangements in areas that were subject to high use or acknowledged as being under stress (for example, systems in the Darwin rural area such as the Berry Springs and Howard East in the Northern Territory and Northern Adelaide Plains in South Australia)
- fully implementing pathways to address identified overuse or overallocation (for example, in Queensland pathways to return some overused groundwater sources to a sustainable level of extraction within a defined time had been identified, but had not been fully implemented) (NWC 2014d)

Since 2014, several jurisdictions have developed water plans for systems subject to overuse or high use and / or progressed efforts to return systems to sustainable levels of extraction.

- In New South Wales, the Department of Primary Industries (Water) advised that there are areas outside the MDB for which pathways to reach long-term extraction limits have not been completed, but that the new Hastings water sharing plan will cover these outstanding areas.
- In Queensland, the Government advised that the finalisation of water planning for the Fitzroy and Pioneer has dealt with concerns about overallocation in the Callide associated groundwater system, including addressing seawater intrusions along the Pioneer coastline.
- South Australia has continued the process of conversion from area-based to volumetric-based licences to address potential allocation and usage issues. In 2014-15 approximately 2500 area based water licences were converted to volumetric allocations in the Lower Limestone Coast Water Allocation Plan area.
- In Western Australia, the Gngangara evaluation statement (2011–14) identified more interventions are needed to increase groundwater recharge and reduce groundwater abstraction to establish a more sustainable balance. It commits the Department of Water to completing a new allocation plan to manage this issue. The Department of Water advised that the Cockburn and South West groundwater plans will include a timeframe for recovery of overallocation and the replacement for the Gingin surface water and groundwater plans will also include a pathway to recovery within clear timeframes. The Western Australian Government is considering reforms to implement statutory water

allocation plans, which would enable the government to set legal allocation limits and keep water abstraction within sustainable limits.

- In the Northern Territory, Berry Springs in the Darwin Rural Water Control District now has a management plan.

In Victoria, the Government's 2016 state water plan included actions to deliver on existing commitments for environmental water recovery by mid-2017, including an additional 8 GL of environmental water for the Thomson River and an additional 1 GL of environmental water for the Barwon River (DELWP (Vic) 2016).

On 16 October 2014 the Australian Government announced the extension of the Great Artesian Basin Sustainability Initiative (GABSI) program for an additional three years through to 30 June 2017. GABSI is a joint program between the Australian, New South Wales, Queensland, South Australian and Northern Territory Governments to provide funding support to repair uncontrolled bores that threaten the long-term sustainability of the Great Artesian Basin. The 2015 *Review of the Strategic Management Plan for the Great Artesian Basin* found 'challenges still remain in changing the behaviour of some water users, including those who continue to have free-flowing bores and bore drains' (Australian Government 2015b, p. 8).

The Commission's view

The intent of the NWI was to rebalance the allocation of water between consumptive users and the environment in some systems, recognising the legacy of historical allocation policies (which provided water licences to consumptive users without due regard to the effects on the environment) was adversely affecting environmental and other public benefit outcomes. In practice, the process of setting 'environmentally-sustainable levels of extraction' and identifying overused systems through water planning has proven highly contentious, as stakeholders have clarified and debated the economic and social trade-offs associated with reallocating water to the environment. Notwithstanding these challenges, realising the outcomes and objectives of the NWI requires addressing all instances of overallocation and / or overuse identified in water plans. Although significant progress is being made, this has not yet occurred and therefore this NWI commitment has not been fully achieved.

Assigning risks for changes in allocation

Under the NWI, parties agreed to clearly assign risk arising from future changes in the availability of water for the consumptive pool.⁷⁹ Jurisdictions could adopt the risk assignment framework specified in the NWI or another agreed alternative risk-sharing formula. 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.

⁷⁹ NWI Paragraph 23 vi.

Progress to date

Only New South Wales and Queensland have adopted the risk sharing framework specified in the NWI.⁸⁰ Other jurisdictions have adopted alternative arrangements to deal with reduced water availability. Victoria seeks to enable water users to manage risk through flexible market arrangements, such as the use of carryover or temporary trade, rather than through specific risk assignment. In Victoria, water rights can be permanently qualified following a 15-year water resource assessment to identify if any long-term reduction in water availability has occurred. South Australia has adopted an alternative risk-assignment framework in accordance with NWI paragraph 51. The *Natural Resources Management Act 2004* (SA) enables the Minister to make reductions to water licences under certain circumstances, primarily when a water allocation is revised and less water is available for consumptive use under this revised plan (NWC 2014c).

Under the Basin Plan arrangement, the Commonwealth has accepted risk obligations resulting from reductions or changes in reliability based on the difference between the 2009 baseline diversion limits and the sustainable diversion limits, which will come into effect from 2019 (NWC 2014c).

Developments since 2014

In 2014, the NWC suggested that the poor uptake of the NWI risk assignment framework was unlikely to change but that alternative mechanisms which have been agreed were largely delivering the intended outcome for irrigators (NWC 2014c).

There have been no material changes in risk assignment provisions since 2014. In February 2015, the former Western Australian Government approved drafting of the Water Resources Management Bill. The approval to draft the Water Resources Management Bill followed the release of *Securing Western Australia's water future* – a position paper, which signalled the intent of the legislation to address risk assignment. The Western Australian Department of Water advised that the new Western Australian Government is currently considering progressing new water resources legislation, of which risk assignment is a component. The Tasmanian Government intends to implement risk assignment arrangements that specify the risk-sharing provision between licence holder and government, based on the NWI risk assignment framework. It intends to consult on risk assignment arrangements as part of a broader consideration of legislative reforms to the *Water Management Act 1999* (Tas), which it expects to occur during 2018-19.

The Commission's view

To meet the outcomes and objectives of the NWI, risk assignment policies should be:

- clearly established (through statutory instruments)

⁸⁰ NWI Paragraphs 46-50.

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- implementable and effective in providing certainty to entitlement holders and in underpinning planning, investment and adjustment decisions
 - clearly articulated and well understood (NWC 2011c).

This commitment under the NWI has not been fully achieved. For example, Victoria has not clearly established a specific risk assignment framework. Tasmania has signalled its intention to implement risk assignment arrangements based on the NWI risk assignment framework. As discussed in chapter 3, there may also be a need for jurisdictions to provide additional information for entitlement holders that clearly sets out how its approach to risk assignment will apply to any changes in the balance between environmental and consumptive use.

Indigenous access

Under the NWI, jurisdictions agreed that water access entitlements and planning frameworks would recognise the requirements of Indigenous people in relation to water access and management. Specifically, the NWI parties committed to:

- including Indigenous representation in water planning wherever possible
- incorporating Indigenous social, spiritual and customary objectives — and strategies for achieving them — in water plans, wherever they can be developed
- ensuring water planning processes take account of the possible existence of native title rights to water
- accounting for water allocated to native title holders for traditional cultural purposes.

This assessment of progress focuses on the NWI commitments related to Indigenous representation in water planning, and the incorporation of Indigenous objectives — and strategies for achieving them — in water plans.

Progress to date and developments since 2014

Indigenous representation in water planning

In 2014, the NWC found that ‘most jurisdictions have improved the amount and quality of consultations with Indigenous communities in water planning and management’ (NWC 2014c, p. 31). Regarding individual jurisdictions, the NWC made a range of observations, including that:

- Indigenous representation on water advisory committees in New South Wales is mandatory under the *Water Management Act 2000* (NSW) (NWC 2014c)
- In Victoria, the Department of Environment, Parks Victoria and several catchment management authorities have Indigenous reference groups to provide input and advice towards their decision-making processes (NWC 2014c)

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- The ACT has statutory requirements to consult all stakeholders, including Indigenous groups, in the development of water plans (NWC 2014c)
 - In Tasmania, there are no specific requirements for Indigenous engagement in the development of water management plans, beyond general stakeholder engagement (NWC 2014c)
 - The *Rights in Water and Irrigation Act 1914* (WA) does not expressly recognise Indigenous issues or engagement, and except through Local Water Resource Management Committees, provides no additional measures for Indigenous engagement. The Department of Water previously had an Indigenous Support Unit tasked with the role of (among others) undertaking Indigenous engagement, however the unit no longer exists (NWC 2014c)
 - In the Northern Territory, planning processes have included Indigenous participation, including through membership of planning advisory groups.

Since this time, most States and Territories have maintained or improved arrangements for engaging Indigenous communities in water planning. A number of developments are particularly noteworthy.

In 2017, the Australian, State and Territory Governments approved the module *Engaging Indigenous Peoples in Water Planning and Management* to supplement the NWI National Water Planning and Management Guidelines (Australian, State and Territory Governments 2017b). This guidance identifies ways to facilitate effective representation and engagement of Indigenous people in water planning, including employing Indigenous water planners and / or staff to provide a conduit for Indigenous views, and working with Indigenous community groups and organisations to define culturally appropriate ways to be engaged in water planning and decision making.

In Victoria, key developments include the 2016 *Water for Victoria* plan, and the 2017 *Yarra River Action Plan*.

- *Water for Victoria* includes commitments to establish an Aboriginal Water Reference Group. The group will advise on water management for Aboriginal values and initiatives to build capacity and engagement for Aboriginal participation in the water sector. It will also develop and apply Aboriginal Participation Guidelines at the catchment level (DELWP (Vic) 2016).
- The Yarra River Action Plan was developed following extensive consultation with Indigenous communities and led to the *Yarra River Protection (Willip-gin Birrarung Murron) Bill 2017* being introduced into the Victorian Parliament. The Bill will establish a new statutory body, the Birrarung Council (which must include at least two Wurundjeri Council representatives), to act as an independent voice for the river (DELWP (Vic) 2017a, 2017f).

Aboriginal engagement is a key requirement of water resource planning in the Basin Plan (refer chapter 10 of the Plan). As such, a number of jurisdictions (including NSW,

Queensland, South Australia, and the ACT) have indicated that they are significantly increasing Indigenous engagement (including with groups such as the SA Murray Lower Darling Rivers Indigenous Nations (MLDRIN), Northern Basin Aboriginal Nations (NBAN) and Ngarrindjeri Regional Authority) as part of the preparation of water resource plans.

In South Australia, the Government has employed two part-time Aboriginal water coordinators based in Aboriginal organisations, as part of Basin Plan engagement. The coordinators' roles include capacity building for individuals as well as their Aboriginal representative organisations. There have also been monthly meetings between DEWNR and MLDRIN representatives, which have been supporting South Australia's Basin Plan Aboriginal engagement work. A broad capacity building and information process on water rights and water markets is being developed and will include mechanisms to build capacity with Indigenous stakeholders to participate in the water market. The Aboriginal Partnerships Program works with Traditional Owners and Aboriginal groups to increase the participation of Aboriginal people in managing natural resources, including water (South Australian Government 2017a).

The NT Government's Sustainable Water Use policy paper indicates that a Indigenous Water Unit is to be established, in part to facilitate Indigenous involvement in water planning decisions, however its precise role and functions are yet to be finalised (Gunner nd).

Identification of Indigenous objectives and strategies for achieving them

In 2014, the NWC found that:

most jurisdictions have ... generally failed to incorporate effective strategies for achieving Indigenous objectives in water planning arrangements. While recognition of Indigenous cultural values and associated water requirements has progressed, implementation of practical change remains variable, with most jurisdictions as yet not making specific provision for water access for Indigenous people. (NWC 2014c, p. 31)

The NWC made a number of findings about individual jurisdictions. For example:

- In New South Wales, cultural access licences (capped at 10 ML per year per application and unable to be traded) and the Aboriginal Water Initiative aim to ensure that Indigenous cultural and economic requirements are identified and built into water planning processes. Community development licences, to support commercial enterprises owned by Indigenous people in coastal unregulated water or groundwater areas, are also available.
- Several Queensland water resource plans include Indigenous water reserves, signalling the intent to provide for future Indigenous water use.
- In Victoria, there are no specific cultural water entitlements, though the *Water Act 1989* (Vic) recognises the right for traditional owner groups to take water under the *Traditional Owner Settlement Act 2010* (Vic).

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- Tasmania has neither legislative provisions that require Indigenous water access issues to be dealt with in its water planning processes, nor any provisions for the recognition of native title rights to water. No water plans in Tasmania identify water requirements for Indigenous customary, social or spiritual needs or provide water specifically to Indigenous people for any purpose.
 - In Western Australia, water plans consider non-consumptive water needs for Indigenous cultural benefit where relevant. This water is that which is not allocated and therefore left in situ to meet cultural needs. No plans provide specifically for Indigenous commercial interests, but these may be met through the licensing process or if there is a native title provision.
 - In South Australia, several water allocation plans (including the Mallee, Tatiara and Padthaway prescribed wells areas) allow unlicensed access and use for social, cultural and spiritual purposes, provided the flow of water is not diverted or impeded for collection.
 - Water planning in the Northern Territory includes identifying and maintaining Indigenous cultural water values (NWC 2014c).

Since 2014, a number of jurisdictions have amended water plans, or water planning processes, to more explicitly provide for the achievement of Indigenous objectives. This is most evident in water resource plans developed under the Basin Plan (where it is a requirement that jurisdictions identify Indigenous objectives and outcomes).

In Queensland, amendments were made to the Gulf water resource plan to provide for reserves of general and Indigenous unallocated water in the Flinders and Gilbert river catchments, and unallocated water reserves (for the purposes of supporting economic opportunities for Aboriginal people and Torres Strait Islanders) are now located in the water plans for the Burnett, Fitzroy and Wet Tropics.

And as part of the development of water resource plans in the ACT, the Government has undertaken 22 assessments (using the Aboriginal Waterways Assessment framework developed by the Murray-Darling Basin Authority (MDBA)) across 16 sites to identify objectives and outcomes that recognise Aboriginal values and uses.

Water for Victoria includes a number of commitments aimed at better recognising and providing for Indigenous values in water plans, including:

- \$4.7 million to establish a statewide Aboriginal Water Program to better understand Aboriginal water values, uses, objectives and outcomes, including intangible cultural heritage such as stories, art, ceremonies and innovations
- amendment of the legislated objectives of the Victorian Environmental Water Holder (VEWH) to consider identified Aboriginal water-related environmental outcomes, and the appointment of a Victorian Aboriginal Commissioner to the VEWH (DELWP (Vic) 2016).

In NSW, the management strategy for the Snowy River was revised in 2014-15 to include a number of increased flow events which provide cultural cues and enhance spiritual connections with the environment for the local Aboriginal community.

The Aboriginal Partnerships Program in South Australia aims to improve awareness and understanding of Aboriginal culture, increase the participation of Aboriginal people in managing natural resources, and protect Aboriginal heritage. One project being conducted under this program is the Ngarrindjeri Partnerships Project (based in the Coorong / Lower Lakes / Murray Mouth area), which seeks to identify the cultural values of sites, and strategies to manage and protect them. (South Australian Government 2017a)

In South Australia, amendments to the Mallee and Peake, Roby and Sherlock water allocation plans are being progressed to better acknowledge and recognise Traditional Owners and their water related interests. Similar amendments are planned for the Eastern Mount Lofty Ranges and Marne Saunders water allocation plans.

The NT Government has committed to the reintroduction of Strategic Aboriginal Reserves under its Sustainable Water Use policy paper. A Strategic Aboriginal Reserve (SAR) is a reserved volume of water from the consumptive pool within a water allocation plan area, which is set aside for exclusive access by Aboriginal landowners to use or trade for their economic benefit. Public consultation on the policy parameters of the SAR is underway, with the policy subject to Government consideration in 2017. The Northern Territory Department of Environment and Natural Resources issued a discussion paper on Strategic Indigenous Reserves (now called SAR) in February 2017.

Water for Victoria commits \$5 million to develop a roadmap for Aboriginal access to water for economic development, working in partnership with Traditional Owners and Aboriginal Victorians (DELWP (Vic) 2016).

Accounting for native title rights

To date, successful native title claims to inland waters are relatively rare (but do exist, for example, in *Spinifex People v The State of Western Australia* [2000] FCA 1717. The Federal Court determined that the claimants had a right to take water, for the purposes of satisfying their personal, domestic, social, cultural, religious, spiritual or non-commercial communal needs, including the observance of traditional laws and customs.

Several commentators have previously noted concerns about the implementation of the NWI provisions relating to native title rights. For example, Jackson and Tan (2013, p. 137) noted:

the extent to which a native title entitlement will satisfy native title requirements can only be determined on a case-by-case assessment in State water plans; however, it is significant that review of New South Wales' 35 Water Sharing Plans (WSPs) reveals that only two have provided an entitlement for native title.

The authors also argued that ‘delays are occurring while jurisdictions wait for native title determinations or negotiations to be resolved before addressing the water requirements likely to satisfy native title rights’ (Tan and Jackson 2013, p. 148).

While the NWC’s 2014 assessment made some references to native title, it did not assess the extent to which individual water plans take account of the possible existence of native title rights.

Since 2014, the Australian, State and Territory Governments have released guidelines on *Engaging Indigenous Peoples In Water Planning And Management*, which include case studies and guidance on native title and other Indigenous land rights.

The Commission’s view

Indigenous representation in water planning processes

Culturally appropriate engagement with Indigenous groups as water plans are developed can help ensure that resultant decisions and outcomes take account of Indigenous interests. Relying on standard consultation processes is generally regarded as inadequate given the unique water needs and values of Indigenous groups, and the (at times) limited capacity of these groups to participate in community-wide consultation forums (due to remoteness, limited knowledge of water planning nomenclature and so on).

Some participants to this inquiry consider further reform in this area is required. For example, the Madjulla Association noted that:

the Western Australian Department of Water’s current working group on Water Reform did not contain any members from Indigenous representative bodies. It is difficult to see how WA’s First Nations peoples’ interests can be represented when we are not at the table for high level water reform discussions. (sub. 14, p. 3)

The Federation of Victorian Traditional Owners Corporation encouraged more direct engagement with Traditional Owners:

The States and MDBA have often sought to garner an Indigenous view from ‘peak bodies’. While this approach is effective in developing system wide information and policies, there remains a need to work more closely with the Traditional Owners and rights holders’ organisations directly in relation to the governance of water within their specific regions. ... Some catchment management authorities and water corporations in Victoria have individual Aboriginal board members and some have employed Aboriginal liaison officers to assist in consultation. However, planning processes, largely do not include Traditional Owners within representative positions. (sub. 37, pp. 8 and 16)

The Murray Lower Darling Rivers Indigenous Nations (MLDRIN) expressed concern about the future of the lauded Aboriginal Water Initiative in NSW, and the risk of backsliding:

While the establishment of the Aboriginal Water Initiative (AWI) within NSW DPI Water had been identified as establishing a benchmark in good engagement, a ‘change management

plan' implemented in 2016 has resulted in severe cuts to Aboriginal identified staff within the AWI and a significantly reduced capacity to undertake direct engagement with Aboriginal communities. (sub. 60, p. 6)

The issues raised may warrant further consideration by relevant State and Territory Governments. However, the Commission considers that jurisdictions have generally made meaningful, positive and sustained progress against the Indigenous representation provisions of the NWI. The majority of States and Territories have established specific mechanisms for engaging with Indigenous groups in the development of water plans — the exceptions are Tasmania and Western Australia where the Commission has not been able to identify *any* dedicated mechanisms for engaging Indigenous people in water planning. It is also too early to judge the effectiveness of jurisdictions' Indigenous engagement initiatives as they have only recently been (or are yet to be) implemented.

Identification of Indigenous objectives and strategies for achieving them

The NWI sought to ensure that water plans explicitly incorporate the social, spiritual and customary objectives of Indigenous people, and strategies for achieving them. While some good progress has been made — particularly in recent years — there is considerable scope for jurisdictions to better recognise and accommodate Indigenous people's water needs by:

- ensuring that clear, well-informed and measureable Indigenous objectives are identified *and* provided for in water plans as a matter of course
- putting in place monitoring and reporting arrangements that promote accountability and foster learning about what does (and does not) work.

Further, as many Indigenous values and objectives are supported by a healthy environment, there will be occasions where environmental and cultural objectives align. It is important, therefore, that water managers have the incentive and capacity to take up opportunities to use held environmental water to achieve Indigenous objectives, without forgoing environmental benefits (chapter 3).

In some cases, governments may provide access to water for Indigenous economic development. Chapter 3 discusses the importance of following good processes to maximise the benefits of such programs.

Taking account of Native title rights

The Commission's preliminary analysis has not identified specific examples of water planning processes that do not adequately accommodate native title rights to water, where they are found to exist. However, it encourages interested stakeholders to comment on jurisdictions' progress — or lack thereof — against the native title provisions of the NWI ahead of the final report (chapter 3).

Interception

Land-use change activities have the potential to intercept significant volumes of surface and / or groundwater. 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 and large-scale plantation forestry) and apply appropriate planning, management and regulatory measures where necessary to protect the integrity of the water access entitlements system and achieve environmental objectives.⁸¹

Under the Basin plan, water resource plans are required to consider interception risks.

Progress to date

The most recent comprehensive assessment of water plans in Australia undertaken by the NWC in 2013 found jurisdictions have for the most part adopted broad coverage of most potential intercepting activities by making all extraction subject to limits, regardless of the type of use (for example, mining, forestry, stock and domestic use). However, it noted important exceptions remain, including the risk to groundwater resources from rights to water for extractive industries that operate outside of water planning arrangements (NWC 2014d).

Developments since 2014

In 2014, the NWC observed that no State or Territory had fully implemented interception arrangements that meet the requirements of paragraph 57 of the NWI, in part due to the prescriptive nature of the paragraph, which requires considerable effort to assess and manage interception in all catchments (box B.5). It further noted:

... management of interception activities in catchments which are assessed as overallocated, fully allocated, or approaching full allocation should be comprehensively implemented where interception has been identified as significant. Progress in this has been slow in many jurisdictions and the aggregate impacts of various intercepting activities on a catchment are not always accounted for. (NWC 2014c, p. 33)

⁸¹ NWI Paragraph 55 to 57.

Box B.5 NWI paragraph 57

Under Paragraph 57 of the NWI, parties agreed that by no later than 2011 existing significant interception activities in water systems that are fully allocated, overallocated or approaching full allocation would be recorded, and that new activities would require a water access entitlement. In water systems not yet fully allocated or approaching full allocation, significant interception activities would be identified and the amount of water they were likely to intercept over the life of the plan would be estimated. For those systems, a threshold level of interception by significant interception activities was to be determined, and a water access entitlement for new interception activities would be required if the system approached full allocation or if that threshold were met. The NWI commitment leaves it to the parties to determine what is 'significant' for a given system.

Since 2014, several jurisdictions have introduced or announced additional measures relating to the management of interception and other water use that currently occurs outside of entitlements and planning frameworks.

- In New South Wales, legislative changes under the *Water Management Amendment Act 2014* (NSW) came into effect on 1 January 2015, which facilitate the issuing of floodplain harvesting access licences, consistent with the Floodplain Harvesting Policy.⁸² Under the *NSW Healthy Floodplains Project*, NSW DPI Water is preparing volumetric entitlements for the take of overland flow (floodplain harvesting) and licensing existing works used for the interception of overland flow (floodplain harvesting) in the Border Rivers, Gwydir, Namoi, Barwon-Darling and Macquarie valleys.
- In Victoria, the Government released the *Water for Victoria* water plan which includes actions to investigate the introduction of a reasonable use limit for domestic and stock rights, and to monitor and report on significant users of water.
- In the ACT, the Government is considering strengthening controls on interception where appropriate through the water resource plan requirements under the Basin Plan. (However, it noted there is no current intention to develop new or revive former sites for commercial plantations in the Territory.)
- In the Northern Territory, the Government completed an assessment of current and potential stock and domestic use on approved land subdivisions in all groundwater systems in Darwin Rural Water Control District. The assessment will inform land and water allocation planning in the area.
- In Queensland, the *Water Act 2000* (Qld) now provides a process to transition water rights that have been afforded under special agreement acts into contemporary water access entitlements under the Act. The policy aims to provide greater certainty for water management and for companies through clear, well-defined and secure water entitlements.

⁸² The Floodplain Harvesting Policy was first published in 2013, setting out a 5-step process to incorporate floodplain harvesting in water sharing plans and issue licences, to manage floodplain water extractions more effectively. A monitoring policy is currently under consultation.

The Commission's view

Key requirements for meeting the objectives and outcomes of the NWI:

- water planners have adequate understanding of the significance of water intercepting activities (such as farm dams and bores, intercepting and storing of overland flows and large-scale plantation forestry) to manage any risks to the integrity of the water access entitlements system and the achievement of environmental objectives
- where required, State and Territories apply cost-effective planning, management and regulatory measures (which may involve incorporating activities into the entitlement framework where feasible) to manage these risks.

Many participants to this inquiry remain concerned about granting water rights or interception activities that occur outside water access entitlements and planning processes. In particular, several participants suggested more could be done to manage the risks to the integrity of the water access entitlements system associated with groundwater use by extractive industries (National Environmental Law Association, sub. 69).

Participants had varying views about the merits of explicitly including intercepting activities into the licensing system. For example, Environment Victoria (sub. 3) argued 'bringing all consumptive water use within the licencing framework to ensure equity of access between users' was a priority. Other participants, including organisations representing the forestry industry, argued that any proposed changes to entitlement frameworks should (in line with the NWI) recognise existing water use and focus on land use *changes* that may affect interception (Australian Forest Products Association, sub. 76; Victorian Association of Forest Industries, sub. 56). Several of these participants highlighted the potential for adverse distributional effects of incorporating existing land uses into water entitlement (licensing) frameworks (Victorian Association of Forest Industries, sub. 56).

The Commission considers that more could be done to meet objectives and outcomes of the NWI with respect to managing interception and water use that occurs outside of entitlements and planning arrangements. In particular, there is scope to better incorporate extractive industries into entitlements and planning frameworks (chapter 3).

Integrating surface water and groundwater management

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 that, in preparing water plans, to assess of the level of connectivity between surface (including overland flow) and groundwater systems.⁸³

The development of water resource plans for the Basin Plan requires basin States to assess the nature of connections between surface and groundwater resources.

⁸³ NWI Schedule E.

Progress to date

State and Territory Governments have taken steps to recognise connectivity between surface and groundwater resources in water planning (table B.4). Since 2004, the number of water plans that recognise the connection between surface water and groundwater has increased substantially (NWC 2014c, 2014d). As noted in section B.7 (knowledge and capacity building), there have also been improvements to foundational information requirements for better groundwater management.

Development since 2014

Since 2014, several jurisdictions have progressed measures to facilitate integrated management of connected surface and groundwater sources. For example:

- In New South Wales, a number of water sharing plans covering unregulated river and alluvial and groundwater sources have commenced.
- In Victoria, the Government issued new or updated guidelines on *Resource Sharing: Planning the take of Victoria's groundwater resources, Groundwater Licensing and the Protection of High Value Groundwater Dependent Ecosystem and Local Management Plans*, which each include provisions relating to integrated resource management (DELWP (Vic) 2017c). For example, the guidelines for groundwater licensing include an assessment of the likelihood that groundwater will interact with features such as rivers, springs, soaks, wetlands or terrestrial vegetation containing high value ecosystem within the license application area.
- In Queensland, amendments to the Barron Resource Operations Plan and the Fitzroy Resource Operations Plan were made in 2015 to improve the management of groundwater resources, recognising the linkages between surface and groundwater in the Atherton Basalts (Barron) and Callide Valley (Fitzroy) groundwater areas.
- In Western Australia, the Gingin Groundwater Allocation Plan (DOW (WA) 2015) includes performance indicators for measuring the impact of groundwater abstraction on surface water features that also rely on groundwater for base flow in the summer months. Some amendments were made to the Lower Gascoyne allocation plan (originally released in 2011) in 2015 following a plan evaluation to better integrate groundwater and surface water management.
- In South Australia, the Government is progressing work to meet the requirement of the Basin Plan to systematically assess the nature of connections between surface and groundwater resources.

Table B.4 Integrated management of surface and groundwater

	<i>Description</i>
NSW	Provisions for the integrated management of surface water and groundwater resources vary between water sharing plans. Based on the degree of connectivity, more recent water sharing plans may include groundwater and surface water as the same water source, while other plans link groundwater rules to surface water rules.
Vic	Connectivity is recognised at a broad level in sustainable water strategies. Several instruments state that areas of connectivity will be identified and managed and this has been undertaken in a few areas of high use through resource appraisals. The Upper Ovens system management plan integrates management of two highly connected systems. Local management plans for groundwater systems in northern Victoria include explicit consideration of the effect of groundwater extraction on rivers and other ground dependent ecosystems and define rules to limit impacts. Guidelines on Resource Sharing, Groundwater Licensing and the Protection of High Value Groundwater Dependent Ecosystem and Local Management Plans include provisions relating to integrated resource management.
Qld	Queensland is progressively including groundwater resources in water plans (formerly water resource plans) and through this process giving consideration to surface water/groundwater connectivity and conjunctive management arrangements. Work is currently underway to bring groundwater management in parts of the Queensland Murray Darling Basin under the Water Planning framework. Through this process interactions between surface water and groundwater will be recognised in groundwater modelling.
WA	Surface water and groundwater plans are generally developed separately. Connectivity is evaluated during plan development and, where relevant, water allocation plans take account of surface water and groundwater linkages when setting allocation limits and developing management arrangements (including local licensing policies and monitoring).
SA	Connectivity is considered in resource assessments and addressed in water allocation plans where relevant. Recognition of potential impact is considered in setting extraction limits. Management approaches include setback limits for groundwater extractions near watercourses, and consideration of groundwater-sourced baseflow in surface water systems when calculating groundwater extraction limits. Where significant surface water resources exist, they are generally incorporated in a single plan covering surface and groundwater.
Tas	Surface water and groundwater are assumed to be 100 per cent connected unless shown otherwise. Groundwater areas can be appointed under the <i>Water Management Act 1999</i> (Tas), requiring groundwater licensing for commercial extraction and triggering appropriate metering and consumption reporting measures. Water Management Plans define the water resources to be managed by the plan. New plans provide for groundwater monitoring and review of the status of groundwater licensing should extraction occur at unacceptable levels.
NT	Most plans have conjunctive management arrangements. Groundwater extraction licences granted in the Top End since 2013 have been subject to annual announced allocations to ensure that connected surface water ecosystems are protected. Linked surface water – groundwater models in the Roper River, Katherine River, Daly River, Howard River and Berry Creek catchments, are used to determine allocations. Surface water extraction licences in the Katherine River and Daly River catchments have been subject to annual announced allocations since 2013. Annual allocations for surface water extraction licences and groundwater extraction licences in the Katherine and Daly River catchments are determined as an integrated exercise utilising linked surface water – groundwater models. In areas for which models are not available, allocations are determined to limit total extraction from the relevant groundwater system to no more than 20 per cent of estimated recharge.
ACT	The <i>Water Resources Act 2007</i> (ACT), disallowable instruments and Think Water Act Water provide for integrated management of surface water and groundwater. Environmental Flow Guidelines also acknowledge the importance of connectivity. The ACT water resource plans highlight the integration of surface water and groundwater connectivity. This is supported by more recent studies.

Sources: NWC (2014c); Responses to State and Territory information requests.

The 2015 review of the Great Artesian Basin Strategic Management Plan suggested that the new Strategic Plan should consider opportunities for greater integration of surface and groundwater planning. A draft new Strategic Management Plan is being developed for the Great Artesian Basin for 2017 to 2032 (Australian Government 2015b; DAWR 2017a).

The Australian and State and Territory Governments (2017c) jointly developed the *National Groundwater Strategic Framework (2016–2026)*, which outlines 28 actions in three priority areas. These actions include developing ‘regionally appropriate protocols to assess conjunctive groundwater-surface water extraction limits, given future climate scenarios’ (Australian, State and Territory Governments 2017c, p. 13). Under the framework:

Jurisdictions ... will play a key role in implementing the actions detailed in the Strategic Framework. Appropriate consultation with stakeholders such as water users, existing entitlement holders, researchers and the broader community will also be required. Implementation pathways will be aligned with existing resources and jurisdictional priorities. (Australian, State and Territory Governments 2017c, p. 2)

The Commission’s view

To achieve the objectives of the NWI, water planning must include:

- an assessment of physical connectivity between groundwater and surface water in the relevant planning area
- where physical connectivity exists, arrangements that cost-effectively manage associated supply risks to entitlement holders and the environment (either through integrated water management plans covering both groundwater and surface water or through linked groundwater and surface water plans).⁸⁴

Past NWC assessments of water plans and recent developments in water planning suggests States and Territories have made substantial progress since 2004 in recognising physically connected systems that display groundwater and surface water connectivity (NWC 2014c). Further work is being undertaken as part of the Basin Plan. While the number of water plans that fully integrate groundwater and surface water resource management remains small, the number of water plans that recognise connectivity between groundwater and surface water is increasing. In the Commission’s view, the choice between fully integrated plans and linked plans should be made on a case by case basis, given the additional benefits of fully integrating plans will not necessarily be significant enough to justify the additional cost.

As noted by participants to this inquiry and NWC previously, management of connected systems (and water planning generally) relies on the jurisdictions’ continued commitment to building knowledge, funding and implementing appropriate monitoring, and adaptively managing systems where new information indicates that management is necessary.

⁸⁴ NWI Policy guidelines note ‘if it is shown that the connectivity between these two systems affects the management of the water resource, surface and groundwater should be managed as a single resource. Ideally, this should be through a single plan or at least through plans that refer to each other in an integrated way’ (COAG 2010b, p. 8).

There are particular challenges where groundwater and surface water systems are partially connected or there are significant time delays in the extraction impacts. There is also a need to more explicitly represent the current science around groundwater surface water interactions (and in particular “connectivity”) within water planning and markets. (University of Melbourne, School of Engineering, sub. 23, p. 2)

More needs to be done to plan and manage surface and groundwater jointly, including investment in better understanding the connectivity of these systems. This would also include the management of risks to the environment and other users in the long term, knowing that groundwater in Australia can be very ancient in age and therefore easily depleted. (Wentworth Group, sub. 40, p. 3)

Section B.7 discusses information and knowledge needs relating to groundwater in more detail.

In 2014, the NWC sought to broaden the scope of integrated management of surface and groundwater systems to go beyond what is required in the NWI. For example, the NWC encouraged governments with water planning and management responsibilities to focus on systematic consideration of the opportunities, benefits and options for further integration of surface water and groundwater resource management. It noted:

potential opportunities for integrating groundwater and surface water management are not limited to physically connected systems in which cross impacts are predicted or observed, or to systems where trade-off decisions need to be minimised. (NWC 2014c, p. 117)

Suggested options included allowing for all potential water systems and users within a designated area, irrespective of water quantity and quality, considering alternative options for storage and delivery of water, such as ‘underground dams’ and aligning objectives across the various institutions that are involved in groundwater and surface water use and management.

The *National Groundwater Strategic Framework* (Australian, State and Territory Governments 2017c) similarly includes actions to support the integration of water supply options for urban and rural water systems through the conjunctive management of surface water, groundwater and other water sources.

While the concept of integrated or conjunctive water management has generated interest among policymakers, water resource managers, utilities, and academics, specific proposals for government support to facilitate conjunctive water management should be examined on their merits (using sound principles and evidence). Chapter 3 discusses the importance of ensuring that entitlement frameworks do not present a barrier to efficient investment in the development of alternative water sources and supply options, such as stormwater, wastewater, and managed aquifer recharge. Pursuing conjunctive management of water in its broadest sense (that is, beyond managing physically connected surface water and groundwater systems as a single resource) is not a necessary condition for meeting the outcomes and objective or intent of the NWI with respect to integrated management of surface and groundwater.

Summary

Table B.5 summarises progress in achieving outcomes and objectives relating to water access entitlements and planning frameworks.

Table B.5 Assessment summary: Water access entitlements and planning

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Water access entitlements		
Legally defined (statutory) long-term share of the consumptive pool	Largely achieved	All jurisdictions (apart from Western Australia and the Northern Territory) have enacted legislation required to create secure, NWI-consistent water access entitlements.
Unbundled (into access, use, and delivery) where cost-effective	Largely achieved	Apart from Western Australia and the Northern Territory.
Apply to all major consumptive water uses (to the extent practical)	Largely achieved	Important exceptions include entitlement exemptions for extractive industries in the Northern Territory and Queensland.
Water plans^b		
Statutory	Largely achieved	Western Australia water allocation plans are not statutory.
Articulate trade-off decisions between economic, social and environmental considerations	Partially achieved	Areas for attention include balancing environmental and consumptive use in a changing climate.
Provide for adaptive management of surface and groundwater systems	Partially achieved	Fit-for-purpose monitoring, reporting and review of plans is needed to support adaptive management.
Water for environmental and other public benefit outcomes		
Statutory recognition and afforded the same level of security as consumptive uses	Largely achieved	Apart from Western Australia.
Tradeable (where held as an entitlement)	Achieved	Environmental entitlements are limited to the MDB and southern Victoria.
Addressing overallocation and overuse		
All overallocated and overused systems returned to sustainable levels of extraction	Partially achieved	There are still a number of systems identified as overallocated and / or overused. Some high use areas do not have finalised plans. Areas for improvement include establishing clearer timelines for returning systems to sustainable levels of extraction and implementing water plans and / or management arrangements in areas subject to high use or acknowledged as being under stress.

(continued next page)

Table B.5 continued

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Assigning risks for changes in allocation		
Clearly established (through statutory instruments)	Partially achieved	Victoria has not clearly established a specific risk assignment framework. Tasmania and Western Australia are contemplating risk assignment frameworks, but are yet to undertake required legislative reforms.
Implementable and effective in providing certainty to entitlement holders	Partially achieved	There are still areas where risk assignment policies could improve understanding of changes in future water allocations.
Indigenous access		
Indigenous representation in water planning processes	Largely achieved	Most States and Territories — apart from Tasmania and Western Australia — have established and / or committed to specific mechanisms for engaging Indigenous people in water planning.
Identification of objectives for Indigenous people and strategies for achieving them	Partially achieved	Areas for attention include explicitly identifying Indigenous objectives, and how they will be achieved, in water plans as a matter of course, supported by monitoring and reporting arrangements.
Interception		
Significance of water intercepting activities assessed and effectively managed	Largely achieved	Important exceptions include extractive industries.
Integrating surface water and groundwater management		
Physical connectivity between groundwater and surface water assessed and managed	Largely achieved	While the number of water plans that fully integrate groundwater and surface water resource management remains small, the number of water plans that recognise connectivity between groundwater and surface water (including through linked groundwater and surface water plans) has increased substantially since 2004. Requires jurisdictions' continued commitment to building knowledge, funding and implementing appropriate monitoring, and adaptively managing systems where new information indicates that management is necessary.

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met. ^b In some jurisdictions (such as Victoria) the entitlement system provides the main statutory basis for how water is shared rather than plans.

B.2 Water markets and trading

The NWI sought to achieve open and efficient water trading markets. It envisages market arrangements that:

- allow water to be traded where hydrological connections permit, including across state and territory borders
- minimise transaction costs, including through good information flows
- enable the appropriate mix of water products to develop
- provide appropriate protection of third-party interests and the needs of the environment.⁸⁵

Many of the requirements for water markets are established through the NWI commitments for water access entitlements and planning frameworks. The ‘Water markets and trading’ element of the NWI includes further actions to remove barriers to trade (including specific actions in regard to the southern Murray-Darling Basin) and establish water registers. In 2008, COAG agreed to further measures to support water trading, including:

- developing a national water market system
- adopting service standards (and a reporting framework) for processing allocation and entitlement trades within the MDB (COAG 2008b).

Trade barriers

The NWI committed jurisdictions to establishing compatible institutional and regulatory arrangements that facilitate intra and interstate trade. Principles for trading rules were agreed that specify that restrictions can only be used to manage environmental, hydrological, water delivery and related issues — and by implication that they not be used to protect production, water infrastructure use or employment in particular locations or industries. 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.⁸⁶ The NWI includes some specific arrangements in regard to the southern MDB.

Progress to date

There has been considerable progress in removing barriers to trade.

- The Victorian Government removed a:
 - 10 per cent limit on the proportion of water entitlements that could be held by non-landholders in 2009

⁸⁵ NWI Paragraph 58.

⁸⁶ NWI Paragraph 60.

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- 4 per cent limit on the annual entitlement trade out of irrigation districts in 2014.
 - Water market rules and water charge rules introduced for the MDB under the *Water Act 2007* (Cwlth) and enforced by the Australian Competition and Consumer Commission (ACCC), have reduced barriers to trade imposed by irrigation infrastructure operators, including by:
 - ensuring that irrigation infrastructure operators do not prevent, or unreasonably delay, the transformation process that is necessary for many irrigators in New South Wales and South Australia to sell water outside their district
 - capping fees imposed when an irrigator terminates part or all of their access to an irrigation network, as well as limiting the circumstances in which those termination fees can be charged.
 - The MDB jurisdictions have collaborated on interstate water trading issues, leading to the adoption of the tagged trade method (under which entitlements retain their original characteristics when traded between States).
 - The Basin Plan water trading rules were introduced in July 2014. The rules, developed by the MDBA, aim to reduce restrictions on trade and improve transparency (among other things). They operate alongside existing state rules and irrigation infrastructure operator rules. In the event of inconsistencies between the sets of rules, the Basin Plan water trading rules apply. The Basin Plan water trading rules are generally consistent with the principles for trading rules set out in the NWI.

On the other hand, some jurisdictions have not abided by the requirement not to introduce new barriers to trade.

- Some restrictions were introduced in response to the Australian Government's buyback of water entitlements for the environment. For example, the New South Wales Government placed an embargo on environmental water trading in 2009 with a view to halting permanent trades to the Australian Government (NWC 2009). This was eventually lifted, but in 2013 New South Wales announced a 10-year, three per cent per valley limit on further buybacks of New South Wales water entitlements for environmental purposes (NWC 2014c). This was repealed in 2014, but only after the Australian Government agreed to limit buybacks to 1500 GL across the MDB.

There have also been a number of other temporary restrictions imposed over the years, including:

- allocation trade out of the Murrumbidgee being suspended in 2009 to prevent possible third-party impacts (due to conveyance losses) from potentially high trade volumes during drought
- allocation trade from New South Wales into the Victorian Murray being suspended in 2011 to prevent impacts on rights of other entitlement holders due to storage capacity issues

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- interstate allocation trading between New South Wales, Victoria and South Australia being suspended for a brief period in 2012 (NWC 2013b).

The NWC reported that these and other ad hoc suspensions across the southern MDB reduced confidence in the market, but that the States had learned from the experience and were gradually improving their processes. Some examples being reforms to carryover arrangements that made suspensions less likely and announcements being made in advance about triggers for future trade suspensions (NWC 2013b).

Developments since 2014

Since the last assessment of the NWI in 2014 there have been a range of developments with respect to trade barriers.

Commonwealth

- The MDBA is working with MDB jurisdictions to identify and rectify inconsistencies between the Basin Plan trading rules and State trading rules (such as the Murrumbidgee and Goulburn inter-valley transfer (IVT) trade limits).

New South Wales

- All 31 WSPs that commenced in 2004 have been replaced and, in addition, a number of new coastal plans have been introduced. In some cases this has resulted in an expansion of trading opportunities or (in the case of replacement plans) new trading rules designed to better manage environmental and / or third party impacts.
- New procedures to improve information for the Murrumbidgee IVT Account were introduced in February 2016. This change was to improve transparency and timely access to information for southern NSW water users, in response to water user feedback. The new arrangements include clear opening and closing triggers, the current account balance being reported on the WaterNSW website and updated daily, alongside information on the process for receiving and processing trades. There is also a queuing process for trade applications submitted within time but unsuccessful because account limits had been reached.
- In 2016, most operational water management functions transferred from the Department of Primary Industries Water to WaterNSW, including the processing of all dealings under section 71 of the *Water Management Act 2000* (NSW) and the daily administration of the Murrumbidgee IVT Account.
- A number of areas for development have been identified, including developing trading frameworks to allow markets to establish in groundwater and unregulated river water sources and reviewing trade rules that were identified as inappropriate trade barriers in a consultant report.

Victoria

- New local management plans have been prepared for a number of groundwater management areas. These plans redefine groundwater management boundaries and should ‘provide greater scope for groundwater trade’ (SRW 2015, p. 1).
- An interface with MDBA systems has been developed to more efficiently manage the Barmah Choke trade restriction.
- The Water for Victoria plan outlines a number of relevant proposed actions, including developing and improving trade rules and investigating the conversion of take and use licences in unregulated surface water and groundwater systems into water shares and other related products.

Queensland

- Recent legislative changes allow fast tracked conversion of water licences to water allocations (entitlements) and this change is expected to facilitate an expansion in the number of tradeable water allocations (entitlements).
- A new process for transitioning water rights contained in special agreement Acts to the *Water Act 2000* (Qld) potentially allows mining companies (and other water users) to trade water.
- Amendments made to the Fitzroy Basin water plan and resource operations plan in 2015 enabled the conversion of 54 water licences in the Lower Callide groundwater sub-area to tradeable groundwater allocations.

Western Australia

- The new Western Australian Government is currently considering progressing new water resources legislation, which could potentially provide for statutory trading rules and simplify trading arrangements (including by removing the current requirement for Ministerial approval for each trade).
- A new water metering policy is being phased in between 2016 and 2020, and it is expected that this will support further water trading to occur, particularly in the south west of the State.

South Australia

- The Southern Basin and Musgrave Prescribed Wells Areas (Eyre Peninsula) water allocation plan has unbundled groundwater rights from land — a first for South Australia (DEWNR (SA) 2016a)
- Water allocation trades in the South Australian MDB no longer require physical signatures, and applications can now be completed and paid for online (DEWNR (SA), pers. comm., 4 September 2017).

Northern Territory

- An impediment to trade has been identified in the *Water Act 1992* (NT), specifically the (unintended) requirement for trade to be subject to the Notice of Intention advertising requirements and timeframes (ie 30 days) applicable to any licence issued. This adds both time and transaction costs to trade. Approval to clarify the Act so that trade continues to be transparent but able to operate in a more agile way will be presented to the Northern Territory Government by the third quarter of 2017.

ACT

- Despite efforts made by the ACT Government there has been very little progress on establishing interstate water trading between the ACT and New South Wales (EPSDD (ACT), pers. comm., 9 June 2017). However, there would seem to be some prospect that this situation will be rectified, with ACT and New South Wales Ministers advising they have reached in principle agreement to establish trade (Murray-Darling Basin Ministerial Council 2017).

The Commission's view

There has been considerable progress in removing barriers to water trading and this has been an important factor in enabling the large expansion of trade that has occurred since the NWI commenced. Progress has been made in:

- removing restrictions and other barriers that had been deliberately introduced to protect production, water infrastructure use or employment in particular locations or industries
- facilitating interstate trading
- introducing water entitlement and planning arrangements that are more supportive of trading.

Some water trade rules, while being a barrier to trade, are necessary to manage hydrological constraints or environmental impacts. Such rules have costs and benefits, as well as equity implications. The costs arise because rules can prevent trades that would have been beneficial to both the buyer and seller. The benefits come from avoiding adverse effects on third parties that would have resulted from trades had they been allowed. The aim should be to craft rules that maximise net benefits and achieve equitable outcomes. While many existing trade rules have the legitimate purpose of protecting third parties, it is not always clear that they do this in a way that maximises net benefits. Chapter 4 explores opportunities to make improvements in this regard.

The final point is that removing formal barriers to trade is not always sufficient to realise the potential gains from trade. This is because governments not only set formal trade rules, they can also prevent trades and other transfers of water from occurring by directing water utilities that they own, or water recovery programs that they fund, to act in certain ways. As discussed in chapter 4, various State Governments have given implicit or explicit direction to water

utilities not to purchase or transfer water for urban use (effectively placing a policy ban on this supply option), and this has imposed high costs on the community.

Water registers

Under the NWI, States and Territories agreed to implement compatible, publicly-accessible and reliable registers of all water entitlements and trades (both permanent and temporary).⁸⁷ It was also agreed that registers be consistent with a set of guidelines, including that they be of a sufficient standard to promote secure entitlements, provide accessible information (including on the prices of trades) and be administered in a way that seeks to minimise transaction costs for market participants.

Progress to date

The action related to the establishment of registers had been ‘substantially completed’ in New South Wales, Victoria, Queensland, South Australia, Tasmania and the ACT by 2007 (NWC 2007, p. 91). Since then registers of entitlements have been established in Western Australia and the Northern Territory. Registers have been progressively improved over time, but there is considerable variation in their functionality and the access they provide to trade data (table B.6).

Although all States and Territories have a register for water entitlements, Queensland has not made their register available online (or free). Further there are deficiencies in South Australia’s register — it allows searches for a specific licence or permit, but does not list a full catalogue of entitlements held.

Of the jurisdictions that have a reasonably large volume of water trade, only Queensland does not provide an online register of allocation and entitlement trades. Instead, Queensland provides monthly reports on the number of entitlement transfers, volume transferred, turnover and weighted average price by water supply and entitlement type. These reports are made available up to two months after the end of each month (for example, on 25 August 2017, the most recent report was for June 2017). The Queensland register does not record price information for allocation trades.

There are deficiencies across all of the trade registers that are available online. None of the online registers identify trade between related parties or environmental transfers. Also, the National Irrigator’s Council (sub. 13, p. 15) noted that:

It is impossible to get trade data which clearly reveals historical market prices because ... [t]here is a considerable lag between contract date (which is not captured) and registration date. To make matters worse the lag is not uniform in any way (two trades next to each other on a register could have been contracted months apart).

⁸⁷ NWI paragraph 59.

Table B.6 State and territory government water registers

	<i>Publicly-accessible information on water entitlements</i>	<i>Publicly-accessible information on water trades^a</i>	<i>Volume of entitlement trade (GL)^b</i>	<i>Volume of allocation trade (GL)^b</i>
NSW	Yes, lists entitlements by water source and licence category	Yes, lists trades (with prices) and has summaries of number and volume of allocation trades (but not prices)	1044	2725
Vic	Yes, lists entitlements by water source and reliability	Yes, lists trades and generates summary reports and charts (all with prices)	213	2388
Qld	No, can request information on specific water entitlements only, and for a fee	Only has monthly summary reports of entitlement trade (with weighted average prices)	100	290
WA	Yes, can extract lists of licences by water resource via online map tool	No	16	10
SA	Only has facility to search for specific licences and accounts	Yes, lists trades (with prices) and has summary of number and volume of trades (but not prices)	160	379
Tas	Yes, lists water entitlements by region or stream name	Only has trade summary reports (with prices)	3	14
ACT	Yes, lists licences by type	No	Included in NSW total	Included in NSW total
NT	Yes, can extract lists of all licences categorised by water source and type via online map tool	..	0	0

^a The NWI specifies registers should include both permanent and temporary trades. ^b 2015-16 trade volumes. .. Not applicable.

Sources: ABARES (2017, fig. maps 1-5, 1-6, 1-9, 1-10); DELWP (Vic) (2017c); DENR (NT) (2017d); DPI (NSW) (2017b); DPIPWE (Tas) (2016b); DWER (WA) (2017b); EPSPD (ACT) (2017); Queensland Government (2016, 2017a); South Australian Government (2015, 2017b); Tasmanian Irrigation (2017b).

Neither Victoria or New South Wales provide both the trade contract date and registration date, and it is not clear which date measure is used for the Queensland trade summaries. South Australia's register does list two dates — a registration date and date transferred.

The National Water Market System (NWMS) project, which commenced in 2008, sought to enable seamless data transfer between water registers (interoperability) and to provide up-to-date water market information that was easily accessible. More than \$30 million was invested in the NWMS, but the project was terminated in 2014. The NWC (2014c, p. 41) reported that 'it is unclear which actions have been implemented and what, if any, objectives have been achieved'.

One consequence of the NWMS being abandoned is that some planned improvements to state registers were not implemented. The NWMS developed a design for a common registry system that would have involved a national portal linked to high performance state registers. Some States delayed work on improving their own systems expecting that the NWMS would deliver useful results (NWC 2014c). The Tasmanian Department of Primary Industries, Parks, Water and Environment reported that with the sudden withdrawal of Australian

Government funding, the development of a contemporary water registry system for Tasmania has not progressed.

Developments since 2014

In 2014, the NWC argued further progress was required to improve public access to water registers and facilitate data searches (NWC 2014c). Since then there has been a number of developments with water registers.

- Victoria has continued to improve the functionality of the Victorian Water Register to reduce transaction costs for market participants and to improve water market information, including by:
 - listing allocation trade opportunities live on the Victorian Water Register website
 - developing a mobile and tablet compatible website for online allocation trading through the Victorian Water Register website
 - providing more detailed price data on the Victorian Water Register website on take and use licence trading
 - providing detailed transaction and price data on the Victorian Water Register website on annual use limit trading
 - streamlining functionality for water corporations to assess and process trades in unregulated surface water systems
 - developing an interface with MDBA systems to more efficiently manage the Barmah Choke trade restriction
 - enhancing functionality to streamline water corporation processing and approval of common applications to manage and transfer water assets.
- The Northern Territory has established a water portal to improve the transparency of water allocations and licence decisions. A public Water Licence Portal has been developed and linked to the Water Allocation Licence and Permit System used internally to manage and report on licence and permit assessment and approvals. The Portal includes all public requirements under the *Water Act 1992* (NT) as well as information on all groundwater and surface water licences issued at the Territory-wide and allocation plan area level, including the volumes issued, to whom, for what beneficial use purpose, from what water resource system and licence terms. The portal will improve the availability of licence information which is a precursor to supporting trade.
- New South Wales has amended the *Water Management Act 2000* (NSW) to streamline the registration process for trades, but these amendments have not yet commenced.
- South Australia is currently:
 - undertaking a project that aims to make existing trade registry data on trade prices and volumes more easily accessible

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- developing a new water licencing system that will replace South Australia’s existing licencing applications, and enable real-time trade and timely, accurate and customised system reporting.

The Commission’s view

All jurisdictions have met the NWI commitment to establish water registers. These registers help underpin the integrity of water access entitlements. Registers have been progressively improved, but there is considerable variation in their functionality and the access they provide to trade data. Given that the volume and value of trade varies greatly across jurisdictions it is not desirable for each jurisdiction’s register to be of the same standard, including in the access to trade information provided. For example, if the NWMS had been completed it might have resulted in Tasmania having a higher quality water register, but it is not clear that the benefits of this would have outweighed the costs. Of those jurisdictions that have a reasonably high volume of trade, Queensland stands out as having a register that is in most need of improvement in order to provide access to timely trade information. That said, none of the registers distinguish related-party trades or environmental transfers from other trades, which can detract from the usefulness of the information they provide.

Water market information

The NWI recognises the role of good information flows in minimising transaction costs. The main NWI action with the potential to improve market information was the one related to the development of water registers (discussed above). Since the NWI was signed the Bureau of Meteorology (BOM) was assigned responsibility for gathering, managing and disseminating Australia’s water data, including trade data, under the *Water Act 2007* (Cwlth).

Progress to date

The quality and accessibility of water market information has improved over time. The development of water registers has contributed to this, although as table B.6 shows, there is a considerable variation across States in the access to water market information they provide. The requirement for water trade information to be provided to the BOM has also led to improvements. In particular, irrigation infrastructure operators now provide data on within-district trades that in many cases are not recorded in water registers. This has led to more comprehensive market information being available from sources such as BOM’s website and the Australian Bureau of Agricultural and Resource Economics and Sciences’ (ABARES) Australian Water Markets reports.

Water market information is now available from a wide range of sources. Sources that provide price and other information in real time, or which are updated weekly or monthly include:

- state and territory water registers

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- the BOM's website, which includes data that are updated every week on allocation trade, entitlement trade and entitlements on issue that can be reported at various scales (including data from water registers and data on within district trades that are not recorded in water registers)
 - the Department of Agriculture and Water Resources website, which provides monthly reports on entitlement market prices across the MDB — to make the information as up to date as possible it incorporates buyer bid and seller ask prices identified from surveys of water brokers and trading exchanges
 - irrigation infrastructure operators websites (for example, Murray Irrigation has price and volume information for each allocation trade conducted through their Water Exchange trading platform)
 - water brokers (either publicly available online, or on a fee for service basis).

Other sources of market information include:

- ABARES' Australian Water Markets reports, an annual report that includes detailed information on water supply and demand, allocation and entitlement trade and jurisdictions performance against service standards relating to the time taken to approve trades
- state government reports, such as the Victorian Water Trading report
- consultants (for example, Aither produces an annual water markets report that reviews the past year and provides an outlook for the coming year)
- MDBA's website, which contains information about water market products
- ACCC's Water Monitoring report, which contains information on regulated water charges, transformation arrangements and compliance with the water market rules and the water charge rules.

Developments since 2014

In 2014, the NWC stated that further progress was required to improve the availability and quality of water market price and volume data, arguing that data were less than optimal in all market sectors (NWC 2014c). Since then there have been a range of developments with respect to market information.

- BOM released a new online water markets information dashboard in March 2017, which provides improved public access to weekly-updated information (BOM, sub. 5, p. 1).
- New South Wales has improved access to market information by publishing more detailed Water Allocation statements and significantly improving the quality of summarised trade data in annual General Purpose Water Accounting reports, including environmental trades.
- Victoria has improved information in annual trade reports to provide segmented reporting of commercial, non-commercial and environmental allocation trades.

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- In Queensland, the provision of private water brokerage services continues to expand, providing another source of water market information.
 - Western Australia has created the Water Information Reporting portal, which has greatly reduced waiting times for water information.
 - South Australia has introduced electronic advice statements for water licence holders to assist them track their remaining allocations and use the information to make decisions about trade and carryover.

In addition, there are a number of projects in progress that may lead to improvements in market information and other aspects of water trading.

- The Australian Government Department of Industry, Innovation and Science has awarded grants of up to \$100 000 each to several firms to complete a feasibility study relating to the challenge to ‘Improve transparency and reliability of water market information’ (under a program called Business Research and Innovation Initiative). These firms may be eligible to apply for a further grant of up to \$1 million to develop a proof of concept for their proposed solution.
- ABARES is undertaking a project on achieving consistent and robust ‘cleaning’ of water market data (for example, to filter out reported trade prices that are clearly unrealistic, so that more meaningful average prices can be calculated). The aims are to achieve a greater consensus among the organisations that are currently involved in cleaning water data (including ABARES, BOM and various consulting firms) on the best procedures to use and to make ABARES data cleaning algorithms available to other organisations so that they can be used in providing data that are as accurate as possible, given the deficiencies in the source data (ABARES, pers. comm. 21 August 2017).
- The MDBA’s work program includes activities designed to achieve better price reporting within the MDB. For example, in seeking to achieve compliance with the Basin Plan water trading rules the MDBA has flagged that it will work with MDB jurisdictions to improve knowledge of price reporting practices, and that they may intervene where individual traders regularly fail to fulfil their reporting obligations. The MDBA also intends to ‘... pursue work on better price reporting through wider parts of our work program. This will include education activities for water market participants’ (MDBA 2016d, p. 7).
- New South Wales has developed a work program for improving water markets, including by further developing trade information products to meet stakeholder needs. A report commissioned by the New South Wales Government identified the quality and timeliness of price information, and the presence of related-party transfers in reported data as areas for consideration (Aither 2017b).
- Victoria plans to complete a review of water market effectiveness later in 2017. Recommendations from this review will inform further improvements to water market information.
- South Australia is currently undertaking a project to enhance stakeholder understanding, access and involvement in South Australia’s water markets. This project is expected to

deliver a range of information products in 2017-18 focused initially on the River Murray. The information will provide explanations and interpretations about existing trading rules, products, opportunities, risks and other arrangements and (as mentioned above) make existing trade registry data on trade prices and volumes more easily accessible).

The Commission's view

In testing government's progress in minimising transaction costs through providing market information it is important to recognise that:

- the minimisation of transaction costs needs to take into account the cost to government of reducing costs for market participants — for example, investing large sums of money to improve access to market information is unlikely to be warranted in systems that have only a small volume of trade
- both government and private sector organisations (such as water brokers) can play a role in reducing transaction costs for market participants — governments should take this into account in determining the scope of their own initiatives.

Taking these points into account, the Commission's view is that good progress has been made in improving information flows, which has reduced transaction costs for market participants, and, in turn, contributed to the success of water markets in Australia. Governments have played an important role in improving information flows, including by providing market information, and they have continued to make further advances in recent years, as discussed above. Water brokers and other private sector organisations have also played a valuable role. Since the NWI commenced there have been enormous improvements in information and communications technologies generally and this has enabled advances that could not have been contemplated at the time the NWI commenced.

As discussed in chapter 4, there are further gains to be made by focusing government market information initiatives mainly on ensuring that basic trade data recorded in water registers are not compromised by unnecessary errors and are freely available in a timely manner.

Trade approval service standards

Following agreement by COAG, the Natural Resources Management Ministerial Council set service standards for processing times by state approval authorities for approvals or rejections of entitlement and water allocation trades. MDB jurisdictions are required to report publicly on trade processing times against those service standards. This initiative was intended to promote faster processing of trades and is aligned with the NWI outcome of minimising transaction costs.

Progress to date

The Basin States have generally exceeded these standards by some margin ever since the standards were introduced (chapter 4).

While the COAG service standards apply only to the MDB (in 2014 the Interim National Water Reform Committee decided not to develop standards for non-MDB jurisdictions (NWC 2014c), there has been some reporting against them for States outside the MDB.

- Western Australia met the standard for allocation trade in 2014-15 and 2015-16, but did not meet the standard for entitlement trade in those years (30.1 per cent and 28.1 per cent of entitlement trades were processed within 20 business days, with the standard being 90 per cent)
- Tasmania met the standard for allocation trade in 2014-15 (data for entitlement trade were not available).

Developments since 2014

The Commission is not aware of any development with service standards since 2014 other than that the Basin States have generally continued to meet them.

The Commission's view

The timely approval (or rejection) of water trades is important to the efficient functioning of water markets and it is a positive outcome that jurisdictions are meeting the agreed service standards. As discussed in chapter 4, the same standards have been in place since 2009 and it is time that they were reviewed and consideration given to tightening them.

Summary

Table B.7 summarises progress against NWI (and subsequent COAG) water trading commitments.

Table B.7 Assessment summary: Water trading

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Removing unwarranted trade barriers	Largely achieved	There has been considerable progress in removing barriers to water trading and this has been an important factor in enabling the large expansion of trade that has occurred since the NWI commenced. There are some remaining policy bans and other barriers to trade between the irrigation, urban and environment sectors. Also, while many trade rules have the legitimate purpose of protecting third parties, it is not always clear that they do this in a way that maximises net benefits.
Publicly-accessible and reliable water registers	Largely achieved	All jurisdictions have introduced water registers, but there is considerable variation in their functionality and the access they provide to information. Further progress is needed, particularly in Queensland.
Reducing transactions costs by improving water market information	Largely achieved	Both governments and the private sector have contributed to reasonably good progress being made on improving market information and thereby reducing transaction costs in water markets. There are some remaining deficiencies in the quality and accessibility of information in water registers.
Compliance with trade approval service standards	Achieved	Basin States have consistently met the standards for processing times for trade approvals (the standards do not apply to non-Basin jurisdictions).

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met.

B.3 Best practice pricing and institutional arrangements

Under the NWI⁸⁸ jurisdictions agreed to adopt best practice pricing and institutional arrangements in relation to the provision of water for urban uses in metropolitan and regional areas, and for irrigated agriculture (box B.6). In particular, jurisdictions agreed to deliver the following outcomes:

- advance the economically efficient and sustainable use of water resources, irrigation infrastructure and government resources
- ensure sufficient revenue streams to fund the ongoing and efficient delivery of services
- minimise any distortion to water markets from the pricing of infrastructure
- avoid any perverse and unintended outcomes.

⁸⁸ NWI paragraphs 66–77.

Box B.6 **Classification of water users applied in this analysis**

The NWI sets differing price outcomes for the supply of infrastructure services to metropolitan and 'rural and regional' users. 'Rural and regional' users were defined under the NWI as 'water and wastewater services provided for rural irrigation and industrial users and in regional urban areas with less than 50 000 connections'.

The water services required by urban users are different to those using water for irrigation agriculture; for example, urban water is treated to drinking water standards. So, to better target its analysis of progress under the NWI, the Commission has analysed service providers in three groups:

- urban water services within *metropolitan areas*
- urban water services within *regional areas*
- *rural water services* supporting irrigated agriculture.

In practice the distinctions used by the NWI do not reflect the normal meanings of 'metropolitan' (i.e. in a metropolitan area) and 'regional' (i.e. in a regional area). For example, many larger regional providers, particularly in Victoria, have more than 50 000 connections. The Commission has followed the distinction between metropolitan and regional typically used by the relevant jurisdictions, which means that larger regional providers continue to be defined as 'regional'.⁸⁹ Further, jurisdiction-wide providers are classified as 'metropolitan'.

In broad terms, the NWI sought to achieve these outcomes through:

- pricing of infrastructure that delivers full recovery of the costs associated with owning and operating that infrastructure
- involving independent economic regulators in the review or setting of prices for government-owned water services
- institutional arrangements to deliver prudent government investment in infrastructure
- the implementation of charges to recover the costs of water planning and management from users
- the use of market-based mechanisms for the release of unallocated water
- the institutional separation of water resource management from regulation
- using regulation and, where feasible, markets and / or pricing to manage environmental externalities
- transparency measures such as public reporting of: subsidies paid to service providers, including Community Service Obligations (CSOs); the cost of water planning and management activities; and the extent to which those costs are recovered from users.

⁸⁹ The key examples are Central Coast (NSW), Cairns, Toowoomba and Townsville (Qld) and Barwon, Central Highlands, Coliban Water, Gippsland Water, Goulburn Valley Water and Western Water (Vic).

Best practice pricing outcomes

The NWI committed jurisdictions to introducing pricing for water services that is consumption-based, achieves full cost recovery, and is consistent across jurisdictions where entitlements are able to be traded.

The NWI defines upper bound pricing (box B.7) as meeting the principle of cost-reflective pricing. While the NWI required metropolitan providers to achieve ‘continued movement towards upper bound pricing’, it only required ‘rural and regional’ services to achieve upper bound pricing ‘where practicable’.⁹⁰ However, rural and regional services were to achieve lower bound pricing outcomes (box B.7).

In cases where full cost recovery is unlikely to be achievable in the long term, the NWI specifies that a CSO could be necessary. The NWI requires the size of any CSO to be reported publicly and that jurisdictions consider actions to remove the need for an ongoing subsidy.

To further clarify the outcomes to be achieved by the jurisdictions the Natural Resource Management Ministerial Council endorsed the NWI Pricing Principles in 2010. Those principles covered four matters:

- recovery of capital expenditure through prices
- urban water tariffs
- cost recovery for water planning and management activities
- pricing for recycled water and stormwater reuse.

Progress to date — Metropolitan pricing

In 2014 the NWC found in relation to urban water that ‘most jurisdictions have made significant progress towards achieving full cost recovery’ (2014c, p. 44). It further clarified (in relation to both urban and irrigated agriculture water services) that this involved ‘widespread adoption of lower-bound pricing’ but that the movement towards upper bound pricing ‘has been less complete’ (2014c, p. 49).

Appendix B of the NWC’s 2014 assessment discussed pricing approaches and outcomes in general terms.

⁹⁰ NWI paragraph 66(v)(b).

Box B.7 Upper and lower bound pricing

Upper and lower bound pricing were defined in the NWI 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 (WACC).
- 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.

The principal difference between upper and lower bound pricing is that upper bound pricing requires service providers to earn a market reflective return on the capital used to provide services and full recovery of that capital, whereas lower bound pricing does not.

The Commission's approach to assessing progress

The Commission has investigated the process by which prices are set as one approach to determining whether prices are consistent with upper bound pricing. It has also developed its own metric based on data from financial statements to assess pricing outcomes. This second approach will be used to establish a baseline against which to assess future progress through future inquiries. In cases where financial statements are not available, the Commission has looked at data published in the National Performance Report (NPR).

Assessment of price-setting processes

Pricing practices for businesses subject to formal price regulation are generally consistent with upper bound pricing (table B.8). The exceptions are that the regulated return on capital used to recommend prices for Seqwater, and to set prices for TasWater, are below a fully market-reflective level. The former is set based on a debt-rate only (that is, it does not allow for a return on equity) (QCA 2015), while the latter allows an inflation-adjusted return on some assets ('existing assets' transferred to TasWater's predecessors before 1 July 2011) of only 2.13 per cent (OTTER 2015).

Table B.8 Components of metropolitan water prices, 2017

Provider		Operating expenditure allowance	Return on capital	Return of capital	Tax allowance
Sydney Water	NSW	✓	✓	✓	✓
Hunter Water	NSW	✓	✓	✓	✓
WaterNSW	NSW	✓	✓	✓	✓
Melbourne Water	Vic	✓	✓	✓	✓
City West Water	Vic	✓	✓	✓	✓
South East Water	Vic	✓	✓	✓	✓
Yarra Valley Water	Vic	✓	✓	✓	✓
Seqwater ^a	Qld	✓	✓	✓ ^b	✓
Water Corporation ^a	WA	✓	✓	✓	✓
SA Water	SA	✓	✓	✓	✓
TasWater	Tas	✓	✓	✓ ^b	✓
Icon Water	ACT	✓	✓	✓	✓

^a Pricing components refer to recommended prices; actual prices may differ from those recommended.

^b Allowed return on capital is not fully market-reflective.

Sources: ERA (2013); ESC (2017); ESCOSA (2016); ICRC (2013); IPART (2016a, 2016b, 2016c); OTTER (2015); QCA (2015).

Assessment of pricing outcomes

While an assessment of regulatory processes is valuable, it is also important to examine pricing outcomes. There are two main reasons for doing this. First, not all service providers are subject to formal economic regulation and, second, outcomes can differ from those anticipated by regulators. For this reason, the Commission has used data available in financial statements to estimate the rate of return a business earns.

Rate of return calculations reflect both revenues and costs, as well as the value of a service provider's assets. In this way, the metric captures the key elements of a provider's financial performance. If a provider is at upper bound pricing, its rate of return metric should be at levels similar to a market-reflective rate of return.

There are a range of ways to calculate rates of return — different approaches will include different revenue items in their calculations or estimate a business' asset base (which acts as the denominator in a rate of return calculation) in different ways. Given these differences, rate of return estimates should be interpreted with caution.

The NWI Pricing Principles (COAG 2010a) give some guidance as to what sorts of revenue items should be included in calculating rates of return. In particular the NWI Pricing Principles indicate that 'new contributed assets', comprising developer charges, contributed

assets⁹¹ and government grants, should not be paid for by customers as they have already been paid for by developers or governments. This suggests that rate of return calculations should exclude these assets. The NWI Pricing Principles also acknowledge that there are a range of ways of calculating the asset base on which a rate of return should be earned, meaning that there is unlikely to be a single ‘correct’ asset base against which to assess a provider’s rate of return. The different metrics used to calculate rates of return are defined in table B.9.

The NPR publishes financial information for many urban water providers (BOM 2017e). However, this source has some limitations. First, its primary rate of return metric, the ‘economic real rate of return’ (ERRR) includes revenue from developer charges and contributed assets, and therefore estimates a provider’s rate of return in a way that is inconsistent with the NWI Pricing Principles (however, ERRR excludes revenue from government grants). For example, a high ERRR could erroneously imply that prices charged to users are excessive when, in fact, this is being driven by high levels of developer charges or contributed assets. Second, the method for estimating the asset base of providers is unclear and, in some cases, significantly differs from regulated asset bases (RABs) used by economic regulators or book values listed in company financial statements.

While the ERRR metric has flaws, so too does the weighted average cost of capital (WACC) equivalent rate of return. While the WACC equivalent rate of return excludes developer charges and contributed assets from revenue, historical developer charges and contributed assets will still affect the asset value used in the calculation. This affects both the denominator of the calculation (the asset value) and the numerator (via the depreciation charge). Overall, these issues mean that the WACC equivalent rate of return is likely to be too low, both because the denominator is likely to be too high and because the numerator is likely to be too low.

A potentially better measure to use for a service provider’s asset value is its RAB. Regulators typically exclude assets contributed by or paid for by developers or governments from the RAB. However, RABs are not available for all providers due either to them being unregulated or the data only being available in some years, and so it is not possible to use this measure comprehensively. Further, RABs are often set on the basis of ‘line in the sand’ valuation, where the RAB is calibrated to be consistent with current prices at a market-reflective WACC. That process makes assessing rates of return using RABs as the asset value somewhat circular. For this reason, the Commission has not used RABs to assess rates of return.

⁹¹ When new housing is developed in an area, developers generally either pay water utilities ‘developer charges’ to contribute to infrastructure costs, or construct assets themselves and provide these to utilities at no charge (‘contributed assets’).

Table B.9 Definition of metrics in analysis of pricing outcomes

<i>Metric</i>	<i>Description</i>	<i>Source</i>
ERRR equivalent income	Revenue from sales to customers, developer charges, contributed assets, CSO payments, fees and charges, rent and lease income, and unspecified other income	Company financial statements
WACC equivalent income	Revenue from sales to customers, fees and charges and CSO payments	Company financial statements
Operating costs	Total expenses minus depreciation, amortisation, impairment losses and finance costs	Company financial statements
Depreciation, amortisation and impairment losses (DAI)	Depreciation, amortisation and impairment losses	Company financial statements
Book asset value	Book value of property, plant and equipment	Company financial statements
ERRR equivalent	ERRR equivalent income minus operating costs minus depreciation, amortisation and impairment losses, divided by asset value	Calculation
WACC equivalent rate of return (RoR)	WACC equivalent income minus operating costs minus depreciation, amortisation and impairment losses, divided by asset value	Calculation
Total income (NPR)	'Total income for utility' as defined in the NPR	NPR (indicator F3)
Operating costs (NPR)	The sum of 'operating cost – water' and 'operating cost – sewerage' as defined in the NPR	NPR (indicators IF11 and IF12)
Replacement cost of fixed assets (NPR)	The sum of 'written-down value of fixed water supply assets' and 'written-down value of fixed sewerage assets' as defined in the NPR	NPR (indicators F9 and F10)
ERRR (NPR)	'Economic real rate of return – water (ratio)' or 'Economic real rate of return – water and sewerage (ratio)' as relevant, expressed as a percentage	NPR (indicators F17 or F19)

Sources: company financial statements; NWC (2014a).

As there is no one perfect measure to assess rates of return, the Commission has estimated two rate of return metrics:

- an 'ERRR equivalent' metric that includes revenue from developer charges and contributed assets and so is comparable to the ERRR metric reported through the NPR
- a 'WACC equivalent rate of return' that excludes revenue from developer charges and contributed assets, and so uses revenue calculations that are closer to how economic regulators calculated a 'weighted average cost of capital' (WACC).

These metrics are defined in table B.9. The midpoint between these two estimates has been used to assess whether service providers are pricing at upper bound levels. In general if the midpoint of these estimates:

- exceeds 6.5 per cent there is some risk of excessive pricing, that is, that prices are in excess of upper bound levels

-
- is in a broadly market-reflective range between 3.5 and 6.5 per cent⁹², prices are likely to be consistent with upper bound pricing
 - is below 3.5 per cent there is some risk of pricing below upper bound levels as the business is unlikely to be earning a market-reflective return on its capital.

In cases where financial statements were not available, the Commission has looked at the ERRR published through the NPR.

Table B.12 sets out the Commission's comparison of rates of return for metropolitan or jurisdiction-wide water service providers in 2015-16, based on financial statements wherever possible. NPR data are published for all providers where available, for completeness. The same metrics are produced for 2014-15 and 2013-14 in table B.13 and table B.14 respectively.

The Commission's analysis indicates that most metropolitan providers are pricing at or near upper bound levels (table B.10). It highlights two cases where current prices appear to be below upper bound levels — Seqwater and TasWater. However, while these providers are not currently pricing at upper bound levels, they are subject to government commitments to increase prices over time. This is broadly consistent with the NWI's requirement to achieve '*continued movement towards upper bound pricing*' (emphasis added).

- The Queensland Government has a policy position to phase the cost of supply augmentation investments made during the Millennium Drought into prices over time. This means that the costs of these investments will be recovered from bulk water prices over the period to 2027-28, although this rate is set at the cost of debt rather than a fully market-reflective rate (DNRM (Qld), pers. comm., 1 June 2017).
- In Tasmania, sections 68 and 68AA of the *Water and Sewerage Industry Act 2008* (Tas), and regulations made under it, require that TasWater fully comply with pricing principles specifying a rate of return reflecting both a return on equity and debt by 1 July 2020. However, this Act also sets a rate of return on equity that is not fully market reflective, at 3 per cent. Further, the Tasmanian Government has recently introduced legislation to the Parliament to limit the rate at which TasWater's prices increase, citing affordability concerns.

⁹² The range of 3.5 to 6.5 per cent was chosen based on weighted average cost of capital estimates (on a pre-tax real basis) made by various economic regulators (ERA 2013; ESCOSA 2013; IPART 2012, 2016b, 2016c).

Table B.10 Assessment of metropolitan pricing outcomes

<i>Provider</i>	<i>Basis of assessment</i>	<i>Assessment</i>
Sydney Water	Financial statements	Pricing at or just above upper bound levels. The deviation above upper bound levels is too small to indicate significant issues.
Hunter Water	Financial statements	Pricing at upper bound levels.
WaterNSW	Regulatory processes	Insufficient data to independently assess pricing outcomes. Regulatory processes indicate that pricing practices are consistent with upper bound pricing (table Table B.8).
Melbourne Water	Financial statements	Pricing at or just below upper bound levels. The deviation below upper bound levels is too small to indicate significant issues.
City West Water	Financial statements	Pricing at upper bound levels.
South East Water	Financial statements	Pricing at upper bound levels.
Yarra Valley	Financial statements	Pricing at upper bound levels.
Seqwater	Financial statements	Pricing below upper bound levels.
QUU	Financial statements	Pricing at upper bound levels.
Unitywater	Financial statements	Pricing at upper bound levels.
Gold Coast	NPR data	Prices have moved to upper bound levels over the past three years.
Logan	NPR data	Prices are at or just above upper bound levels. The deviation above upper bound levels is likely to be due to the effect of developer charges and contributed assets.
Redland	NPR data	Prices in 2014-15 were well above upper bound levels and at upper bound levels in 2015-16 (no data for 2013-14).
Water Corporation	Financial statements	Pricing at or just above upper bound levels. The deviation above upper bound levels is too small to indicate significant issues.
SA Water	Financial statements	Pricing at or just below upper bound levels.
TasWater	Financial statements	Pricing below upper bound levels.
Icon Water	Financial statements	Pricing at upper bound levels.
Power and Water Corporation	NPR data	The ERRR metric suggests that prices are significantly above upper bound levels, particularly in 2015-16. ^a However, this result appears to be driven by the company's devaluation of its asset base, and so is unlikely to be indicative of excessive pricing.

^a The published ERRR data for the Power and Water Corporation were corrected after a data entry issue was identified, as advised by the BOM and confirmed with the Power and Water Corporation .

Sources: BOM, pers. comm., 7 April 2017; company financial statements; Power and Water Corporation, pers. comm., 22 August 2017.

Other than the cases of Seqwater and TasWater, which were discussed above, table B.10 suggests some other cases where prices may deviate slightly from upper bound levels. In the cases of Sydney Water, the Water Corporation, Melbourne Water and SA Water the deviations were too small to suggest serious problems with pricing practices. In the case of Logan City Council the finding of pricing above upper bound pricing (in one year only) is

likely to be affected by the use of the ERRR metric, which is biased upward due to the inclusion of developer charges and contributed assets. The ERRR reported for Redland City Council in 2014-15 is significantly above market reflective levels and so is of more concern, but it is possible that this is driven by high levels of developer charges in that year. The Queensland Competition Authority (QCA) examined Redland City Council's proposed pricing for 2014-15 and found that it may be too high, but noted that the provider planned to 'smooth' the effect of any overpricing by underpricing in future years (2014). This conclusion is tentatively supported by the fact that its ERRR reduced significantly in 2015-16. Finally, while the Power and Water Corporation's reported ERRR for 2015-16 also suggests pricing above upper bound levels, this appears to be driven by the company's devaluation of its asset base in its NPR reporting, which in turn inflates the reported ERRR metric (Power and Water Corporation, pers. comm., 22 August 2017). Once this effect is taken into account, it is highly unlikely that the Power and Water Corporation is charging above upper bound levels.

There are some further cases where data in financial statements are significantly different to that reported under the NPR. These differences are explained below.

- Sydney Water and Hunter Water report low ERRRs through the NPR. However, this seems to be driven by the very high asset value estimates reported in the NPR; these estimates are significantly above both those companies' book values and their RABs. Given that the Independent Pricing and Regulatory Tribunal's (IPART's) regulatory approach allows for a market reflective rate of return (table B.8), and the Commission's analysis of their financial statements, it is unlikely that the ERRRs reported through the NPR indicate underpricing by these providers.
- Melbourne Water reports low ERRRs through the NPR. However, this seems to be driven by a high estimate of operating costs reported in the NPR. The most likely explanation of this is that payments to the Victorian Desalination Plant are treated as operating costs, rather than as finance payments as they are in Melbourne Water's financial statements. Given that the Essential Services Commission's (ESC's) regulatory approach allows for a market reflective rate of return (table B.8), and the Commission's analysis of its financial statements, it is unlikely that the ERRRs reported through the NPR indicate underpricing by Melbourne Water.

Progress to date — Regional urban pricing

As discussed above, in 2014 the NWC considered that there had been 'widespread adoption of lower-bound pricing' but that the 'movement to upper-bound pricing has been less complete' (NWC 2014c, p. 49). This finding would imply that pricing outcomes in regional areas are broadly consistent with the NWI, which required regional providers to achieve lower bound pricing, but specified that movement towards upper bound pricing need only occur 'where practicable'.⁹³

⁹³ NWI paragraph 66(v)(b).

The Commission's approach to assessing progress

In determining whether prices for regional service providers are consistent with the NWI, the Commission has investigated:

- price-setting processes
- whether the use of subsidies complies with the NWI
- tariff structures
- pricing outcomes (rates of return).

The assessments of subsidies and tariff structures are important here as subsidies are more prevalent in regional areas than in metropolitan areas; similarly, non-NWI consistent tariff structures have persisted in regional areas longer than in metropolitan areas.

The assessment of financial outcomes differs slightly from that for metropolitan providers. Most regional providers do not publish financial statements, and so the NPR is the primary source of financial information available. However, where available, the Commission has assessed pricing outcomes using data from financial statements, similarly to the process for metropolitan providers.

Assessment of price-setting processes

Price-setting processes for regional service providers in Victoria and New South Wales are compliant with lower bound pricing (table B.11), assuming that New South Wales providers comply with the State Government's guidelines for planning and price-setting. It is not possible to assess the price-setting processes for regional Queensland providers as these are not formalised or transparent.

Table B.11 Components of regional water pricing, 2017

	<i>Lower bound</i>		<i>Upper bound</i>		
	<i>Operating expenditure allowance</i>	<i>Allowance for asset refurbishment / replacement</i>	<i>Return on capital</i>	<i>Return of capital</i>	<i>Tax allowance</i>
Regional New South Wales ^a	✓	✓			
Regional Victoria	✓	..	✓	✓	✓
Regional Queensland ^b	?	?	?	?	?

.. not applicable. ^a Assessment assumes that providers comply with the NSW Government's Best Practice Management of Water Supply and Sewerage Guidelines. ^b Regional Queensland price-setting processes are not transparent and cannot be assessed.

Sources: Department of Water and Energy (NSW) (2007); ESC (2013b).

Assessment of subsidies

As discussed above, the NWI anticipates that regional service providers that cannot achieve full cost recovery may require a CSO. Transparent subsidies of this form are considered to be NWI-consistent.

Substantial government grants are provided to regional providers in New South Wales. State government funding of the order of \$2 billion has been allocated in New South Wales over the period from 1996 (chapter 6, box 6.7), and only a small portion of this funding (the \$200 million Aboriginal Communities Water and Sewerage Program) has been structured as a CSO consistent with the NWI. The majority of the funding has been provided through *ad hoc* capital grants and does not appear to have been targeted towards service areas where full cost recovery is not possible, and therefore is not NWI-consistent. Further detail on these subsidies is available in chapter 6.

Though not of the same scale as in New South Wales, the Queensland Government has also provided significant non-NWI consistent funding to regional service providers in recent years. Between 2012 and the 2017-18 State Budget, the Queensland Government allocated funding for water infrastructure in the order of \$140 million, with further funding provided through general local government grants and subsidies (chapter 6, box 6.7). A further \$355 million was allocated in the 2017-18 State Budget. Though some of these funds have been targeted to higher-need communities, such as Aboriginal communities, these funds are tied to capital expenditure and so are not structured as an NWI-consistent CSO.

Victorian regional providers receive only small and occasional government grants. Based on the Commission's analysis of financial statements, over the three years from 1 July 2013 to 30 June 2016 these totalled about \$20 million, or approximately 0.6 per cent of total revenue. While this could suggest some degree of inconsistency with the NWI, in practice this level of grant funding is immaterial to an overall assessment of pricing practices in that State.

Providers in other States and Territories receive CSOs that are structured in line with NWI requirements:

- The Western Australian Government provides the Water Corporation with a CSO for high-cost regional services.
- The South Australian Government provides SA Water with a CSO for high-cost regional services.
- The Northern Territory Government provides both the Power and Water Corporation and its subsidiary, Indigenous Essential Services, with CSOs for high-cost regional and remote Indigenous services respectively.

However, CSOs in the Northern Territory are provided for both electricity and water services, and so the water CSO payments are not fully transparent. Transparently publishing the CSO for water would be consistent with the NWI.

The ACT and Tasmanian Governments do not provide CSOs for their regional services.

Assessment of tariff structures

The Commission is only aware of one provider with non-NWI consistent tariff structures. The Townsville City Council's tariff structure continues to offer a free water allowance, with users on the standard tariff only paying for water consumed in excess of 772 kilolitres per year (City of Townsville 2017). While the Council also offers a two-part tariff with a fully consumption-linked component on an opt-in basis, users on this tariff would pay a higher total charge if they use more than 298 kilolitres (City of Townsville 2017), which is less than Townsville's average household consumption in 2015-16 of 369 kilolitres (BOM 2017e).

Assessment of pricing outcomes

There will always be a degree of ambiguity in any assessment of lower bound pricing (the key NWI requirement for regional service providers). This is because it is difficult to assess whether a provider is making sufficient provision for future asset refurbishment and replacement as required by the NWI definition of lower bound pricing. For this reason the Commission has focused on areas where there is a material risk of pricing below lower bound levels, rather than seeking to form precise estimates as to whether individual providers are complying with this requirement. In general, providers with negative rates of return will be significantly at risk of pricing below lower bound levels, while providers with low, but positive, rates of return are also at some (albeit lower) risk.

A further difficulty with this assessment is data availability. Most regional providers do not publish financial statements and so the primary information on financial rates of return is the ERRR metric published through the NPR (the same metric is also used by the New South Wales Government in its benchmarking studies of regional providers). As noted above, the ERRR metric includes developer charges and contributed assets alongside other sources of revenue, and so tends to overstate rates of return. In practice, this increases the likelihood that providers with low or negative ERRRs are pricing below lower bound levels.

Assessment based on NPR data

The key findings from the Commission's assessment of ERRR data available through the NPR are summarised below:

- While most New South Wales regional providers with more than 10 000 connections appear to be pricing in a way that is consistent with lower bound pricing, a significant number of small providers have negative ERRRs, indicating a significant risk of pricing below lower bound levels. New South Wales Government benchmarking data indicate that 11 water providers (13 per cent) and 14 sewerage providers (16 per cent) had negative ERRRs in 2015-16. Of these, only one provider had more than 10 000 connections. While this is an improvement on outcomes in 2014-15 and 2013-14 (in 2013-14, 24 water providers (25 per cent) and 22 sewerage providers (22 per cent) reported negative ERRRs), this still suggests pricing is often not consistent with the NWI, particularly given that ERRRs tend to overstate rates of return due to the effect of developer charges and contributed assets.

-
- The BOM has informed the Commission that ERRRs for a number of regional Victorian providers have been misreported in recent years (BOM, pers. comm., 2 August 2017). For this reason the Commission has not assessed outcomes for Victorian providers based on NPR data, but instead has undertaken further analysis based on financial statements (detailed below).
 - Financial outcomes for providers in regional Queensland with more than 10 000 connections appear consistent with the NWI. However, a lack of data makes it impossible to assess outcomes for smaller providers.

Assessment based on data from financial statements

While the reporting difficulties with the ERRR metric for Victorian regional providers discussed above prevent the use of NPR data for this assessment, it is possible to assess lower bound pricing for these providers using their reported financial statements. This assessment uses the same methodology used for metropolitan providers (detailed above), and has the advantage that it can highlight the effect of developer charges and contributed assets on reported rates of return. The Commission notes that this approach allows a more precise assessment of lower bound pricing than is possible for New South Wales and Queensland providers, and results should be interpreted with this in mind. The Commission has analysed Victorian regional providers' financial statements for the past two years where data are available (table B.15).

This analysis excludes three Victorian regional providers with significant irrigation operations (Lower Murray Water, Grampians Wimmera Mallee Water and Coliban Water). This is for two reasons. First, it is not possible to assess the financial performance of the urban business on a standalone basis from financial statements as both urban and irrigation operations are combined. Second, the Commission understands that the irrigation asset values for several of these businesses are inflated by historical investment programs with significant government funding. As discussed above, this tends to inflate the depreciation charges applying to these businesses, and so will bias the rate of return calculation downwards. For this reason, calculated rate of return metrics are not likely to give an accurate conclusion of the current pricing practices of these businesses.

The Commission's analysis indicates that Victorian regional providers with predominantly urban operations are achieving lower bound pricing. They typically earn low, but positive, rates of return. The fact that they are earning low rates of return (below upper bound levels) does not indicate a problem with the ESC's approach to regulating these providers — the RABs used in that regulatory process are typically lower than the book asset values published in financial statements, and so it is expected that metrics based on book asset values would suggest a lower rate of return.

Table B.15 Financial outcomes from annual reports for Victorian regional providers, 2014-15 and 2015-16

	Year	ERRR equivalent income	WACC equivalent income)	Operating costs	DAI	Book asset value	ERRR equivalent	WACC equivalent RoR	Midpoint
		\$m	\$m	\$m	\$m	\$m	%	%	%
Barwon	2014-15	207	177	94	65	2 263	2.2	0.8	1.5
	2015-16	218	184	86	67	2 636	2.5	1.2	1.8
Central Highlands	2014-15	95	85	50	20	885	2.8	1.7	2.3
	2015-16	98	90	53	22	1 125	2.0	1.3	1.7
East Gippsland	2014-15	33	31	18	10	328	1.8	1.0	1.4
	2015-16	34	32	19	10	445	1.0	0.7	0.9
Gippsland	2014-15	129	117	75	34	1 073	1.9	0.7	1.3
	2015-16	142	127	78	37	1 111	2.4	1.1	1.7
Goulburn Valley	2014-15	80	72	42	25	768	1.7	0.6	1.2
	2015-16	82	76	45	26	859	1.2	0.6	0.9
North East	2014-15	61	55	36	20	698	0.7	0.0	0.3
	2015-16	66	60	38	20	740	1.0	0.3	0.7
South Gippsland	2014-15	29	27	17	9	310	0.9	0.2	0.6
	2015-16	29	29	19	9	388	0.3	0.1	0.2
Wannon	2014-15	77	74	44	23	548	1.8	1.2	1.5
	2015-16	77	74	43	22	737	1.7	1.3	1.5
Western	2014-15	82	70	41	18	677	3.3	1.5	2.4
	2015-16	102	76	53	19	779	3.8	0.5	2.2
Western-port	2014-15	21	19	13	6	177	1.5	0.4	0.9
	2015-16	21	20	15	6	206	0.0	-0.5	-0.3

Source: company financial statements.

The Commission's view – Metropolitan and regional water services

Metropolitan pricing

Overall, the Commission's assessment indicates that jurisdictions have largely met their commitments to move towards upper bound pricing, with the exception that pricing by Seqwater and TasWater is below upper bound levels. Both Queensland and Tasmania have clear policies to increase prices for these providers over time, which would be broadly consistent with the NWI. However, legislation recently introduced in the Tasmanian Parliament, if passed, would slow the rate of price increases in that State.

While movement towards upper bound pricing is important to achieve economically efficient provision and use of water infrastructure assets, it is not sufficient. Chapter 6 discusses the

role of economic regulation, governance and competition frameworks in supporting these broader objectives.

Regional urban pricing

Overall, the Commission's analysis indicates a number of instances where pricing by some regional providers is inconsistent with the NWI.

The primary risk is in regional New South Wales, while some risk exists in regional Queensland. New South Wales Government data shows that a number of providers in that State are earning negative ERRRs and are therefore highly likely to be pricing below lower bound levels. Further, if the effect of developer charges and contributed assets are taken into account this would be likely to highlight further examples of potential underpricing. However, the instance of underpricing has reduced over time. In regional Queensland an absence of data means that it is not possible to determine whether pricing practices among these providers are consistent with the NWI.

The provision of significant capital subsidies by both the New South Wales and Queensland Governments further suggests that pricing practices in these States are not consistent with the NWI.

There are four main conclusions from this analysis.

- Capital subsidies in New South Wales and Queensland should be reformed to become NWI-consistent CSOs (discussed further in chapter 6).
- Townsville should reform water tariffs such that all users are on consumption-based tariffs.
- A range of regional providers should review their pricing approaches to ensure they are pricing at levels consistent with lower bound pricing, particularly in New South Wales.
- NPR and other financial reporting processes should report, in addition to the ERRR metric, a second metric that excludes the effect of developer charges and contributed assets to allow clearer analysis of compliance with upper and lower bound pricing, and to allow all jurisdictions to be compared on the same basis (discussed further in chapter 6).

The Commission's analysis also indicates that the NWI requirement to report CSOs transparently could be more fully implemented in the Northern Territory.

Table B.12 Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2015-16

Provider ^a	Juris-diction	ERRR equivalent income	WACC equivalent income	Operating costs	DAI	Book asset value	ERRR equivalent	WACC equivalent RoR	Midpoint	Total income (NPR)	Operating costs (NPR)	Replacement cost of fixed assets (NPR)	ERRR (NPR)
		\$m	\$m	\$m	\$m	\$m	%	%	%	\$m	\$m	\$m	%
Sydney	NSW	2 825	2 659	1 358	276	17 133	7.0	6.0	6.5	2 803	1 294	45 069	2.0
Hunter	NSW	322	294	130	51	2 504	5.6	4.5	5.1	325	138	7 077	2.2
Melbourne	Vic	1 853	1 690	460	396	14 665	6.8	5.7	6.2	1 427	845	12 124	2.3
CWW	Vic	667	605	480	61	1 879	6.7	3.4	5.1	670	482	2 412	8.0 ^c
SEW	Vic	1 038	894	694	91	3 602	7.0	3.0	5.0	1 040	656	3 725	9.6
YVW	Vic	1 019	930	701	113	4 157	4.9	2.8	3.9	1 009	693	4 347	4.9 ^c
Seqwater	Qld	803	794	228	313	11 118	2.4	2.3	2.3	818	np	6 706	3.0
QUU	Qld	1 265	1 029	653	187	5 258	8.1	3.6	5.8	1 269	653	4 862	8.8
Unitywater	Qld	643	490	305	79	3 273	7.9	3.2	5.6	638	291	3 304	9.0
GCCC	Qld	np	np	np	np	np	np	np	np	610	275	3 608	6.3
Logan	Qld	np	np	np	np	np	np	np	np	239	111	1 502	6.4
Redland	Qld	np	np	np	np	np	np	np	np	121	53	704	6.2
WC ^b	WA	2 689	2 373	879	528	16 419	7.8	5.9	6.8	1 855	594	15 222	5.3
SA Water	SA	1 495	1 403	511	362	13 604	4.6	3.9	4.2	1 427	497	13 170	4.6
TasWater	Tas	296	273	176	77	1 985	2.2	1.0	1.6	309	178	2 628	-0.1 ^c
Icon Water	ACT	337	308	160	51	2 180	5.8	4.5	5.1	350	155	3 812	3.7
PWC ^b	NT	np	np	np	np	np	np	np	np	209	87	675	11.5 ^c

^a CWW = City West Water; SEW = South East Water; YVW = Yarra Valley Water; QUU = Queensland Urban Utilities; GCCC = Gold Coast City Council; WC = Water Corporation; PWC = Power and Water Corporation. ^b The NPR publishes data for different service areas separately; these are summed here to produce a provider-wide estimate. ^c ERRR data for these businesses were corrected after a data entry issue was identified, based on the advice of the BOM. np not published

Sources: BOM (2017b); company financial statements.

Table B.13 Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2014-15

Millions of dollars

<i>Provider^{a,b}</i>	<i>Juris-diction</i>	<i>ERRR equivalent income</i>	<i>WACC equivalent income)</i>	<i>Operating costs</i>	<i>DAI</i>	<i>Book asset value</i>	<i>ERRR equivalent</i>	<i>WACC equivalent RoR</i>	<i>Midpoint</i>	<i>Total income (NPR)</i>	<i>Operating costs (NPR)</i>	<i>Replacement cost of fixed assets (NPR)</i>	<i>ERRR (NPR)</i>
		<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>%</i>
Sydney	NSW	2 713	2 551	1 324	253	15 471	7.3	6.3	6.8	2 715	1 249	44 110	1.7
Hunter	NSW	315	280	137	65	2 613	4.3	3.0	3.6	317	147	6 889	2.0
Melbourne	Vic	1 732	1 615	471	411	14 294	5.9	5.1	5.5	1 362	857	12 364	1.6
CWW	Vic	594	553	444	45	1 872	5.6	3.5	4.5	607	452	1 613	7.1 ^d
SEW	Vic	916	823	639	82	3 511	5.6	2.9	4.2	931	609	3 876	8.2
YVW	Vic	932	862	640	98	3 978	4.9	3.1	4.0	943	np	4 294	4.5 ^d
Seqwater	Qld	771	763	233	257	12 031	2.3	2.3	2.3	801	np	6 873	np
QUU	Qld	1 189	979	638	178	5 146	7.3	3.2	5.2	1 210	646	4 756	7.7
Unitywater	Qld	607	482	289	93	3 193	7.1	3.1	5.1	611	284	3 225	8.1
GCCC	Qld	np	np	np	np	np	np	np	np	524	273	3 729	4.2
Logan	Qld	np	np	np	np	np	np	np	np	242	112	1 457	6.6
Redland	Qld	np	np	np	np	np	np	np	np	99	52	642	11.7
WC ^c	WA	2 712	2 290	855	489	16 208	8.4	5.8	7.1	1 884	573	15 368	5.7
SA Water	SA	1 414	1 321	510	326	13 486	4.3	3.6	3.9	1 376	472	13 025	4.5
TasWater	Tas	293	275	166	68	1 878	3.1	2.2	2.6	305	169	2 694	0.7
Icon Water	ACT	308	291	171	44	2 134	4.4	3.6	4.0	290	128	3 744	3.0

^a CWW = City West Water; SEW = South East Water; YVW = Yarra Valley Water; QUU = Queensland Urban Utilities; GCCC = Gold Coast City Council; WC = Water Corporation; PWC = Power and Water Corporation. ^b No NPR data were published for the Power and Water Corporation (NT) in this year. ^c The NPR publishes data for different service areas separately; these are summed here to produce a provider-wide estimate. ^d ERRR data for these businesses were corrected after a data entry issue was identified, based on the advice of the BOM. **np** not published

Sources: BOM (2017b); company financial statements.

Table B.14 Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2013-14

<i>Provider^{a,b}</i>	<i>Juris-diction</i>	<i>ERRR equivalent income</i>	<i>WACC equivalent income</i>	<i>Operating costs</i>	<i>DAI</i>	<i>Book asset value</i>	<i>ERRR equivalent</i>	<i>WACC equivalent RoR</i>	<i>Midpoint</i>	<i>Total income (NPR)</i>	<i>Operating costs (NPR)</i>	<i>Replacement cost of fixed assets (NPR)</i>	<i>ERRR (NPR)</i>
		<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>%</i>	<i>%</i>	<i>%</i>	<i>\$m</i>	<i>\$m</i>	<i>\$m</i>	<i>%</i>
Sydney	NSW	2 608	2 478	1 301	261	14 635	7.2	6.3	6.7	2 641	1 253	43 150	1.6
Hunter	NSW	324	297	137	54	2 653	5.0	4.0	4.5	312	134	6 852	2.4
Melbourne	Vic	1 268	1 167	429	338	14 206	3.5	2.8	3.2	1 418	906	12 035	1.7
CWW	Vic	609	579	471	42	1 812	5.2	3.6	4.4	629	491	3 094	8.1
SEW	Vic	968	875	693	79	3 246	6.0	3.2	4.6	1 000	682	3 368	8.6
YVW	Vic	989	931	712	91	3 935	4.7	3.3	4.0	1 016	696	4 138	5.4
Seqwater	Qld	707	691	242	343	10 813	1.1	1.0	1.1	738	238	10 775	2.1
QUU	Qld	1 052	906	607	171	5 020	5.5	2.5	4.0	1 104	636	4 679	6.1
Unitywater	Qld	544	456	275	81	3 094	6.1	3.2	4.7	558	278	3 129	6.5
GCCC	Qld	np	np	np	np	np	np	np	np	503	259	3 759	3.7
Logan	Qld	np	np	np	np	np	np	np	np	223	108	1 486	5.8
WC ^c	WA	2 487	2 196	845	475	15 747	7.4	5.6	6.5	1 784	572	15 172	5.1
SA Water	SA	1 362	1 254	539	333	13 663	3.6	2.8	3.2	1 334	505	12 794	3.3
TasWater	Tas	269	257	154	61	1 828	3.1	2.3	2.7	277	158	2 690	-0.2
Icon Water	ACT	313	288	172	43	2 055	4.8	3.5	4.2	310	123	3 641	3.0
PWC ^c	NT	np	np	np	np	np	np	np	np	227	74	856	8.4

^a CWW = City West Water; SEW = South East Water; YVW = Yarra Valley Water; QUU = Queensland Urban Utilities; GCCC = Gold Coast City Council; WC = Water Corporation; PWC = Power and Water Corporation. ^b No NPR data were published for Redland City Council (Qld) in this year. ^c The NPR publishes data for different service areas separately; these are summed here to produce a provider-wide estimate. **np** not published

Sources: BOM (2017b); company financial statements.

Rural water

Water for irrigated agriculture is delivered via a mix of bulk water services and distribution services (box B.8) which are operated by government corporations and private operations, often member corporations or trusts. The NWI water pricing outcomes and actions are not differentiated between service types or the nature of their ownership. However, the varying ownership arrangements for distribution infrastructure across Australia may mean that different policies are required to meet the outcomes sought.

Box B.8 **The services delivering water to irrigated agriculture**

Bulk water services

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.

Distribution services

Distribution 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 (chapter 7, section 7.1).

The NWC included the Northern Territory and ACT in its 2014 assessment of progress toward completion of the agreed actions on pricing for ‘rural and regional’ water services. That analysis effectively focused on urban uses as:

- agricultural water users in the Northern Territory installed their own water infrastructure — chiefly bores and channels — and so there are no water infrastructure charges levied in the Northern Territory
- very little water is used for agriculture in the ACT and there are no dedicated bulk water or distribution services for irrigated agriculture.

In the absence of dedicated water services for irrigated agriculture in the Northern Territory and the ACT for the period 2014–2017, they have not been included in this assessment of progress.

Progress to date — Rural bulk water services pricing

The NWC’s 2014 assessment was that all jurisdictions had achieved lower bound pricing outcomes and that it was ‘difficult to identify the degree to which pricing is moving to upper-bound, or whether price increases are reflecting a more comprehensive approach to cost recovery’ (2014c, p. 45).⁹⁴

⁹⁴ This assessment included Tasmania where bulk water services pricing is unregulated.

No jurisdiction has changed its approach to the pricing of bulk water services since the NWC’s 2014 assessment (table B.16). South Australia, where the costs of River Murray Operations are not passed onto rural water users, is the only jurisdiction where full cost recovery is not occurring. All other jurisdictions are constructing their prices consistent with lower bound principles (at a minimum).

Table B.16 Components of rural bulk water services pricing

	<i>Lower bound</i>		<i>Upper bound</i>		
	<i>Operating expenditure allowance</i>	<i>Allowance for asset refurbishment / replacement</i>	<i>Return on capital</i>	<i>Return of capital</i>	<i>Tax allowance</i>
Cwth ^a	✓	✓			
NSW	✓	✓ ^b	✓	✓	✓
Vic	✓	✓ ^b	✓	✓	✓ ^c
Qld	✓	✓	d	d	
WA	✓	✓			
SA ^e					
Tas	✓	✓			

^a Relates to the cost of River Murray Operations (RMO) passed onto the Basin States (chapter 7, section 7.4). ^b Relates to the costs of RMO passed on to users. ^c Allowance is on actual tax payable. ^d Some schemes are priced above lower bound but prices are not explicitly set to provide a return on, and return of, capital. ^e Bulk water charges are not levied in South Australia nor are RMO costs passed onto users.

The Commission was unable to replicate the quantitative analysis of pricing outcomes used in the analysis of urban pricing outcomes (above) because:

- there are no contemporary data sources comparable to the NPR
- there are no consistent time series data on which to form a view of prices over time that is not shaped by the seasonal vagaries of individual years
- there is not sufficiently detailed segment reporting in the annual reports of WaterNSW, SunWater, Goulburn-Murray Water, Water Corporation (WA) and Tasmanian Irrigation to facilitate an analysis of pricing outcomes for rural water services⁹⁵
- the construction of Tasmanian Irrigation’s Tranche 1 and 2 projects since 2010 distorts year-to-year rate of return calculations.

The lower bound pricing outcomes required under the NWI for rural water services are better assessed against the scale of government subsidies for operating costs. The presence of such a subsidy is clear evidence that lower bound pricing is not being achieved.

⁹⁵ This variously prevents the isolation of financial results for rural water from other uses (such as industrial and urban) and the separation of bulk water outcomes from distribution outcomes.

The NWI commits jurisdictions to publicly disclose any subsidies paid. At present, this is variously undertaken through budget papers, regulatory price determinations and the annual reports of bulk water service providers (depending on the jurisdiction).

The scale of annual subsidies is set out in table B.17. As outlined in chapter 7 (section 7.4), there are also undisclosed subsidies and / or cross-subsidies between users that arise from bulk water entities holding unsold water entitlements and paying the user charges associated with those entitlements. These subsidies are a particular issue for Paradise Dam (Queensland) where there are substantial entitlements held by SunWater (2016). Similar subsidies, though small in nature, also arise for some of Tasmanian Irrigation’s legacy schemes.

Table B.17 Government subsidies for bulk water supplies to irrigators

	<i>Average annual subsidies</i>	<i>Period</i>	<i>Comments</i>
	\$ million		
WaterNSW	0.8 ^a	2017–21 ^b	Subsidies relate to the north valley and south coast valley bulk water services. Attempting to transition to full cost recovery for these valleys is considered likely to price all customers out of the market before cost recovery is achieved (IPART 2017). As a result, prices have been set between the customers’ capacity to pay and the avoidable cost to WaterNSW if the services were not supplied.
Victoria	-	-	
SunWater (Qld)	5.4 ^c	2014–16	Queensland has set price paths for the relevant schemes that will see the subsidies reduce over time. There was a decrease in the subsidies paid to SunWater from \$6.0 million in 2014-15 to \$4.7 million in 2015-16. Over the same period there was a 10 per cent decline in the subsidies paid to Seqwater.
Seqwater (Qld)	2.1 ^c	2014–16	
Water Corporation (WA)	29.9 ^a	2017-18 ^b	Prices are negotiated on a case-by-case basis by the Water Corporation with its irrigation bulk water customers (four distribution networks and one private company). Prices are set to recover operating costs and an allowance for infrastructure replacement (that is, lower bound pricing). There are no material government subsidies for operating costs or asset replacement — the quoted subsidy almost entirely relates to a return on, and return of, capital for pre-existing assets.
Tasmanian Irrigation	0.9	2015-16	The majority of the subsidy is for unfunded borrowing costs.
South Australia			While there is no supplier of bulk water for irrigation in South Australia, there is effectively a government subsidy for the cost of River Murray Operations. The amount of this subsidy is not publicly disclosed.

^a Subsidy relative to upper bound pricing. ^b A forecast subsidy was used in these instances as it is the most recent and reliable indicator available. ^c Includes bulk water services and distribution services.

Sources: Department of Water (WA), pers. comm., 26 June 2017; DNRM (Qld), pers. comm., 1 June 2017; DPIPWE (Tas), pers. comm., 2 June 2017; ERA(WA) (2017a); IPART (2017); NWC (2014c); Responses to State and Territory information requests; Seqwater (2016); SunWater (2016); Tasmanian Irrigation (2016a).

Progress to date — rural distribution services pricing

The NWC (2014c) noted that the approaches to pricing across distribution schemes vary according to the location, ownership arrangements and size of the scheme. Those arrangements are unchanged in 2017 (table B.18).

Table B.18 Ownership and pricing arrangements for distribution services: 2017

	<i>Location</i>	<i>Ownership and pricing arrangements</i>
NSW	Inside MDB	• Infrastructure is user-owned — operators set their own prices and are subject to the <i>Water Charge (Termination Fee) Rules 2009</i> and <i>Water Charge (Infrastructure) Rules 2010</i> .
	Outside MDB	• Infrastructure is user-owned — operators are unregulated and set their own prices.
Vic	Inside MDB	• Infrastructure is publicly owned — maximum prices are set by the ESC and operators are subject to the <i>Water Charge (Termination Fee) Rules 2009</i> and <i>Water Charge (Infrastructure) Rules 2010</i> .
	Outside MDB	• Infrastructure is publicly owned — maximum prices are set by the ESC.
Qld	Inside MDB	• Infrastructure is publicly owned — maximum prices are set by the Government and operators are subject to the <i>Water Charge (Termination Fee) Rules 2009</i> and <i>Water Charge (Infrastructure) Rules 2010</i> .
	Outside MDB	• For publicly owned infrastructure — maximum prices are set by the Government. • For user-owned infrastructure — prices are set by the operator.
WA	Statewide	• Infrastructure is user-owned — operators set their own prices but the Government can request these be reviewed by the economic regulator.
SA	Statewide	• Infrastructure is user-owned — operators set their own prices and are subject to the <i>Water Charge (Termination Fee) Rules 2009</i> and <i>Water Charge (Infrastructure) Rules 2010</i> .
Tas	Statewide	• Infrastructure is publicly owned — the operator is unregulated and sets its own prices.

ESC Essential Services Commission. **MDB** Murray-Darling Basin.

The NWC found that lower bound price outcomes were being achieved in the MDB in 2014. However, outside the Murray–Darling, the NWC found information on, and transparency of, the extent of cost recovery to be ‘generally poor’ (with the exception of Harvey Water (WA) and Tasmanian Irrigation).

It is generally accepted that there are sufficient incentives for user-owned distribution networks to operate efficiently, reflect the associated costs in prices and maintain the infrastructure network (ACCC 2016). Accordingly, 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. However, these networks have a degree of market power and regulation in place to limit the abuse of that market power in price setting — the Commission considers those issues in chapter 7 (section 7.5).

Prices for government-owned distribution networks in Victoria, Tasmania and parts of Queensland are set in the same manner as bulk water services. The resultant prices are generally consistent with lower bound principles (at the minimum) except for some Queensland schemes where small operating subsidies are being paid (those subsidies are captured in the overall figures reported in table B.17).

The Commission's view – Rural water

At a minimum, all jurisdictions (except South Australia's bulk water supplies) are constructing the majority of their prices for both bulk water and government-owned distribution services consistent with the lower bound parameters set out in the NWI. Where prices fall short of lower bound outcomes, the resultant government subsidy is generally disclosed and a price path set to move toward cost recovery.

As anticipated in the NWI and within the NWI Pricing Principles, the realisation of the outcomes sought under the NWI rely on the interaction between the construction of prices, the role of economic regulators and government decisions on funding new infrastructure. For example:

- oversight by an independent economic regulator of the prices charged for government-owned infrastructure (as required under the NWI and discussed below) supports not just the construction of prices according to lower (or upper) bound principles but also the efficiency of those services and the transparency of charges to users
- under the NWI Pricing Principles, upper bound pricing should be achieved for new government-owned infrastructure. Achievement of this outcome in turn relies upon government decisions on how new infrastructure is financed and funded (also covered under the NWI and discussed below).

The interplay of these factors and their collective effect on the achievement of the NWI outcomes and objectives, is considered in chapter 7.

Independent price regulation

The NWI requires the jurisdictions to 'use independent bodies 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 ...'.⁹⁶ This requirement applies to both urban and rural water uses. Each is considered in turn below.

⁹⁶ NWI paragraph 77.

Urban water (metropolitan and regional)

Progress to date

The NWC found that ‘while all jurisdictions have implemented reforms to deliver economic regulatory oversight, many governments continue to blur their roles as owner, policy setter and regulator. There is evidence that independence is not always maintained’ (2014c, p. 65).

At present economic regulatory arrangements are as follows:

- Economic regulators set prices or revenues for providers in New South Wales (metropolitan providers only), Victoria, South Australia, Tasmania⁹⁷ and the ACT
- Economic regulators provide non-binding recommendations in Western Australia and south-east Queensland (bulk water only)
- Providers in regional New South Wales, south-east Queensland (retailer-distributors), regional Queensland and the Northern Territory are not subject to formal price regulation.

The economic regulatory arrangements in each jurisdiction across both metropolitan and regional urban services, including the situation in 2014 and changes since that time, are set out in table B.19.

Developments since 2014

Developments since 2014 include the removal of the QCA’s price monitoring function in relation to south-east Queensland retailer distributors and legislation introduced in the Tasmanian Parliament that would greatly constrain the role of OTTER in setting prices for TasWater.

The Commission’s view

The jurisdictions agreed under the NWI ‘to use independent bodies 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’.⁹⁸ As no further criteria are specified in the NWI, it is a matter of judgment whether a jurisdiction’s approach advances the objectives and outcomes sought under the NWI. However, in general, arrangements are strongest in New South Wales (metropolitan providers only), Victoria, South Australia, Tasmania and the ACT; though, arrangements in Tasmania may be changed by legislation currently before the Tasmanian Parliament.

The Commission has analysed the pricing and institutional arrangements for urban water in chapter 6 and identified areas where greater use of economic regulation is likely to improve

⁹⁷ The Tasmanian Government has recently introduced legislation that would greatly constrain the role of the economic regulator in setting prices in that State.

⁹⁸ NWI paragraph 77.

outcomes and support the broader NWI outcome of the efficient and sustainable use of water infrastructure assets.

Table B.19 Economic regulation of metropolitan and regional urban services

	Arrangements in 2014		Arrangements in 2017
	Metropolitan	Regional urban	
NSW	IPART sets maximum prices	Providers set their own prices in accordance with the <i>NSW Best Practice Management of Water Supply and Sewerage Framework</i> . ^a The New South Wales Government monitors financial outcomes through annual performance reporting.	No change
Vic	The ESC sets maximum prices	The ESC sets maximum prices.	No change
Qld	The QCA recommends maximum prices for Seqwater (bulk water). The QCA reviews price outcomes for south-east Queensland retailer-distributors.	Providers set their own prices. The industry and the Queensland Government both undertake performance reporting, though financial reporting is limited to larger providers.	The QCA no longer reviews prices for south-east Queensland retailer-distributors. The Queensland Government is considering QCA advice on a long-term approach to economic regulation in south-east Queensland.
WA	The Government can request the Economic Regulation Authority to make price recommendations for the Water Corporation.	The Government can request the Economic Regulation Authority to make price recommendations for the Water Corporation, Aqwest and Busselton Water.	No change.
SA	Essential Services Commission of South Australia sets maximum revenues for SA Water.	Essential Services Commission of South Australia sets maximum revenues for SA Water.	No change.
Tas	The Office of the Tasmanian Economic Regulator (OTTER) sets maximum prices for TasWater. ^b	OTTER sets maximum prices for TasWater. ^b	Legislation has been introduced that would greatly constrain the role of OTTER in setting prices.
NT	The NT Government sets prices for the Power and Water Corporation.	The NT Government sets prices for the Power and Water Corporation.	No change.
ACT	The Independent Competition and Regulatory Commission sets maximum prices for Icon Water (then ACTEW).	Not applicable.	No change.

^a Essential Water, which serves Broken Hill, is regulated by IPART. ^b The prices charged by TasWater in 2014 were based on a 2012 determination applied to the three Tasmanian service providers then in existence.

Sources: DNRM (Qld), pers. comm., 1 June 2017; Department of Water and Energy (NSW) (2007); DEWS (Qld.) (2017); ERA (2017a); ESC (2017); ESCOSA (2016); ICRC (2013); IPART (nd); NSW Government (2017); OTTER (2015); QCA (2015, 2017); qldwater (2017); Utilities Commission (NT) (2017).

Rural water

Progress to date

Table B.20 sets out a comparison of the NWC's (2014c) assessment of progress toward this action compared with current arrangements. Overall, there has been no change in arrangements since 2014.

The NWC did not consider the cost of the MDBA's River Murray Operations (RMO) borne by the Basin States and passed through to users in New South Wales and Victoria. The RMO budget is determined by the MDB Ministerial Council and there is no scrutiny of that process by an economic regulator. There are calls from participants for RMO costs to be subject to the scrutiny of an economic regulator if the States continue to pass those costs through to users (chapter 7, section 7.4).

Table B.20 Role of economic regulators in rural water services

	<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
NSW	IPART sets prices for government-owned bulk water infrastructure.	No change.
Vic	ESC sets prices for government-owned bulk water infrastructure and government-owned distribution networks.	No change.
Qld	QCA recommends prices for government-owned bulk water infrastructure and government-owned distribution networks. Prices are set by the Government.	No change.
WA	ERA reviews and recommends prices for the government-owned bulk water infrastructure.	The Government can request the ERA to review prices. Otherwise, prices are negotiated between the Water Corporation and its customers.
SA ^a	—	No change.
Tas ^b	Prices were not reviewed by the economic regulator.	No change.

^a There are no bulk water service providers in South Australia. ^b Prices for both government-owned bulk water infrastructure and government-owned distribution networks are set by the operator (Tasmanian Irrigation).

Sources: NWC (2014c); Responses to State and Territory information requests.

The Commission's view

The jurisdictions agreed under the NWI 'to use independent bodies 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'.⁹⁹ As no further criteria are specified in the NWI, it is a

⁹⁹ NWI paragraph 77.

matter of judgment whether a jurisdiction's approach advances the objectives and outcomes sought under the NWI.

New South Wales and Victoria are meeting their commitments under the NWI by having prices set by an independent economic regulator.

Queensland is meeting its NWI commitments by subjecting prices to the QCA's scrutiny. The terms of reference for the QCA's price reviews are set by the Minister and, in the past, the QCA has been limited in the matters it could consider in its review. Such limits may prevent the QCA from recommending optimal prices and also detract from the transparency of the Queensland Government's final decision on prices. For these reason, the Commission considers there is scope to improve processes in Queensland (chapter 7, section 7.3).

For the small bulk water schemes that predominate in Western Australia and Tasmania, there would very likely be no net benefits from implementing a formal, ongoing price setting or review function. This is because the costs of the economic regulator's oversight would exceed any efficiency gains due to the modest size of those operations. As such, an alternative, more cost-effective form of regulatory scrutiny is required — the alternatives are considered further in chapter 7 (section 7.3).

While the MDBA's operating costs were found to be efficient in 2014 (Synergies Economic Consulting 2014), the absence of an ongoing review by an independent economic regulator creates some uncertainty over whether those outcomes will be maintained into the future.

While economic regulation brings a number of benefits, such as transparency and the 'depoliticisation' of pricing decisions, it will not deliver the objectives and outcomes sought under the NWI on its own. For example, one of the benefits of independent economic regulation is the scrutiny of capital expenditure for its prudence but these gains are lost when governments make poor decisions on grant funding for infrastructure.

The interplay of economic regulation, government decisions on new infrastructure, pricing outcomes and the collective effect on the achievement of the NWI outcomes and objectives, is considered in chapter 7.

Investment in new or refurbished infrastructure

The jurisdictions agreed under the NWI that investment in new or refurbished water infrastructure would only proceed where it was economically viable and ecologically sustainable. The NWI did not prescribe specific actions to support the delivery of these outcomes.

Urban water

A range of institutional elements can support economically viable and ecologically sustainable infrastructure investments. These include:

-
- governance arrangements that support robust decision-making by service providers
 - clear institutional responsibilities around investment planning processes
 - rigorous review of investment decisions, such as is provided by independent economic regulation
 - not distorting investment decisions through the provision of government subsidies.

Progress to date

In 2014 the NWC expressed concern that ‘existing planning and regulatory structures are not well placed to encourage optimal future long-term infrastructure and service planning decisions’ (2014c, pp. 64–65).

Table B.21 summarises a range of important factors affecting investment decisions in each jurisdiction.

Developments since 2014

New capital subsidies have been introduced in New South Wales and Queensland and planning arrangements have changed in Victoria for both metropolitan and regional urban providers (table B.21).

The Commission’s view

Given the multiplicity of elements that affect investment decisions, it is not realistic to make definitive judgements on whether the NWI’s requirement of economically viable and ecologically sustainable infrastructure investments is being achieved. Further, while good institutional and regulatory frameworks offer some protection against poor decisions, they are no guarantee. Ultimately, good outcomes require a consistent commitment from governments, service providers and regulators to good governance frameworks, robust and transparent decision-making processes, and avoiding the politicisation of decisions.

Chapter 6 highlights several areas in which the Commission considers that investment decision-making frameworks can be made more robust, and thereby better support the broad objective of economically viable and ecologically sustainable infrastructure investments. These are:

- extending economic regulation to retailer-distributors in south-east Queensland and the main provider in the Northern Territory
- enhancing existing regulatory process in south-east Queensland (for bulk water) and Western Australia
- clarifying supply augmentation arrangements in a range of locations, including metropolitan New South Wales, South Australia, Western Australia, Tasmania, the ACT and the Northern Territory

- reforming capital subsidies to local government-owned service providers in regional New South Wales and Queensland into CSO payments, consistent with the NWI.¹⁰⁰

Table B.21 Investment decision-making frameworks for urban providers

<i>Arrangements in 2014</i>			
	<i>Metropolitan</i>	<i>Regional urban</i>	<i>Arrangements in 2017</i>
NSW	Service providers are corporatised. Planning for Greater Sydney and the Hunter region occurs through metropolitan water planning processes coordinated by the NSW Government. Investments are subject to independent economic regulation, but some past decisions have been excluded from scrutiny by government.	Investment plans in accordance with <i>NSW Best Practice Management of Water Supply and Sewerage Framework</i> . A range of subsidies for investment, including through the Country Towns Water Supply and Sewerage Program.	New capital subsidies for regional providers, including through the Water for Security for Regions program, Regional Water and Waste Water Backlog program, the Resources for Regions program and the Safe and Secure Water program. Review of <i>Best Practice Framework</i> commenced.
Vic	Service providers are corporatised. Planning occurs through Integrated Water Cycle Strategies. Investments are subject to independent economic regulation, but some past decisions have been excluded from scrutiny by government.	Service providers are corporatised. Planning occurs through Integrated Water Cycle Strategies. Investments are subject to independent economic regulation.	Planning occurs through Urban Water Strategies and, for metropolitan Melbourne, through a Melbourne Water System Strategy.
Qld	Some service providers are corporatised, while others operate as part of local government. Investments are subject to limited scrutiny by economic regulator. Bulk water planning undertaken in accordance with Chapter 2A of the <i>Water Act 2000</i> (Qld).	Subsidies for investment through the Royalties for Regions program.	Subsidies for regional capital investments through the Royalties for Resource Producing Communities Fund, Regional Capital Fund, Remote Communities Infrastructure Fund and Indigenous Water Infrastructure Program.
WA	Service providers are corporatised. Investments subject to scrutiny by economic regulator. Planning arrangements are not formalised.		No change.
SA	Service providers are corporatised. Investments subject to independent economic regulation. Unclear planning arrangements..		No change.
Tas	Service providers are corporatised. Investments are subject to independent economic regulation. Informal planning arrangements.		No change.
NT	Service providers are corporatised. Investments are not subject to independent scrutiny. Informal planning arrangements.		No change.
ACT	Service providers are corporatised. Investments are subject to independent economic regulation. Informal planning arrangements.		No change.

Sources: DILGP (Qld.) (2017b, 2017c); DPI (NSW), pers. comm., 6 June 2017; (2017c, nd, nd, nd); DSD (Qld) (2017b, 2017c, 2017e); Department of Water and Energy (NSW) (2007); ERA (2017a); ESC (2017); ESCOSA (2016); ICRC (2013); IPART (nd); NSW Government (2017a, 2017b); OTTER (2015); QCA (2015, 2017); Utilities Commission (NT) (2017)).

¹⁰⁰ NWI paragraph 66(v)(c).

Rural water

Progress to date and developments since 2014

In considering government investment in new infrastructure to 2014 the NWC observed:

... overly optimistic estimates of viability, inadequate cost-benefit analysis and inefficient pricing impose long-term costs on the community through ongoing subsidies or unanticipated environmental degradation. (2014c, p. 9)

Other points raised by the NWC in that assessment include:

- ‘economically viable decision-making’ would be best supported by upper bound pricing for new infrastructure projects
- social and environmental considerations should be part of the business case for projects
- there is limited knowledge of water resources in areas of new development (particularly in northern Australia). Water planning in these circumstances needs to be fit-for-purpose and adaptive.

Collectively, these views were reflected in the NWC’s recommendations that:

All government water infrastructure investment should generate a return for the community and be subject to robust water planning and transparent cost-benefit analysis (recommendation 8).

NWI principles, including best practice water pricing, should underpin all new water developments including those in northern Australia (recommendation 9).

The performance of the jurisdictions against the NWI and the NWC’s recommendations has been mixed:

- none of the 10 government-funded projects announced since 2014 have met the NWC’s recommendation for a transparent cost-benefit analysis (table B.22)
- all projects (in the opinion of the jurisdictions) are consistent with or will be required to be consistent with NWI principles (table B.22) except for the Broken Hill Pipeline project where the position is unclear
- the stated benefit-cost ratios of the projects announced since 2014 (except for the Broken Hill pipeline project) indicate they are all worthwhile but the Commission has been unable to confirm the veracity of those analyses as they remain confidential. As noted in chapter 7, there is a tendency for the private benefits accruing to irrigators to dominate these analyses which raises the question as to why these projects are reliant on government funding to proceed if they are in fact viable without government funding.

Table B.22 Major infrastructure funding announced since 2014

Largest projects by jurisdiction: minimum cost \$5 million

<i>Project</i>	<i>Government funding</i>	<i>Cost-benefit analysis publicly released</i>	<i>Benefit cost ratio^a</i>	<i>Project consistent with NWI principles</i>	
\$ million					
Cwth	Rockwood Weir (Qld)	260 ^b	Yet to be completed ^c	—	Requirement of funding
	Dungowan Dam (NSW)	150 ^b	To be completed by April 2018 ^c	—	Requirement of funding
NSW	Broken Hill Pipeline	unavail ^d	No (CIC)	unavail	unavail
Vic	South West Loddon Rural Water Supply	81 ^e	No (CIC)	1.4:1	Yes
	Macalister Irrigation District Modernisation (1A)	32	No (CIC)	1.4:1	Yes
	Macalister Irrigation District Modernisation (1B)	60 ^e	No (CIC)	1.5:1	Yes
	Werribee Irrigation District Modernisation	31 ^e	No (CIC)	1.6:1	Yes
	Southern Highlands Irrigation Scheme	23 ^e	No (CIC)	1.3:1	Yes
Tas	Swan Valley Irrigation Scheme	14 ^e	No (CIC)	2.8:1	Yes
	Duck Irrigation Scheme	24 ^e	No (CIC)	1.5:1	Yes

unavail details were not available to the Commission. **CIC** Commercial and / or cabinet in confidence. ^a The full cost-benefit analyses for these projects have not been made public. The jurisdictions advised these ratios in response to the Commission's information request. ^b Includes Australian and State Government funding. A condition of the Australian Government's funding commitment is that it is at least matched by the State Government. ^c The project was announced with funding to be provided subject to a business case demonstrating the viability of the project. ^d The cost is 'commercial-in-confidence' (New South Wales Government 2017c) The project has been included in this analysis as one of its goals is to 'to keep more water in productive use within the Murray-Darling Basin' (New South Wales Government 2016, p. 4.15). ^e Includes funding from both the Australian and State Governments.

Sources: Responses to Commonwealth, State and Territory information requests; Tasmanian Irrigation Pty Limited (2015, 2017a).

The Commission's view

The step of ensuring the consistency of new projects with the NWI is an important achievement that supports the success of new infrastructure by promoting investor confidence through certain water entitlements and stable water planning arrangements to support business planning. The inclusion of NWI compliance in the eligibility criteria for the Australian Government's \$2 billion National Water Infrastructure Loan Facility and the \$500 million National Water Infrastructure Development Fund reinforces continued compliance.

Achieving the NWI goals of economic efficiency, and the efficient (and sustainable) use of irrigation infrastructure and government resources requires more than establishing the viability of new infrastructure through cost-benefit analysis. It requires:

- consideration of the role of government in projects where the benefits created are largely private in nature and the equity of imposing large burdens on tax payers from projects from which they do not benefit
- consideration of the nature of any government support provided to new infrastructure given the potential for subsidised infrastructure to distort trade and investment decisions
- risk management measures to ensure the water made available through new infrastructure is taken up and put to productive use to generate the anticipated benefits and to limit the risk to taxpayers of footing the bill for under-utilised infrastructure
- a level of assurance through an economic regulator that the charges for access to and use of new infrastructure deliver efficiency outcomes.

Some jurisdictions have taken steps forward in some of these areas, such as the use of pre-sold water entitlements in Tasmania to ensure the water from projects is put to productive use (chapter 7, section 7.6). But even in those instances, other government decisions (such as providing grant funding for infrastructure primarily generating private benefits) has undermined those positive steps and detracted from achievement of the NWI's objectives.

The role of government in the commissioning of new irrigation infrastructure is an area requiring improvement in all jurisdictions and is considered in chapter 7.

Cost recovery for water planning and management activities

The NWI required jurisdictions to:

- bring into effect consistent approaches to pricing and attributing costs of water planning and management
- report publicly on cost recovery for water planning and management.

Progress to date and developments since 2014

The NWC (2014c) found mixed progress among jurisdictions toward recovering the costs of water planning and management activities from water users. No jurisdiction has advanced in its progress on this action since that assessment (table B.23).

The Victorian Government undertook to improve the transparency of its Environmental Contribution levy in 2015 through the public reporting of expenditures and outcomes (among other measures).

In 2014-15, 49 per cent of South Australia's recoverable water planning and management costs were charged to water users. This grew to 55 per cent in 2015-16. This is consistent

with the announcement in South Australia's 2010-11 State Budget that the rate of cost recovery for the State's water planning and management activities would increase over time.

Table B.23 Cost recovery for water planning and management

	<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
NSW	Full cost recovery has been implemented under the scrutiny of the economic regulator (IPART) and backed by public reporting of costs and cost recovery.	No change.
Vic	An Environmental Contribution charge is levied on water corporations — 5 per cent of revenue for urban water and 2 per cent of revenue for rural water. The proceeds are applied to initiatives targeting the sustainable management of water and / or address adverse water related environmental impacts — those initiatives include water planning and management activities.	No change.
Qld	Cost recovery is limited to certain transaction-based fees (such as application and administrative fees, water licence fees and meter service charges) and volumetric charges in specified areas. There is limited (if any) public reporting of costs and cost recovery.	No change.
WA	Cost recovery is limited to certain transaction-based fees (such as licence transfer fees) and there is limited (if any) public reporting of costs and cost recovery.	No change.
SA	A Natural Resource Management (NRM) levy is applied to share the cost of water planning and management (as well as other activities) across users. The nature and structure of the levy, as well as the activities it funds, varies across South Australia's 8 NRM regions and is determined by the NRM boards for the individual regions.	No change.
Tas	The costs of water planning and management activities are periodically reviewed to determine the costs to be borne by Government and water users on a beneficiary-pays basis. There is limited public reporting of costs and cost recovery.	No change.
NT	There is no cost recovery or public reporting of costs.	No change.
ACT	A Water Abstraction Charge is levied on urban water supply at a flat rate per kilolitre. The proceeds are applied to a mix of purposes — those of most relevance here being the funding of water planning and management activities.	No change.

Sources: NWC (2014c); Responses to State and Territory information requests.

The Commission's view

There is scope to improve cost recovery arrangements in Queensland, Western Australia, Tasmania and the Northern Territory. There are three considerations for these jurisdictions in relation to cost recovery.

First, while the benefits of cost recovery are clear, cost recovery should not be pursued where the cost of doing so exceeds the benefits. That means government funding of planning and management activities may be the best course in jurisdictions with small planning and management costs due to low levels of water use and / or fewer water resources to manage.

Second, cost recovery may not be viable until water users are receiving the services and outcomes expected from a well-run water planning and management system. For Western Australian and Northern Territory water users this includes legal certainty in their water entitlements.

Third, water planning and management activities need to be undertaken before new development can proceed (chapter 7). Consideration needs to be given to how those costs are recovered from the water users benefiting from the new development.

There may be scope to improve arrangements in Victoria, South Australia and ACT whose broad based levies lack the precision of New South Wales' approach. Broad based levies are administratively simpler, but:

- can impose less discipline on governments to discern the between the costs incurred for water planning and management activities and costs incurred in delivering other policy goals (including those that should be funded by governments rather than water users)
- 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 different water sources.

The balance to be found in these jurisdictions (and others) is between the merit of an activity-based approach to cost recovery and the budgetary and compliance savings from administrative simplicity.

Environmental externalities

The NWI called on the jurisdictions 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)'¹⁰¹
- continue to examine the feasibility of using market based mechanisms in that management
- implement pricing that includes externalities where feasible.

Progress to date and developments since 2014

The approaches of the jurisdictions to the management of environmental externalities are summarised in table B.24 and are unchanged from 2014. In keeping with the construction of the NWI, all jurisdictions have continued to use measures such as extraction limits and / or water licence conditions in their management of environmental externalities. The Northern Territory, Tasmania and Western Australia have made no progress toward using charges to recover the cost of environmental externalities from users.

¹⁰¹ NWI paragraph 73(i).

Table B.24 Management of environmental externalities

<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
<p>NSW</p> <ul style="list-style-type: none"> • A range of regulatory measures are used to address environmental externalities including water extraction limits and mandatory water access licence rules. • The costs incurred by water utilities in meeting regulatory measures designed to address environmental externalities are scrutinised by IPART and passed through to users in price determinations. 	No change
<p>Vic</p> <ul style="list-style-type: none"> • Environmental externalities are managed through a range of regulatory measures including setting extraction limits and placing conditions on water use licences. • An Environmental Contribution charge is levied on water corporations — 5 per cent of revenue for urban water and 2 per cent of revenue for rural water. In line with the <i>Water Industry Act 1994 (Vic)</i>, the proceeds are applied to initiatives which assist in the sustainable management of water and / or address adverse water related environmental impacts. 	No change
<p>Qld</p> <ul style="list-style-type: none"> • Environmental externalities are managed by setting extraction limits in water plans, specifying conditions for the use of water in water licences and, in some instances, fees. 	No change
<p>WA</p> <ul style="list-style-type: none"> • Licensing the take of water is the main approach to managing environmental externalities. 	No change
<p>SA</p> <ul style="list-style-type: none"> • Environmental externalities are managed through a range of mechanisms such as water licences (and conditions on those licences) and salinity management zoning. • A Natural Resource Management (NRM) levy is applied to share the cost of environmental impacts across users. The nature and structure of the levy, as well as the activities it funds, varies across South Australia's 8 NRM regions and is determined by the NRM boards for the individual regions. • the <i>Water Industry Act 2012 (SA)</i> allows the Treasurer to issue Pricing Orders to the Essential Services Commission of South Australia on parameters, principles or factors (including environmental externalities) that must be considered in its pricing determinations. 	No change
<p>Tas</p> <ul style="list-style-type: none"> • Water planning and regulation are the main means of managing environmental externalities. 	No change
<p>NT</p> <ul style="list-style-type: none"> • Water planning and regulation are the main means of managing environmental externalities. 	No change
<p>ACT</p> <ul style="list-style-type: none"> • A Water Abstraction Charge is levied on urban water supply at a flat rate per kilolitre. The proceeds are applied to a mix of purposes — those of most relevance here are the environmental protection of water sources and costs related to environmental flows. 	No change

Sources: NWC (2014c); Responses to State and Territory information requests.

The Victorian Government undertook to improve the transparency of its Environmental Contribution levy in 2015 through the public reporting of expenditures and outcomes (among other measures).

The Commission's view

The key actions for the effective management of environmental externalities — extraction limits and conditions on water licences — are being delivered by the jurisdictions. Further protection from potentially damaging activities is provided by the system of licences and approvals required under the environmental laws of the jurisdictions.

No jurisdiction is applying a specific 'environmental externality' charge. The charges and levies of Victoria, South Australia and the ACT raise funds for a variety of purposes, including water planning and management activities (which also contribute to addressing environmental outcomes). While these charges and levies may not be suited to dealing with specific externalities (including those that arise regardless of the amount of water used), they can be a cost-effective way of raising revenue to address a range of environmental externalities. Part of the effectiveness of such an approach relies on transparency as to how the tax is determined and how the funds are used.

The effectiveness (and appropriateness) of externality pricing will depend upon the situation (Dwyer et al. 2006). The relatively moderate level of development for most water resources across Western Australia, Tasmania and the Northern Territory (compared to other jurisdictions) means they generally have a lesser need (if any) for externality pricing. This may, however, change over time as development opportunities are pursued in these jurisdictions.

Release of unallocated water

The release of unallocated water was considered within the NWI and the jurisdictions were called on to:

- ensure 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 before unallocated water is released
- use market-based mechanisms in the release of water to the extent practicable.

Progress to date and developments since 2014

The release of unallocated water in all jurisdictions is informed by an assessment of the resource and / or water plans (table B.25) and this is unchanged from 2014. The use of market mechanisms in the release of unallocated water is also unchanged from 2014.

Table B.25 Release of unallocated water

	<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
NSW	<ul style="list-style-type: none"> • Most water sources in New South Wales are fully committed and access licences can only be obtained through the water trading market. • The availability of unallocated water is assessed against the extraction limits specified in the relevant water sharing plan and, for water sources in the Murray-Darling Basin, the sustainable diversion limit. • The <i>Water Resources Management Act 2000</i> (NSW) provides for the release of unallocated water by: tender; auction; or other process as specified in the Minister's order. 	No change
Vic	<ul style="list-style-type: none"> • Only a small number of surface water systems in southern Victoria have unallocated entitlements available for users. • Under the <i>Water Act 1989</i> (Vic) unallocated water can be sold via auction, tender or in any other manner that the Minister thinks fit. 	No change
Qld	<ul style="list-style-type: none"> • The <i>Water Regulations 2016</i> (Qld) provide for the release of unallocated water (both groundwater and surface water) by: public auction; tender; fixed price sale; or grant for a particular purpose. • Individual Water Plans also provide specific details for the release of unallocated water within those systems. • Matters considered in releases of unallocated water include: the efficiency of existing and proposed water use practices; the availability of an alternative water supply for the purpose for which water is required; environmental impacts; cultural heritage impacts; impact on other water resources and entitlements. 	No change
WA	<ul style="list-style-type: none"> • The allocation mechanism for the release of unallocated water is by first-in-first-served. This means applications to take water from a particular water resource are assessed in the order in which they are received. 	No change
SA	<ul style="list-style-type: none"> • The <i>Release of Unallocated Water Policy</i> is premised on the NWI. The policy notes the release of unallocated water by market mechanisms is the preferred approach and that alternative ways of meeting water demands (such as trading) should be considered before deciding to release unallocated water. • The <i>Natural Resources Management Act 2004</i> (SA) allows the Minister to determine the procedures for the release of unallocated water (including allowing release through auction or tender). 	No change
Tas	<ul style="list-style-type: none"> • Hydro Tasmania holds the rights to access all unallocated water within 'hydro-electric districts'. Hydro Tasmania may agree to transfer the rights to discrete volumes of water to other users. • Assessments for the release of water are assessed on a case-by-case basis and consider allocation levels at local, sub-catchment and end of catchment scales as well as taking into account future climate scenarios. The <i>Surface Water Allocation Decision Framework</i> requires that no material environmental harm or significant third party impact should result from a water allocation. • Unallocated water in irrigation areas is released through market mechanisms. 	No change
NT	<ul style="list-style-type: none"> • The availability of water is assessed against Water Allocation Plans and the consumptive pools set out in those plans. • The allocation mechanism for the release of unallocated water is by first-in-first-served. 	No change
ACT	<ul style="list-style-type: none"> • Unallocated water is only released when the water plan identifies that part of the consumptive pool has not been granted to an entitlement or licence. • The price of entitlements for water released is determined by the ACT Government. 	No change

Sources: DEWNR (SA) (n.d); DNRM (Qld) (2017b); DPI (NSW) (2017a); DPIPWE (Tas) (2005b, 2005a); NWC (2014c); Responses to State and Territory information requests.

The Commission's view

All jurisdictions use water plans and water resource assessments to inform decisions on the release of unallocated water. These actions support the sustainable use of those water resources. Most jurisdictions also use (or can use) market mechanisms or a price on entitlements in their release of unallocated water.

However, the NWI recognised that use of market mechanisms may not always be practicable. The approaches of Western Australia and the Northern Territory will not detract from the NWI objectives where it is highly unlikely the subject water resource will become fully allocated (that is, where supply far outstrips demand). This is because such a resource could only ever be expected to attract a nominal bid for entitlements through auction or tender. Further, the use of a first-in-first-served approach would have a lower administrative cost than using market mechanisms (and no discernible difference in outcomes). In this context, it should be noted that the majority of Western Australia's unallocated resources are located in the north of the State and that some of those resources (such as the Ord River) are not expected to be fully allocated (MJA 2010).

The best approach to releasing unallocated water will depend on a range of factors including: the cost of different mechanisms to release unallocated water; the highest value use to which the water will be put; the existence of unregulated externalities; and, the quality of information on the demand for new entitlements. To deliver the best outcomes, jurisdictions need access to a range of tools, not just market mechanisms.

The water legislation of most jurisdictions provides for (or does not preclude) using a range of mechanisms to release unallocated water. In contrast, Western Australia's complex water legislation has limited the mechanisms that can be used in the release of unallocated water (MJA 2010). This was recognised in *Securing Western Australia's Water Future* (DOW (WA) 2013) which proposed new legislation (which has yet to proceed) to allow for unallocated water to be granted by various mechanisms. A change in policy and legislation has also been flagged as necessary in the Northern Territory if water is to be allocated through market mechanisms (Northern Territory Government 2015, p. 9).

Separation of water management from service delivery

The agreed separation of service delivery from government was largely complete across all jurisdictions by 2011 (NWC 2011d). The NWC did not assess progress again in 2014.

The only change in arrangements of note since 2014 was a reallocation of responsibilities between WaterNSW and DPI Water in 2016. The change was intended to give the Department of Primary Industries Water (DPI Water) a sharper policy focus on water market regulation and the oversight of major government funded water infrastructure projects. DPI Water retained responsibility for compliance activities relating to local water utilities, water corporations, major utilities, mining companies and state significant developments (DPI (NSW) nd). Otherwise, WaterNSW is responsible for monitoring and reporting

non-compliant activities to DPI Water. WaterNSW has also been conferred powers to impose statutory penalties for taking water illegally (WaterNSW nd).

Service delivery remains separated from policy activities in all jurisdictions using corporatised service providers.

Performance benchmarking

Urban water

The urban NPR process was developed in line with the NWI requirement and continues to be published. It is now coordinated by the BOM, and the most recent report, covering financial year 2015-16, was published in March 2017 (BOM 2017c).

Rural water

The NWI called for the benchmarking of service providers and the public reporting of the price and service outcomes. The NWC (2014c) found there was little support among the jurisdictions for the continued benchmarking in relation to irrigation infrastructure given the lack of material benefits from the exercise. The NPR for irrigation services was discontinued in 2014 as the costs were considered to outweigh the benefits.

Significant differences in the scale, nature and ownership of distribution networks limit the insights to be gained from comparisons across Australia (or even within some jurisdictions). These differences are compounded by factors such as seasonal conditions and commodity prices which affect year-to-year water use across Australia and make comparisons difficult. For government-owned bulk water and distribution services, economic regulation (chapter 7) provides an independent assessment of operating efficiency and prices. Locally owned distribution networks can also pursue benchmarking arrangements among themselves where it is beneficial for them to do so. Further, within the MDB, bulk water and distribution services are subject to transparency requirements in relation to their pricing arrangements.

Summary

Table B.26 reflects the collective progress of all jurisdictions toward the completion of best practice pricing actions set out in the NWI.

Table B.26 Assessment summary: Best practice pricing and institutional arrangements

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Best practice pricing		
Metropolitan	Largely achieved	Providers are generally pricing at or near upper bound levels. However, there is some evidence of underpricing in south-east Queensland (bulk water) and Tasmania.
Regional	Partially achieved	There is evidence of underpricing in regional New South Wales. The use of capital subsidies in regional New South Wales and Queensland is inconsistent with the NWI and is likely to lead to inefficient pricing. Greater transparency on pricing outcomes in regional Queensland is needed to assess consistency with the NWI. Greater clarity on the use of CSOs in the Northern Territory would improve consistency with the NWI.
Rural	Largely achieved	All jurisdictions except South Australia (bulk water), are generally delivering lower bound pricing (or better) required under the NWI. Where this does not occur, the resultant subsidies are usually being reported (albeit through different methods) by the jurisdictions.
Price regulation		
Urban	Partially achieved	Economic regulators set prices or revenues for providers in New South Wales (metropolitan providers only), Victoria, South Australia, Tasmania and the ACT. Economic regulators make non-binding recommendations in Western Australia and south-east Queensland (bulk water only). Providers in regional New South Wales, south-east Queensland (retailer-distributors), regional Queensland and the Northern Territory are not subject to formal price regulation. The Tasmanian Government has introduced legislation that would greatly constrain the role of the independent economic regulator in that State.
Rural	Partially achieved	New South Wales, Victoria and Queensland have met the actions set out in the NWI. There is scope to refine Queensland's arrangements to deliver better outcomes. The economic regulator has a more limited role in Western Australia and no role in Tasmania. There is scope to improve arrangements in both jurisdictions.
New infrastructure		
Urban	Partially achieved	Corporatisation and economic regulation supports more prudent investment decisions by many metropolitan providers. However, future investment decisions can be improved by clarifying supply augmentation planning arrangements and extending the use of independent economic regulation in some jurisdictions. The ongoing use of capital subsidies in regional New South Wales and Queensland is likely to undermine the objective of economically efficient investment.

(continued next page)

Table B.26 (continued)

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
New infrastructure (continued)		
Rural	Partially achieved	<p>NWI water entitlement and planning principles have been applied (or are to be applied) for the large majority of new major projects announced since 2014. This has supported the environmental sustainability of new projects.</p> <p>The viability of new projects since 2014 are said to have been confirmed through cost-benefit analysis but the confidentiality of those analyses means this cannot be verified.</p> <p>There is room to improve in all jurisdictions in relation to:</p> <ul style="list-style-type: none"> • the role of government in new infrastructure projects where the benefits created are largely private in nature • the extent to which the capital cost of new infrastructure projects is recovered from users and / or beneficiaries • the nature of any government support provided to new infrastructure given the potential for subsidised infrastructure to distort trade and investment decisions.
Cost recovery for planning and management	Partially achieved	<p>New South Wales is the only jurisdiction to have met its NWI commitment.</p> <p>The broad based levies applied in Victoria, South Australia and the ACT could be refined to deliver more precise and transparent outcomes.</p> <p>Western Australia, Tasmania and the Northern Territory need to move toward greater cost recovery where it is cost-effective to do so.</p>
Environmental externalities	Achieved	<p>The key actions for the effective management of environmental externalities — extraction limits and conditions on water licences — are being delivered by the jurisdictions. Further protection from potentially damaging activities is provided by the system of licences and approvals required under the environmental laws of the jurisdictions.</p> <p>The effectiveness (and appropriateness) of externality pricing will depend upon the situation and no jurisdictions are applying a specific 'environmental externality' charge. Notwithstanding, the approach of each jurisdiction in relation to pricing for externalities is considered to be appropriate to their current circumstances.</p>
Unallocated water	Largely achieved	<p>All jurisdictions have the appropriate systems to determine when unallocated water can be released. Legislative change is required in Western Australia and the Northern Territory if market mechanisms are to be used in the release of unallocated water.</p>
Separation of functions	Achieved	<p>All jurisdictions have achieved the agreed separation of service delivery from government.</p>

(continued next page)

Table B.26 (continued)

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Performance benchmarking		
Urban	Achieved	Jurisdictions have developed the National Performance Report consistent with their commitment under the NWI.
Rural	Terminated	Should not be pursued while ever the costs exceed the benefits. Benefits are likely to remain limited as: <ul style="list-style-type: none"> • there are significant differences across bulk water operations which make meaningful comparisons difficult • there are relatively few government-owned distribution networks to compare (and the numbers are decreasing with Queensland networks moving to local ownership and management).

^a **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

B.4 Integrated management of water for environmental and other public benefit outcomes

The NWI recognises that water is needed to provide for environmental and other public benefit outcomes (such as recreational opportunities and Indigenous cultural values) and that this water must be managed in an integrated way. To facilitate this, the NWI requires jurisdictions to identify the desired outcomes from water provided for this purpose and to develop and implement effective and efficient management practices and institutional arrangements to achieve them.¹⁰²

The Commission has considered progress under this element under the following headings:

- identifying specific environmental and public benefit outcomes
- management and institutional arrangements
- water recovery measures.

Identifying specific environmental and public benefit outcomes

Under the NWI, all signatories agreed to identify the desired environmental and other public benefit outcomes¹⁰³ of water management with as much specificity as possible.¹⁰⁴

102 NWI paragraph 78.

103 In schedule b(i) of the NWI, other public benefit outcomes include: mitigating pollution, public health, Indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values.

104 NWI paragraph 78(i).

Specifying the desired outcomes in sufficient detail aids in assessing whether objectives are being achieved and assists in targeting management arrangements to meet those objectives.

This section assesses the progress made by jurisdictions in identifying the desired environmental and other public benefit outcomes, whether through statutory water plans or in planning for the use of held environmental water. The arrangements that aim to provide for these outcomes within water plans are assessed in section B.1.

Progress to date

Since 2004, significant progress has been made in identifying specific environmental and public benefit outcomes. Environmental, hydrological, social and economic assessments are routinely undertaken as part of the water planning process to inform the definition of the rules-based water provisions that aim to achieve the outcomes sought. In many cases, water managers have sought to better define environmental needs when updating water plans (NWC 2014c).

While most water for the environment is provided as rules-based water through water plans (planned environmental water), some water is provided through entitlements that are either purchased on water markets or created through investments in water-saving infrastructure, among other means. This water is known as held environmental water and is currently only in use in New South Wales, Victoria, Queensland and South Australia.

The technical assessments that inform the development of water plans also inform decisions to acquire held environmental water entitlements. In planning for the use of these entitlements, the watering requirements of environmental assets are identified locally on an annual basis. Watering proposals are submitted to environmental water holders, who prioritise environmental flows in light of local, catchment and system-scale objectives.

There have been advances in the development of tools for setting environmental priorities, as well as in methodologies for determining the flows required to achieve particular environmental outcomes.

- Victoria's Aquatic Value Identification and Risk Assessment sets out a process to identify specific waterway values, threats and risks to prioritise management actions within regional waterway strategies. This process includes recreational and other public benefit values associated with waterways (DELWP (Vic) 2015). These are used in developing priorities for environmental flows and complementary waterway management activities.
- Tasmania's Conservation of Freshwater Ecosystems Values program is a statewide audit that identifies environmental values, associated water requirements and management priorities. Tasmania used the program in developing water management plans and to identify priority areas for environmental flow studies (NWC 2014b, 2014c).
- the Tasmanian Environmental Flows project aims to link flow events to ecological outcomes (DPIPWE (Tas) 2010).

Non-environmental public benefit outcomes are increasingly being considered. The Victorian Waterway Management Strategy and the Basin Plan require environmental water holders to consider opportunities to achieve complementary social, cultural and economic outcomes where these are consistent with environmental objectives (NWC 2014c). However, there are relatively few examples of well-identified and measurable outcomes being explicitly included in water plans, and they are often closely linked with environmental outcomes. For example, the Wimmera Waterway Strategy explicitly assumes water quality objectives required to meet environmental outcomes will also meet recreational requirements (WCMA 2014). Indigenous cultural and spiritual values associated with water have been identified in at least some water plans in all jurisdictions except Tasmania — this is discussed in section B.1.

While acknowledging good progress, the NWC (2014c) found that environmental and public benefit outcomes were often broadly specified in water plans, making it difficult to assess whether or not they were being met when water plans are reviewed (section B.1). Environmental water holders have generally been more specific in describing the outcomes sought through their water deliveries.

Developments since 2014

While there have not been any significant changes in approach since 2014, some jurisdictions are planning to or have recently implemented changes that should improve the specification of environmental and other public benefit outcomes.

- Through its Water for Victoria plan, Victoria has indicated it intends to better provide for recreational water uses by requiring the Victorian Environmental Water Holder (VEWH), catchment management authorities and water corporations to plan for and provide water services that explicitly consider recreational values within existing frameworks (DELWP (Vic) 2016).
- New South Wales has expanded the potential use of the environmental water allowance in the Hunter Regulated River water sharing plan (replaced in 2016) to include water-dependent Aboriginal cultural values (DPI (NSW) 2016d). New South Wales has also developed guidelines for setting and evaluating plan objectives for water management. The process outlined in the guidelines is being adopted in the water resource plans currently being developed for the Basin Plan (DPI (NSW), pers. comm., 6 June 2017).
- The 2017 New South Wales Metropolitan Water Plan recognises that environmental flows will also support recreational values (although the recreational values themselves are not specified) (New South Wales Government 2017b).
- Queensland's changes to its water planning processes in December 2016 allow for the specification of plan 'measures', which increase the level of detail on outcomes within water plans and will allow progress to be better assessed (DNRM (Qld), pers. comm., 1 June 2017). These are to be implemented progressively through water plan reviews.

-
- The Queensland Government assesses local environmental values (including recreational values, ecosystem health and Indigenous cultural and spiritual values) through its process for determining water quality guidelines under the *Environmental Protection (Water) Policy 2009* (DEHP (Qld) 2017). These are then used as an input into water planning.
 - Victoria has submitted long-term environmental watering plans for all its water resource plan areas, while South Australia has submitted two plans and Queensland has submitted one. Further plans are in development in New South Wales and the ACT (MDBA, pers. comm., 29 August 2017). The Basin Plan (s. 8.19) requires these plans to identify priority environmental assets in each area and the necessary flow regimes to protect those assets.

Commission's view

To meet the requirements of the NWI, State and Territory Governments should have information available and processes in place to ensure environmental and public benefit outcomes are clearly identified, whether environmental water is provided through planned water or held entitlements.

All jurisdictions have made significant progress to that end since the NWI was agreed. Victoria, Queensland, South Australia and Tasmania have comprehensive databases of environmental and public benefit values within each state that are used to inform water planning. In New South Wales, Western Australia, the Northern Territory and the ACT, environmental outcomes are identified on a regional basis through water planning. Environmental water holders plan on an annual basis and for individual watering events, and so are able to identify in greater detail the environmental outcomes sought through water delivery. But overall, there is still scope to improve the specification of environmental outcomes.

There is also scope to better identify and provide for other public benefit outcomes, particularly where these may not necessarily align with environmental benefits. Some jurisdictions (particularly Victoria) are considering wider public benefit outcomes in planning for the use of held environmental water. However, in some cases water holders have made broad statements about environmental flows also supporting recreational values, but such statements are yet to result in measurable outcomes. Moreover, although most jurisdictions (bar Tasmania) have made progress in identifying specific Indigenous cultural and spiritual values associated with water, more could be done (as discussed in section B.1).

Management and institutional arrangements

Parties to the NWI agreed to appoint environmental managers with the necessary authority and resources to achieve identified environmental and other public benefit outcomes. Governments were to develop effective and efficient management and institutional arrangements, including:

- accountable environmental water managers

-
- joint arrangements for any shared resources
 - common arrangements for inter-connected surface and groundwater systems
 - independent audit, review and public reporting on outcomes and the adequacy of management arrangements
 - enabling environmental water managers to trade water on the temporary market
 - special requirements to sustain high conservation value environmental assets.¹⁰⁵

Progress to date

Since the inception of the NWI, substantial progress has been made in establishing effective and efficient management and institutional arrangements for environmental water. Environmental water provisions in water plans are discussed in section B.1. These planned environmental water provisions do not require any active decision making on their use, but water managers must ensure consumptive users comply with the rules to ensure flows are provided (section B.1).

However, as mentioned above, in some jurisdictions planned water can be supplemented with held environmental entitlements to achieve environmental and other public benefit outcomes. In these cases, active environmental water managers are required to make decisions on where and when to use water, and on whether to trade it or make use of ‘carryover’ provisions to keep it for use in subsequent years.

Accountable environmental water managers

Responsibilities for the management of environmental water (planned and held) are outlined in table B.27.

As shown in table B.27, all jurisdictions have identified entities with responsibility for defining and enforcing planned environmental flow provisions. This is normally the responsibility of State and Territory water departments. Since the inception of the NWI, the Governments of Australia, New South Wales, Victoria and South Australia have also each identified bodies with responsibility for actively managing water entitlements to achieve environmental outcomes. Queensland, Western Australia, Tasmania, the Northern Territory and the ACT do not own entitlements for environmental purposes, although Queensland facilitates the use of Commonwealth-owned entitlements within the State.

¹⁰⁵ NWI paragraph 79(i).

Table B.27 Responsibilities for environmental water

<i>Jurisdiction</i>	<i>Planned environmental water</i>	<i>Held environmental water</i>
Commonwealth	Murray-Darling Basin Authority ^a	Commonwealth Environmental Water Office Murray-Darling Basin Authority (The Living Murray)
New South Wales	Office of Water	Office of the Environment and Heritage ^b
Victoria	Department of Environment, Land, Water and Planning	Victorian Environmental Water Holder ^c
South Australia	Department of Environment, Water and Natural Resources	Department of Environment, Water and Natural Resources
Queensland	Department of Natural Resources and Mines	..
Western Australia	Department of Water and Environmental Regulation	..
Tasmania	Department of Primary Industries, Parks, Water and Environment	..
Northern Territory	Department of Environment and Natural Resources	..
ACT	Environment, Planning and Sustainable Development Directorate	..

^a The Murray-Darling Basin Authority have responsibility for reviewing (and in some cases, preparing) water resource plans in the Basin. These plans identify planned environmental water requirements. ^b The New South Wales Office of the Environment and Heritage is also responsible for the active management of environmental contingency allowances defined in water plans. ^c Some entitlements held by the VEWH include rules-based environmental water. .. Not applicable.

Source: Adapted from NWC (2014c, p. 52).

Most held environmental water is located in the MDB, with some entitlements also held in southern Victoria. Institutional arrangements vary between jurisdictions. In Victoria, the VEWH is a statutory body corporate, while the Commonwealth Environmental Water Holder (CEWH) is a statutory office holder within a government department. Environmental water is managed by State Government departments in New South Wales and South Australia. Held environmental water in the MDB is managed under the Basin Plan.

While all jurisdictions have established managers with responsibility for environmental water provision, these managers are not always as accountable as they could be due to the limits to their arrangements for independent auditing, review and reporting of environmental outcomes (discussed below).

Joint arrangements for shared resources

For water resources that are shared across jurisdictions, joint arrangements are required to ensure outcomes are not undermined by inconsistent management. Key joint arrangements have included the Intergovernmental Agreement on Implementing Water Reform in the

Murray-Darling Basin (which supports the objectives of the Basin Plan), the Great Artesian Basin Sustainability Initiative, and the Lake Eyre Basin Intergovernmental Agreement.

Such 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 groundwater-dependent ecosystems. For example, The Living Murray (TLM) program coordinates held environmental water provided by the Governments of Australia, New South Wales, Victoria, South Australia and the ACT to achieve environmental outcomes at six ‘icon sites’ along the River Murray. However, the Commission considers that — in the context of the Basin Plan — TLM represents an opportunity to streamline arrangements for environmental water management in the MDB, as discussed in chapter 5.

Common arrangements for inter-connected surface and groundwater systems

All jurisdictions recognise the need for common arrangements in managing significantly interconnected surface and groundwater resources. Although few water plans fully integrate management of surface water and groundwater, an increasing number of plans recognise the connectivity between these resources. Where not managed under the same plan, some water plans in connected systems take into account cases where rivers, wetlands and other ecosystems are dependent on groundwater. The integration of surface water and groundwater management is discussed further in section B.1.

Independent audit, review and public reporting

Governments need to monitor environmental outcomes to be able to review and report on them.¹⁰⁶ In relation to planned environmental water, jurisdictions have generally developed programs that measure flows and hence are able to review the extent to which planned water regimes are being implemented (NWC 2014c). In addition, Queensland monitors the environmental outcomes from planned flows through the Queensland Environmental Flows Assessment Program, and the ACT also assesses environmental water arrangements to inform future flow releases.

However, other jurisdictions undertake only limited monitoring of environmental outcomes in a way that is targeted to plan provisions. South Australia and Victoria conduct condition monitoring (Victoria has statewide indices of stream, wetland and estuary condition), but could do more to link these programs to the outcomes of planned environmental flows. For the period between 2008 and 2011, New South Wales published valley reports on the environmental and socioeconomic outcomes from flows, but a lack of such information limited a recent review of water sharing plans in New South Wales (NRC (NSW) 2016). Western Australia focusses its monitoring effort in high-value locations that are subject to stress, such as the Gnamptara, Jandakot and Pilbara groundwater areas. Tasmania and the

¹⁰⁶ Paragraph 80 of the NWI also explicitly requires monitoring of water being recovered and managed for environmental and other public benefit outcomes.

Northern Territory do not generally monitor environmental outcomes, although Tasmania considered environmental outcomes in reviewing the River Clyde water plan.

Most jurisdictions review their water plans at regular intervals (section B.1), but not all: for example, Tasmania is yet to undertake a number of its scheduled plan reviews (DPIPWE (Tas), pers. comm., 2 June 2017). A number of plan reviews in South Australia have also experienced delays. In general, there has been limited reporting on the outcomes of planned environmental flow provisions, including through plan reviews.

All managers of held environmental water monitor, review and report on the outcomes from delivery of their entitlements. They undertake operational monitoring of flow volumes and inundated areas to ensure their water is delivered as planned. Over time, environmental water holders have focused more on monitoring and reviewing longer-term ecological responses to watering. The NSW Office and Environment and Heritage (OEH), VEWH and CEWH publish annual reports on environmental outcomes (the VEWH also reports on other public benefit outcomes). Ecological outcomes are also briefly covered in South Australia's annual report on environmental watering in the River Murray.

Independent auditing of environmental water management arrangements (planned and held) is currently very limited. Reviews at the State and Territory level are usually undertaken by the same government agencies responsible for implementation. The NWC independently audited the arrangements in all jurisdictions through its Australian Environmental Water Management reviews in 2010, 2012 and 2014. However, these assessments ceased with the abolition of the NWC in 2015. While the Commission now has the NWC's former responsibilities for reviewing the NWI and the Basin Plan, the Commission's role is too broad to enable detailed auditing of environmental water management arrangements. The lack of independent audit, review and reporting limits the accountability of environmental water managers.

Trading

All environmental water holders have the authority to trade. The CEWH has engaged in three trades (the first was in 2014) while the VEWH and the OEH have bought and sold smaller volumes more regularly since 2011.

Special requirements for high value assets

Special requirements have been put in place to sustain a number of high conservation value assets. For example, the CEWH is required to protect assets covered by international agreements, such as wetlands of international importance listed under the Ramsar Convention,¹⁰⁷ and most of the sites to which TLM delivers held environmental water are Ramsar-listed sites. Efforts to protect such assets are facilitated by the Aquatic Ecosystems Toolkit, which provides nationally-consistent guidelines for identifying and classifying high

¹⁰⁷ Water Act 2007 (Cwlth), s. 105(3).

ecological value aquatic ecosystems (Aquatic Ecosystems Task Group 2012). High ecological value aquatic ecosystems have been identified in Victoria and South Australia (NWC 2014c).

Developments since 2014

In 2014, the NWC (2014c, p. 129) noted the ‘considerable achievements’ that jurisdictions had made in implementing the NWI requirements for environmental management, but also highlighted two areas where they could improve.

- Monitoring and reporting on the outcomes of environmental water use was still ‘in its infancy’ for many jurisdictions (2014c, p. 52).
- There was an opportunity to ‘streamline’ arrangements to coordinate environmental watering activities by jurisdictions in shared resources such as the MDB (2014c, p. 52).

Since the NWC’s previous assessment, there has been some progress towards refining management and institutional arrangements for both planned and held environmental water provision.

- Changes to the Queensland water planning framework in 2016 will include ‘measures’, which provide guidance on how certain environmental outcomes may be achieved (DNRM (Qld) 2016g).
- In 2016, the Australian Government amended the *Water Act 2007* (Cwlth) to provide the CEWH with more flexibility to use the proceeds from trade to fund environmental works (Minister for Agriculture and Water Resources 2016).
- In relation to monitoring, reviews and reporting:
 - South Australia implemented a Natural Resources Management Reporting Framework Trial in 2015, which reported on the status and trends in the condition of South Australia’s natural resources (including water resources) (DEWNR (SA) 2015b).
 - In 2015 and 2016, respectively, New South Wales and South Australia published extensive reviews of the outcomes of their held environmental water programs (DEWNR (SA) 2016b; OEH (NSW) 2015b).
 - New South Wales replaced its Ecosystem Performance and Assessment Strategy with a Water Management Science Strategy, and is currently developing a monitoring, evaluation and reporting program for MDB water resource plan areas (DPI (NSW), pers. comm., 6 June 2017).
 - In its 2015-16 outcomes report, ‘Reflections’, the VEWH explicitly reported for the first time on ‘shared community benefits’ (such as fishing and Indigenous values) from the use of its water in each catchment (VEWH 2016b).
 - In 2016, Victoria’s *Water for Victoria* plan committed \$20 million to establish a waterway research hub and review existing waterway monitoring programs, as well

as \$90 million to (among other things) enable Victoria to trial a statewide monitoring approach (DELWP (Vic) 2016).

- In 2016, the CEWH released the first reports from its Long-Term Intervention Monitoring Program (LTIM), a \$30 million project to monitor the outcomes of Commonwealth environmental water delivery in seven MDB regions from 2014 to 2019 (DEE 2016).

Commission's view

Jurisdictions have made significant progress against this section of the NWI. Environmental management arrangements have developed considerably, and all jurisdictions have identified agencies responsible for managing water for environmental and other public benefit outcomes through water plans and (where relevant) held environmental water. NWI actions concerning joint arrangements, trade and special requirements for high value environmental assets have been achieved. However, further work is required to fully meet the outcomes of the agreement in the two areas identified by the NWC in 2014: monitoring and reporting, and arrangements in shared resources.

While jurisdictions generally monitor the delivery of environmental flows and progress has been made through projects such as the CEWH's LTIM initiative (as discussed in chapter 5), there is scope to improve the capacity of jurisdictions to review and report on the outcomes from flow delivery. This is needed to increase the accountability of environmental water managers.

Investment in these activities should reflect the risk to these outcomes and their value to the community. Western Australia's risk-based approach to monitoring appears reasonable, but even in areas where the risk is low, some monitoring is needed to ensure management arrangements remain sufficient to maintain the value of environmental assets. The Northern Territory and Tasmania should commence monitoring of ecological outcomes, starting with high-value environmental assets.

Governments in the MDB should also continue to improve their capacity to monitor and evaluate outcomes, particularly in relation to the use of held environmental water. Areas for attention include better coordination, more transparent reporting and increased coverage of the potential for shared community benefits from the delivery of environmental water.

For both planned and held environmental water, State and Territory Governments should make provision for independent auditing of outcomes and the management arrangements in place to support those outcomes.

In addition, although there are joint arrangements in place to manage the shared resources of the MDB, the governance arrangements for managing held environmental water in the MDB could be improved.

These issues are examined in chapter 5.

Water recovery measures

To balance environmental and other public benefits with consumptive uses of water resources, it is necessary in overallocated and overused systems to reduce the amount of water in the consumptive pool by recovering water for the environment. However, the means by which water is recovered has a material effect on the welfare of water users and the wider community, as acknowledged in NWI paragraph 97 (discussed in section B.8).

The NWI includes principles for deciding how to recover water, emphasising the need to consider all available options and assess the socioeconomic costs and benefits and the implications for wider natural resource management outcomes.¹⁰⁸ The mix of water recovery measures is to be selected primarily based on cost-effectiveness.

Progress to date

Jurisdictions have used a range of options to recover water for the environment. Early water recovery (both prior to and during the NWI) was often focused on public investment in water saving infrastructure, with a portion of the saved water reallocated as environmental entitlements. Water for Rivers, which recovered water for the Snowy River and elsewhere from 2002 to 2012, was one such program (NWC 2014b). In other cases, water has been recovered by revising licence conditions, such as in South Australia (DEWNR (SA) 2013).

Since 2004, nearly 3000 GL of water has been recovered to achieve environmental outcomes within the MDB. This includes 875 GL recovered prior to 2009 through programs including TLM and Water for Rivers (MDBA 2017f), and a further 2083.3 GL recovered toward the 2750 GL target outlined in the Basin Plan. Of the 2083.3 GL, the Australian Government has recovered 1202 GL through entitlement purchases and 704.5 GL through infrastructure projects (MDBA 2017g).¹⁰⁹

While much of the initial water recovery occurred through open market purchases of water entitlements by the Australian Government, water saving infrastructure investments have since become more prominent. The Australian Government's water recovery strategy for the Basin prioritises water recovery through infrastructure investment over water purchases (DOE 2014).

Outside of the MDB, water recovery is ongoing in a small number of overused systems. Since 2007, Western Australia has been seeking to address overuse in the Gngangara Mound groundwater system in the south-west of the state within water planning. This has primarily been achieved by recouping unused water entitlements and through efficiency programs (DOW (WA) 2009).

¹⁰⁸ NWI paragraph 79(ii).

¹⁰⁹ Estimates of contracted recovery expressed in long-term diversion limit equivalent terms, as of 30 June 2017. The rest of the 2083.3 GL comprises 15 GL gifted to the Australian Government by the Queensland Government and 161.9 GL recovered by State Governments.

Developments since 2014

Since 2014, the following changes have taken place.

- In 2015, the Australian Government amended the *Water Act 2007* (Cwlth) to cap water purchases in the MDB at 1500 GL of the Basin-wide target of 2750 GL (Minister for the Environment 2015).
- In March 2017, water ministers in the Basin States agreed that the remaining gap in water recovery in the southern MDB will be met through an agreed package of supply measures (MDBA 2017d). Supply measures include works to improve the efficiency of environmental flow provision, changes to river operations and works to reduce evaporative losses (MDBA 2015c).

The Commission's view

Under the NWI, jurisdictions agreed to consider all available options for recovering water and select from these options primarily on the basis of cost-effectiveness. Water recovery in the MDB is ongoing in accordance with the 2012 Basin Plan. As the implementation of the Plan will be reviewed by the Commission in 2018, progress in the Basin has not been extensively assessed in this inquiry.

However, the Commission notes that the Australian Government has capped water purchases in the Basin at 1500 GL, and recent ministerial announcements indicate that no further water purchases will take place to recover water in the southern MDB. The remaining gap is intended to be met by investment in irrigation infrastructure and other supply measures, with a share of the water savings returned to the Australian Government.

There is no indication that the decision to invest in irrigation infrastructure in preference to water purchases was made on the basis of cost-effectiveness, and therefore this approach does not meet the requirement of the NWI. There is evidence that recovering water through investment in new or updated irrigation infrastructure is more expensive than water purchases. In their analysis of water recovery in the Goulburn-Murray irrigation district, RMCG (2016, p. 42) calculated that water recovered through on-farm efficiency programs cost an average of \$3600 per megalitre of water recovered, at a premium of at least 33 per cent to market prices through 2016. Significant public funds have been spent on, and committed to, infrastructure projects which are unlikely to be cost-effective and risk being inefficient (PC 2010).

The NWI outlines a limited role for targeted adjustment assistance to communities. There are, however, potential pitfalls in the design of community adjustment programs. These are outlined in section B.8.

Summary

Table B.28 summarises progress in achieving the NWI requirements against this element.

Table B.28 Assessment summary: Integrated management of water for environmental and other public benefit outcomes

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Well-defined environmental and other public benefit outcomes	Partially achieved	Environmental outcomes are increasingly well defined, but remain broad in many cases. Other public benefit outcomes are generally poorly specified.
Accountable environmental water managers	Largely achieved	All jurisdictions have environmental water managers, but the limits to their arrangements for independent auditing, review and reporting on outcomes mean they are not always fully accountable.
Joint arrangements for shared resources	Achieved	Key arrangements include those for the MDB, Great Artesian Basin and Lake Eyre Basin.
Common arrangements for connected surface and groundwater systems	Largely achieved	While the number of water plans that fully integrate groundwater and surface water resource management remains small, the number of water plans that recognise connectivity between groundwater and surface water (including through linked groundwater and surface water plans) has increased substantially since 2004.
Independent audit, review and reporting of environmental and other public benefit outcomes, and supporting management arrangements	Partially achieved	Progress has been made, but jurisdictions should increase their focus on monitoring outcomes, provide more balanced reporting, and provide for independent auditing (this function was largely lost with the abolition of the NWC).
Environmental water holders able to trade	Achieved	Environmental entitlements are limited to the MDB and southern Victoria.
Special requirements for high conservation value assets	Achieved	Special requirements are in place for Ramsar wetlands and other high ecological value sites.
Water recovery options selected primarily on the basis of cost-effectiveness	Not achieved	Recent decisions to prioritise infrastructure projects over water purchases in the MDB have prevented this action from being met.

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met.

B.5 Water resource accounting

Water planning and management relies on adequate information on water resources and water use. Under the NWI, parties agreed that the outcome of water resource accounting arrangements is:

... 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.¹¹⁰

This section considers progress in achieving outcomes and objectives relating to water accounts, environmental water accounting, metering and compliance. Section B.2 (water markets and trading) assesses jurisdictions' progress in implementing state entitlement registers that underpin the integrity of water entitlements and markets and provide information for water accounts.

Water accounts

Under the NWI, parties agreed to develop and implement robust water accounting, which ultimately could be reconciled and aggregated to produce a national water balance. The NWI also includes commitments to develop accounting standards and standardised reporting (to enable ready comparison of water use, compliance against entitlements and trading information).

Progress to date

All State and Territories collect and manage water data and information to inform water management within their respective jurisdictions. This information provides a key input to national water accounts.

Since 2007, the BOM has assumed a central role in the collection and publication of water data and information. Under part 7 of the *Water Act 2007* (Cwth) BOM is responsible for 'collecting, holding, managing, interpreting and disseminating Australia's water information' and 'compiling and maintaining water accounts for Australia' (s 120). The BOM's functions include:

- developing water information standards (including water accounting standards)¹¹¹
- collecting and publishing water information
- conducting regular national water resources assessments
- publishing an annual National Water Account
- providing regular water availability forecasts
- giving advice on matters relating to water information
- enhancing understanding of Australia's water resources. (BOM 2008)

110 NWI paragraph 80.

111 States and Territories participated in the development of a range of national water accounting standards and reporting frameworks (NWC 2014b).

In undertaking these roles, the BOM draws on information and data collected by State, Territory and Commonwealth agencies and other organisations in the water sector (such as water utilities).

The National Water Account provides information about water stores and flows, water rights and water use. It also reports on the volumes of water traded, extracted and managed for economic, social, cultural and environmental benefit. The reporting regions included in the Account contain more than 75 per cent of Australia's population and are where 70-80 per cent of Australia's annual water consumption occurs (BOM 2017d).

Since 2008, the BOM has expanded the range of available water information, such as water storage information, water accounts, streamflow forecasts, market information and water resource assessments. The BOM developed these information streams through the Improving Water Information Program (IWIP). The Australian Government provided \$450 million for the IWIP over the 10 years from 2007-08 to 2016-17 (ANAO 2014).

The Australian Bureau of Statistics (ABS) also produces the Australian Water Account, which provides information on the physical and monetary supply and use of water in the Australian economy (ABS 2016b).

Developments since 2014

In 2014, the NWC recommended that work be done to streamline data collection and sharing requirements of Commonwealth agencies (including the BOM) to minimise the reporting burden and maximise the usefulness of the information produced. The Australian National Audit Office (ANAO) (2014) also suggested that BOM should work more closely with data providers to improve services.

Since the 2014 assessment, the Australian Government released an independent review of the *Water Act 2007* (Cwth), which recommended that an interagency working group produce options for reducing the reporting burden (Australian Government 2014b). An interagency working group subsequently analysed the data needs of the relevant Commonwealth agencies (including the costs of providing that information and the benefits of the information based on it) and recommended amendments to the water regulations in order to streamline data requirements (IWG 2016). The recommendations of the interagency working group were accepted by the government and implemented through the *Water Amendment (Water Information) Regulations 2017* (Cwth) (BOM 2017b).

The BOM (sub 5, p. 1) advised it plans 'in 2017/18 to provide a parallel National Water Account and Water Account Australia (led by the Australian Bureau of Statistics) for a selected region to clarify and promote the benefits of both, individually and in tandem'.

The Commission's view

To meet the intent of the NWI, national water accounting should:

-
- provide practical, credible and reliable information
 - be accessible to all stakeholders
 - avoid unnecessary duplication of effort.

As noted in section B.2, State and Territories have made good progress implementing State entitlement registers that underpin the integrity of water markets and provide information for national accounts.

National water accounting is generally providing practical, credible and reliable information. In 2015 the Centre for International Economics assessed the annual benefits from the BOM's existing water information products as being worth between \$67 million and \$287 million (BOM, sub. 5) (the report is not publicly available). The BOM's *Improving Water Information Programme Progress Report* noted 'key benefits identified by users included better investment decisions, risk management and operational decision-making, and consistency across regions' (2016a, p. 26).¹¹²

The ANAO's performance audit of the effectiveness of BOM's implementation of the IWIP concluded that 'although not complete, the Bureau's current suite of water information products and services provide governments with important data to inform better policy decisions in relation to water services and infrastructure investment' (2014, p. 24). Based on 56 stakeholder responses, the report also noted that 'in general, stakeholders have indicated a positive view of the Improving Water Information Program' but that 'Stakeholders have also suggested a need to increase the coverage and quality of products and services available' (2014, p. 24).

The full effects of recent reforms to streamline information collection are yet to play out. For example, the National Irrigators' Council (sub. 13, p. 11) noted it 'will continue to monitor progress on actions and recommendations from the interagency report'.

Environmental water accounting

Under the NWI, parties agreed to develop and implement a register of new and existing environmental water, along with annual reporting.¹¹³

Progress to date

Environmental water managers in the Murray-Darling Basin and southern Victoria — that is, the Commonwealth Environment Water Holder, the VEWH, the MDBA (on behalf of The Living Murray program) and New South Wales Office of Environment and Heritage — all maintain publicly available records of their environmental water holdings. They also

112 The benefits relate to a range of services and products developed under the Improving Water Information Programme rather than national water accounts in particular.

113 NWI paragraph 85.

report annually on the total volume of water delivered under these entitlements. States and Territories generally report on environmental water provided through planned (rules-based) arrangements as part of periodic reporting on water plans and / or state water accounts — however, the degree of detail varies across jurisdictions (NWC 2014c).

Developments since 2014

There have been no major changes to environmental water accounting arrangements since the 2014 assessment.

The Commission's view

Key requirement for meeting the objectives of the NWI include that:

- environmental water held as a water access entitlement is fully accounted for in public water registers, as applies to other water access entitlement holders
- there is regular public reporting on how held environmental water is being used (to promote accountability for publicly owned assets)
- there is public reporting on planned environment water (to ensure water is being provided consistent with rules in water plans or equivalent instruments such as bulk entitlements).

Jurisdictions have largely met the requirement that environmental water held as a water access entitlement, and its use, are fully accounted for (where relevant). Jurisdictions also generally undertake public reporting on environmental water provided through planned (rules-based) arrangements. As discussed in section B.4, there is scope to improve how monitoring, evaluation and reporting of outcomes are undertaken in all jurisdictions to promote improved environmental water management.

Metering and measuring

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).¹¹⁴ To recognise that metering needs to be practical, credible and reliable, they also agreed to develop and apply a national meter specification; national meter standards specifying the installation of meters; and national standards for ancillary data collection systems associated with meters.

In 2009, COAG agreed to a National Framework for Non-Urban Water Metering (the Non-Urban Metering Framework) to help meet NWI commitments. The Non-Urban Metering Framework has a ten-year implementation period, requiring meters to comply with the national metering standards over time. Jurisdictions agreed to develop implementation

¹¹⁴ NWI paragraph 87 to 88.

plans to document priorities and targets for non-urban water metering.¹¹⁵ The Australian Government was to prepare and publish a National Implementation Plan for Non-urban Water Metering drawing on state and territory implementation plans.

As part of the Non-Urban Metering Framework, parties agreed that State and Territory Governments would publicly report on implementation of the Framework every two years from 2012 and that the BOM would maintain and publish information from state and territory reports on its website.

Progress to date

All State and Territories (apart from Tasmania and the Northern Territory) have developed and submitted implementation plans under the National Non-Urban Metering Framework. In Tasmania, the 2014 Standard for Non-Urban Water Meters seeks to implement the national metering framework. In the Northern Territory, the Non-Urban Water Metering Policy and Code of Practice seeks to follow the intent of the National Framework to implement national standards for accuracy levels in the recording of water usage.

Implementation of the National Non-Urban Metering Framework has been subject to delays. In 2014, NWC observed these delays had been partly because of difficulties associated with having meters certified to the required standard. All technical aspects of the Non-Urban Metering Framework — such as the development of the Australian standards for non-urban meters and accreditation of meter testing facilities — are now complete (Department of Agriculture and Water Resources, pers. comm., 24 August 2017). The Commission understands that progress in rolling out compliant metering is generally taking longer than the timelines set out in the National Framework (Department of Agriculture and Water Resources, pers. comm., 24 August 2017).

Jurisdictions have not completed public reporting on the implementation of the Non-Urban Metering Framework.

Developments since 2014

Policy developments since the 2014 assessment include the following:

- In 2015, jurisdictions advised the Australian Government that the Non-Urban Metering Framework per se was not necessary going forward, as jurisdictions had processes in place to manage metering as appropriate for their jurisdictions, based on risk and cost-benefit. Consequently, the Australian Government is yet to prepare a national implementation plan (Department of Agriculture and Water Resources, pers. comm., 24 August 2017).

¹¹⁵ In relation to areas such as meter deeming, upgrading meters and installations, certified workforce, implementation of national standards for non-urban meters, and review of jurisdictional legislation to ensure compliance.

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- In New South Wales, Department of Primary Industries (DPI) Water has been developing a Water Take Measurement Strategy to clearly articulate how different types and volumes of water take must be measured. The Strategy is currently in draft form, with expected consultation to be undertaken in the later part of 2017.
 - The Victorian Government released the Victorian Non-Urban Metering Policy in May 2014 (which reaffirmed Victoria's commitment to the National Metering Framework in the 2010 Victorian State Implementation Plan). In particular, Victoria's commitment to meet the National Framework objectives by 2020 in the 2010 implementation plan was made subject to Commonwealth funding. Because funding has not been forthcoming Victoria has adopted an extended timeframe to meet specified commitments.
 - In Queensland, the Government introduced Non-Urban Water Metering Policy for Unsupplemented Extractions in July 2014.¹¹⁶ The policy reflects a policy decision to cease direct involvement in the purchase, installation and maintenance of meters and move to self-meter reading. The policy implements the 2009 National Framework for Non-Urban Water Metering policy and is supported by Queensland's implementation plan for Non-Urban Water Metering. Both establish the framework for meter specification, installation, maintenance and replacement.
 - In South Australia, the Government reports that it completed compulsory metering of all significant extractions from prescribed water resources by the end of 2014.¹¹⁷
 - In Western Australia, the Government released the *Measuring the taking of water policy* in January 2016. Under the policy, all licensed water use over 10 megalitres (ML) per year will be subject to metering or alternative measurement by 2020, except where there is minimal benefit to water resource management from doing so. The Western Australian Government (sub. 80) advised that metering is proposed to expand significantly throughout the State under the new policy and implementation of the policy will be staged over the next few years. The Department of Water will undertake annual evaluations of progress against its implementation plan for the policy, and will provide updates in its Annual Report over the duration of the implementation program.
 - In Tasmania, the 2014 Tasmanian Standard for Non-Urban Water Meters seeks to implement the national metering framework.
 - In the Northern Territory, the Department of Environment and Natural Resources has established the Non-Urban Water Metering Policy and Code of Practice. The policy seeks to follow the intent of the National Framework to implement national standards for accuracy levels in the recording of water usage.
 - In the ACT, the Government advised that the 2015 water metering guideline was implemented based on the national framework (EPA (ACT) 2015).

116 The government made minor changes in 2016 to reflect the new Water Regulation 2016 by updating references to this regulation and its new schedule number.

117 In South Australia most non-urban meters are owned by entitlement holders. The standards for non-urban water metering are implemented under the Natural Resources Management Act 2004 (SA) and Regulations and are clarified through the South Australia Metering Policy and Meter Specifications.

The Commission's view

To meet the intent of NWI, water accounting (including water metering) should provide *adequate* measurement to support public and investor confidence in the amount of water being traded and extracted for consumptive use. The NWI also notes metering should be practical, credible and reliable.

All jurisdictions are yet to fully achieve this goal. As noted above, State and Territories have developed non-urban metering policies (often based on the Non-Urban Metering Framework) but are still in the process of implementing these policies on the ground. As discussed in chapter 8, it is important that the Australian, State and Territory Governments agree on a way forward with the Non-Urban Metering Framework that maximises the net benefits of rolling out new meters and clearly communicate this to affected water users.

While the accuracy of metering and metering coverage has improved in many parts of Australia (NWC 2014c), there are areas of high use (such as areas in Western Australia) where enhanced metering and / or measurement may assist in more effective management of the resources. The Queensland Farmers' Federations (sub. 61) highlighted further work required to implement metering and measurement for non-stock and domestic licenses under the Great Artesian Basin Plan.

As noted below, a number of reviews, at the State and Commonwealth level, have been announced in response to issues raised by the ABC's Four Corners program, which aired on 24 July 2017 (including issues relating to metering).

Compliance and enforcement

State and Territory Governments are responsible for administering water compliance and enforcement laws within their jurisdiction. The development of the National Framework for Compliance and Enforcement Systems for Water Resource Management (the National Compliance Framework) implemented a 2009 COAG 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 Australian Government approved up to \$60 million in funding for the National Compliance Framework to enhance compliance, provide consistency across jurisdictions and identify gaps in current systems in place. The Australian Government's funding for implementation of the Framework (which ended up being \$53.4 million) ended, as planned, on 30 June 2016.

The National Compliance Framework comprised six major components:

1. water laws: each jurisdiction has agreed to 'use (its) best endeavours to introduce and pass legislation to adopt consistent offence provisions to minimise unlawful water take'

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2. risk assessment: all water resources are assessed according to a nationally consistent risk profile requiring minimum levels of compliance monitoring by the jurisdictions in line with increased risk
 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: more compliance officers in the field to ‘carry out annual monitoring events equal to 10 per cent of the total number of water entitlement/licence holders of a water resource, using on ground officers’
 6. reporting: water agencies publish annual reporting and compliance strategies and statistics. (NWC 2014c).

Progress to date

The Australian Government commissioned an Evaluation Report for the National Framework for Compliance and Enforcement Systems for Water Resource Management, which was finalised in March 2016 (KPMG 2016). The report found that there was ongoing work by jurisdictions to further progress or potentially complete their milestone requirements and achieve alignment with the National Compliance Framework requirements. It noted the most progressed and aligned elements of the National Compliance Framework were risk based compliance and enforcement, best practice tools, public and stakeholder education and monitoring (KPMG 2016)(table B.29).

The evaluation report noted that the legislative framework review has been the most challenging element to implement and achieve consistency, across the board. It also noted annual public reporting, including monitoring and compliance strategies and compliance statistics, has not been implemented to the same extent as other elements of the National Compliance Framework (KPMG 2016).

A key lesson identified by the evaluation report was that:

An option for future programs being implemented nationally, and trying to account for a variety of circumstances, would be to have a clear focus on the set of outcomes that are aiming to be achieved, and greater flexibility in the means to achieve it. This could see a framework that is more principles-based and less prescriptive, and gives jurisdictions greater freedom to achieve specific outcomes in a manner that is appropriate to their circumstances. (KPMG 2016, p. 4)

The evaluation report noted that — while the majority of elements of the National Compliance Framework will be retained following the completion of the program — the cessation of funding would result in a less intensive approach to compliance and monitoring in some cases. The most notable expected changes following the end of the program were:

- The discontinuance or reallocation of resources including a reduction in field officer time spent on field/audit activities and project officer roles who were engaged for activities such as stakeholder education products. The end of Commonwealth funding will not be replaced by state funding across South Australia, Queensland, Victoria and New South Wales to the same extent (KPMG 2016, p. 54).
- With the exception of South Australia, jurisdictions will no longer pursue the 10 per cent monitoring target for Category 3 water resources. For example, it noted that New South Wales has over 50 000 licence holders and intends to undertake more targeted, risk-based monitoring approaches, which is expected to be just as effective in identifying noncompliance but will not require the same level of resourcing. The evaluation had found all jurisdictions have met the target of annual monitoring events equal to 10 per cent of water entitlement/licence holders in Category 3 areas (KPMG 2016, p. 45–46,55).
- A narrower range of stakeholder information products will be maintained going forward (KPMG 2016, p. 55).

Table B.29 KPMG evaluation: Alignment with National Compliance Framework^a

March 2016

	<i>NSW</i>	<i>VIC</i>	<i>Qld</i>	<i>WA</i>	<i>SA</i>	<i>Tas</i>	<i>ACT</i>	<i>NT</i>
Water Laws	na	na	na	na	na	na	na	na
Risk assessment	✓	✓	✓	✓	✓	✓	✓	✓
Toolbox	✓	✓	✓	✓	✓	✓	✓	✗
Stakeholder education	✓	✓	✓	✓	✓	✓	✓	✓
Monitoring	✓	✓	✓	✓	✓	✓	✓	✓
Reporting	✗	✓	✓	✓	✓	✗	✗	✗

^a The evaluation report included tables for each of the six areas of the National Framework (except water laws) using a traffic light assessment. In this table, the ticks indicate green assessment and crosses indicate amber assessment. With respect to the water laws, the report found broad consistency among States and Territories in offence provisions but considerable lack of consistency among the penalties applied for each offence provision rather than the offence provisions themselves. It noted States most heavily affected by drought (South Australia, New South Wales and Queensland) tend to have the strongest legislative frameworks. **na** – Not available.

Source: KPMG (2016).

Developments since 2014

In addition to the Evaluation of the National Compliance Framework mentioned above, the New South Wales Minister for Regional Water, Niall Blair, announced the appointment of Mr. Ken Matthews to conduct an independent investigation into the issues raised by the ABC's Four Corners program on 24 July 2017 and to provide the final report to Government by 30 November 2017 (Blair 2017).

Other announced reviews following ABC's Four Corners program include:

- a Basin-wide Compliance Review by the MDBA (pending agreement by the Basin States, findings will be presented to COAG on 15 December 2017) (MDBA 2017b)
- an Australian National Audit Office Audit of National Partnership Agreement payments to State and Territory Governments (the Auditor-General expanded the scope of this audit following a request from Tony Burke MP regarding the Four Corners episode. The main audit is due in March 2018 but a separate report on this issue may be tabled in 2017 (ANAO 2017b, 2017a))
- an inquiry into the integrity of the water market in the Murray-Darling Basin by the Senate Rural and Regional Affairs and Transport References Committee (due by 5 December 2017) (Parliament of Australia 2017).

The Commission's view

Credible and cost-effective compliance and enforcement frameworks for water resources are fundamental to ensuring clear and secure property rights to water. The National Compliance Framework sought establish a nationally-agreed standard for ensuring compliance with state-based water laws and regulations. The recent evaluation of the National Compliance Framework suggests jurisdiction have implemented changes to their compliance and enforcement frameworks that will have ongoing benefits. However, it also highlights areas for improvement in most jurisdiction (such as reporting and consistency in water laws). As such, they are yet to fully achieve this commitment.

Some participants suggested further measures are needed to improve compliance, noting the recent end of Australian government funding under the National Framework. Chapter 8 discusses these issues in more detail.

Summary

Table B.30 summaries progress with respect to specific commitments relating to water resource accounting.

Table B.30 Assessment summary: Water resource accounting

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Water Accounts		
Practical, credible and reliable information	Largely achieved	
Avoid unnecessary duplication of effort.	Largely achieved	The full effects of recent reforms to streamline information collection are yet to play out.
Environmental water accounting		
Environmental water held as a water access entitlement is fully accounted	Largely achieved	
Public reporting on use of entitlements	Largely achieved	
Public reporting on planned environment water	Largely achieved	
Metering		
Develop and implement metering actions	Partially achieved	States and Territories have developed non-urban metering policies (often based on the National Framework) but are still in the process of implementing these policies on the ground.
National Metering Framework implemented		While the accuracy of metering and metering coverage has improved in many parts of Australia, there are areas of high use (such as areas in Western Australia) where enhanced metering and / or measurement may assist in more effective management of the resources.
Compliance and enforcement		
National Compliance Framework implemented	Partially achieved	The 2016 evaluation of the National Compliance Framework suggests jurisdiction have implemented changes to their compliance and enforcement frameworks that will have ongoing benefits. However, it also highlights areas for improvement (such as reporting and consistency in water laws).

^a **Achieved:** All requirements met, **Largely achieved:** Requirements generally met, with some exceptions, **Partially achieved:** Only some requirements met, **Not achieved:** No requirements met.

B.6 Urban water reform

Progress against the NWI objectives, outcomes and actions in the area of urban water is considered below under two headings:

- service quality
- water reuse, end use efficiency, water sensitive urban design and innovation.

Urban water service quality

The NWI committed jurisdictions to ‘provide healthy, safe and reliable water supplies’.¹¹⁸ But this did not include any specific actions to address the health and safety aspects of water supply. The NWC assessed progress in this area in general terms, noting that:

Regional and remote service providers face their own range of economic, demographic and geographic challenges, and there have been incidents of non-compliance with drinking water standards. Boil-water alerts have been triggered in many regional and remote communities across Australia to manage public health during system failures. (2014c, p. 66)

The Commission has analysed drinking water quality outcomes since 2014 to develop an up-to-date picture of progress in this area.

Progress to date

The Australian Drinking Water Guidelines (ADWG) offer a framework within which water quality outcomes can be monitored and managed consistent with the overall objective of healthy and safe supplies. The Commission recognises that achieving the broad NWI outcome of healthy and safe water supplies does not require avoidance of all breaches of the ADWG; rather a risk-based approach must be taken that recognises that it is not likely to be feasible or cost-effective to avoid all instances of non-compliance. Nevertheless, if a service provider is consistently not meeting the ADWG’s recommended concentrations of particular substances, increased efforts are likely to be required for it to maintain water quality.

The Commission has examined drinking water quality outcomes in each jurisdiction. These outcomes are summarised in table B.31.

In each of the cases above it remains to be seen whether the actions undertaken and in progress will be sufficient to maintain or improve water quality, but the Commission recognises that significant efforts are being made.

In relation to Queensland, the Commission considers that better targeting of state financial resources through CSO payments (discussed in chapter 6) will support improved drinking water quality outcomes in regional and remote locations. This approach is likely to enhance the commitment of \$120 million in the 2017-18 Queensland Budget for capital expenditure to improve service quality. However, in many cases these communities may not need new infrastructure, and greater spending to attract skilled personnel, or other areas of operational expenditure may be more effective in improving outcomes.

¹¹⁸ NWI paragraph 90(i).

Table B.31 Summary of water quality outcomes and related policy efforts

	<i>Reporting sources</i>	<i>Summary of water quality outcomes</i>	<i>Recent policy efforts</i>
NSW	New South Wales Government performance monitoring.	Generally good compliance with the ADWG, though some issues remain in Aboriginal communities.	\$200 million committed over 25 years from 2009 through the Aboriginal Communities Water and Sewerage Program. Significant improvement in Statewide compliance in recent decades. ^a
Vic	Annual reporting by corporations to Department of Health.	Generally good compliance with the ADWG, though there was one instance of non-compliance in 2015-16 reported through the NPR (Gippsland Water).	None identified
Qld	Company Drinking Water Quality Management Plan reports. Queensland Government comparative report	Comparative reports indicate water quality incidents are common. Stakeholder feedback and provider reporting supports this view. Reporting is incomplete for smaller providers.	\$120 million committed in the 2016-17 State Budget for water infrastructure in remote Indigenous communities. One of the objectives of this funding is to improve health outcomes.
WA	Annual reporting by corporations to Department of Health. A May 2015 Auditor-General report examined issues in remote Indigenous communities.	Significant issues in communities served by the Remote Area Essential Services Program between 2012 and 2014. The WA Government advises that instances of non-compliance with the ADWG have reduced significantly since that time.	Various program-level improvements have been implemented since 2013. A 'roadmap' for regional services reform has been set out and commits the Government to improve standards for essential and municipal services in Aboriginal communities.
SA	Annual reporting by SA Health	Generally good compliance	None identified
Tas	Annual report from TasWater to the Department of Health and Human Services. State of the Industry reports by OTTER.	Compliance issues remain (99.2 per cent of the population received water that complied with the ADWG's microbiological guidelines in 2015-16). 15 boil water alerts remain in place as of September 2017.	TasWater's corporate plan targets reducing the number of towns on boil water or public health alerts to 5 or less by 2018-19. This is supported by a 10 year investment plan funded by ongoing price increases.
NT	NPR reporting for Power and Water Corporation. Indigenous Essential Services publishes a report for its remote operations.	Some compliance issues remain. Six of 72 remote communities did not comply with the ADWG's microbiological guidelines in 2015-16 and seven did not comply with various chemical parameters, including nitrates, uranium, barium and fluoride.	Indigenous Essential Services receives a significant annual CSO, in the order of \$80 million.
ACT	Annual report by Icon Water.	Generally good compliance. -	None identified

^a In 1991 only 91 per cent of New South Wales' regional population had water supplies that complied with the microbiological guidelines of the ADWG.

Sources: Queensland provider Drinking Water Quality Management Plan reports; Department of Communities (Housing) (WA), pers. comm., 17 July 2017; qldwater, sub. 41; Queensland Government, sub. 45; Cairns Regional Council, sub. 52; LGAQ, sub. 71; BOM (2017a); DEWS (Qld) (2017); DPI (NSW) (nd); Furner (2017); IES (2016, 2017); Queensland Government (2017); TasWater (2016, 2017); WA Government (2016); Western Australian Auditor General (2015).

Water reuse, end use efficiency, water sensitive urban design and innovation

The NWI sets out objectives and outcomes that promote water reuse, end use efficiency, promotion of water sensitive urban design (WSUD) and innovation in water supply. These include:

- an overarching objective to have ‘policy settings which facilitate water use efficiency and innovation in urban and rural areas’¹¹⁹
- 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’.¹²⁰

Parties to the NWI agreed a range of actions to support these. These actions include:

- implementing the Water Efficiency Labelling Scheme
- implementing a ‘Smart Water Mark’ program for household gardens
- developing national health and environmental guidelines for recycled water and stormwater
- developing national guidelines for evaluating water sensitive urban developments.

Subsequent agreements made by COAG set out further actions that would promote similar objectives and outcomes, including developing centres of excellence for water recycling and desalination.

In 2014 the NWC noted that jurisdictions had:

... delivered 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. (2014c, p. 63)

While these specific NWI actions had been achieved, the NWC also highlighted a potential to do more in relation to WSUD:

While many demonstration and research examples have illustrated the benefits of water sensitive urban design applications, there have not been many outcomes that can be attributed to this approach. Water sensitive urban design provides major opportunities for innovation and change, but there are several challenges associated with its incorporation as core business for the urban water sector. (2014c, p. 67)

Noting the potential for further policy action highlighted by the NWC, the Commission has examined progress since 2014 below. It has also examined barriers to implementation of WSUD and other ‘integrated water cycle management’ approaches in chapter 6.

119 NWI paragraph 23(viii).

120 NWI paragraphs 90(ii), (iii) and (v).

Progress to date

Jurisdictions achieved significant coordinated policy actions in this area in the early years of the NWI. The actions listed above were completed in line with the timeframes envisaged by the NWI and subsequent agreements, though the centres of excellence for recycled water and desalination were closed in 2016. In some cases, these policies have been demonstrated to achieve net benefits for society; for example, the Water Efficiency Labelling and Standards scheme was found in an independent review to be cost-effective, and to have saved water with an economic value of up to \$1.5 billion (Aither 2015, p. 2).

The actions listed above generally involved coordinated action by all jurisdictions rather than individually. However, jurisdictions have individually implemented a range of policies that address similar objectives and outcomes. These are summarised in table B.32.

The Commission's view

The Commission's analysis of progress shows that jurisdictions where water quality issues persist have all taken action to address this issue. For example, the Western Australian Government has implemented operational improvements to improve water quality outcomes through the Remote Area Essential Services Program, and the Commission understands that this has led to significant improvements in the microbial drinking water quality results (Department of Communities (Housing) (WA), pers. comm., 17 July 2017). It has also initiated a strategic review of regional services for Indigenous Communities, covering a broad range of range of municipal, housing and human services, including water services (Western Australian Government 2016).

In Tasmania, TasWater's current price and service plan provides for managed price increases to fund ongoing investment to improve both drinking water quality and wastewater regulatory compliance (TasWater 2015).

Remaining water quality issues in the Northern Territory do not appear to reflect a lack of resources or expertise, and the Commission has not identified specific policy actions to manage these issues.

It is not possible to assess the cost-effectiveness of all policies delivered through the NWI or by jurisdictions individually, though there are examples where cost-effectiveness has been independently established, such as for the Water Efficiency Labelling and Standards scheme. Robust policy-making processes, including regulatory impact statements and cost-benefit analysis, is required to ensure that existing and new policies have clear objectives and that these are achieved in a cost-effective way.

Table B.32 Actions to promote water reuse, end use efficiency, water sensitive cities and innovation since 2014

Key current and recent jurisdictional policies

NSW	<p>The New South Wales Government released guidance in 2015 to assist service providers implement national guidelines on health and environmental risks of recycled water (NSW Guidance for Recycled Water Management Systems).</p> <p>2014 statutory review and subsequent revision of the <i>Water Industry Competition Act 2006</i> (NSW).</p> <p>WaterSmart Cities program announced in the 2017 Metropolitan Water Plan</p> <p>Changes to operating licences for Sydney Water and Hunter Water to determine and target an 'economic level of water conservation'.</p>
Vic	<p>The Victorian Government has committed funding to promote water use efficiency through the Community Rebate Program (since 2015-16) and the Community Sport and Recreation Program (since 2016).</p> <p>Various initiatives as part of the Water for Victoria plan, including household, school and industrial water efficiency programs, requiring water corporations to identify diverse water sources to maintain community assets (such as sporting fields and public gardens) and to develop water strategies that consider all water sources, and developing place-based integrated water management forums.</p>
Qld	<p>In 2014 amendments were made to the <i>Water Supply (Safety and Reliability) Act 2008</i> (Qld) to reduce the regulatory burden on recycled water providers and encourage reuse.</p> <p>In 2014 a general 'beneficial use assessment' under the <i>Environmental Protection Act 1994</i> (Qld) was put in place to streamline the reuse of water from coal seam gas operations.</p>
WA	<p>The Western Australian Government announced an expansion of the Water Corporation's Groundwater Replenishment Scheme in 2016.</p> <p>The Western Australian Government is working to update its policy for managed aquifer recharge, including supporting guidelines.</p>
SA	<p>The South Australian Government formed Water Sensitive SA in 2015 to support knowledge sharing and capacity building for WSUD.</p> <p>The South Australian Government has also undertaken reforms to the SA planning system, and supported research and benchmarking, to support WSUD.</p>
Tas	None identified.
NT	The Power and Water Corporation runs the Living Water Smart program in Darwin and the Alice Water Smart program in Alice Springs.
ACT	<p>Since 2014 the ACT Government has developed the Healthy Waterways Program with the support of Commonwealth Government funding, which is a WSUD project to improve water quality in the ACT and downstream within the MDB.</p> <p>The WSUD General Code was reviewed in 2014 and the ACT Government is currently consulting on proposed amendments.</p>

Source: Responses to State and Territory information requests.

There are positive recent examples of jurisdictions developing water efficiency and reuse policies with a clear emphasis on economic efficiency. For example, the New South Wales Government has adjusted licence requirements for Sydney Water and Hunter Water so that they are required to determine and achieve an 'economic level of water conservation', in contrast to previous requirements that targeted restricting demand to specific, but arbitrary, levels. Similarly, in 2013 the Queensland Government adjusted an earlier policy that mandated the use of rainwater tanks in certain classes of building across the State, to one where local governments opt-in to the mandate where they can 'demonstrate that introducing the requirements have the potential to deliver a net benefit to the local community' (DHPW (Qld) 2017).

Policies that facilitate good practice should also support economically efficient water services by ensuring that all potential supply and management options are considered. For example, guidelines developed through the NWI to clarify the health and environmental requirements on recycled water and reuse of stormwater should ensure that these supply options can be considered alongside all others. Similarly, the Western Australian Government is currently reviewing and updating guidelines for managed aquifer recharge (Department of Water (WA), pers. comm., 26 June 2017).

As argued in the body of the report, the Commission does not generally support policy action in this area through mandates or subsidies. While mandates and subsidies can be effective in increasing uptake of specified approaches, there is a significant risk that this will not be done in a cost-effective way.

The Commission’s view

Overall, the Commission’s view is that jurisdictions, both collectively and individually, have undertaken significant action in this area and substantially met their commitments under the NWI. A sustained focus on cost-effectiveness will ensure that water reuse, water use efficiency, WSUD and innovation are pursued in ways that supports broader efficiency objectives.

Summary

Table B.33 summarises progress against NWI objectives, outcomes and actions in the area of urban water.

Table B.33 Assessment summary: Urban water reform

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Achieving healthy and safe water supplies	Partially achieved	Jurisdictions where water quality issues persist have all taken action, with some evidence of success. Better structuring and targeting of State Government subsidies is likely to be necessary to address water quality issues in Queensland. However, the success of current policy efforts cannot be guaranteed and a further review of efforts and outcomes may be required in future assessments.
Pursuing water reuse, end use efficiency, water sensitive urban design and innovation	Largely achieved	Jurisdictions, both collectively and individually, have undertaken significant action in this area and substantially met their commitments under the NWI. Recent policy efforts have shown a greater focus on cost-effectiveness, and this focus should be maintained.

^a **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

B.7 Knowledge and capacity building

The jurisdictions agreed to the following actions to support the implementation of the NWI:

- identifying the key knowledge and capacity building priorities necessary to support the NWI
- identifying and implementing proposals to better coordinate the national water knowledge effort.¹²¹

The NWI identified a number of areas where there were significant knowledge and capacity building needs for ongoing implementation including:

- assessment of water availability over time
- changes to water availability from climate and land use change
- interaction between surface water and groundwater
- ecological outcomes from environmental flow management
- improvements in farm irrigation system and catchment water use efficiency
- catchment processes that impact on water quality
- improvements in urban water use efficiency.

Progress to date

The NWC (2011d, 2014c) found that progress had been made in addressing knowledge and capacity needs identified as necessary for the implementation of the NWI and that work in implementing proposals to coordinate research efforts at a national level — the development of the National Water Knowledge and Research Platform (the Platform) — was also progressing, but slowly. The progress in advancing knowledge and capacity was the result of:

- considerable investment by Australian, State and Territory Governments in research projects and programs
- ongoing identification of knowledge and capacity gaps by the jurisdictions
- collaborative research and sharing of information between universities, research organisations and water agencies.

Investments in knowledge and capacity building since 2004 have, among other things, led to:

- the development of modelling tools, frameworks and guidelines for water management and planning, such as the:
 - Framework for the Assessment River and Wetland Health, used to provide nationally consistent assessment of aquatic ecosystem health (NWC 2011d)

¹²¹ NWI Paragraph 101.

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- Australian Groundwater Modelling Guidelines, used to promote a consistent approach to the development of groundwater flow and solute (substances dissolved in water) transport models in Australia (Barnett et al. 2012)
 - assessments of current and future water availability in water systems across Australia in order to provide a framework for future water policy decisions (completed under the CSIRO’s Water and Land Flagship (CSIRO nd))
 - a better understanding of the risks and potential impacts associated with Australia’s coal seam gas and coal mining activities on water and water-dependent assets (completed under the Bioregional Assessment Programme (Australian Government 2016))
 - tools to monitor, assess and forecast the availability, condition and use of Australia’s water resources (developed by the CSIRO, in partnership with BOM under the Water Information Research and Development Alliance) (CSIRO nd)
 - improvements in the capacity to measure, monitor and manage water resources through the Raising National Water Standards Program which ended in 2012 and was funded with \$200 million by the Australian Government (Australian Government 2005; NWC 2013c)
 - the development and uptake of smart water technologies through the Water Smart Australia Program which ended in 2012 and was funded with \$1.6 billion by the Australian Government (GHD 2012)
 - the establishment of Cooperative Research Centres and Centres of Excellence (box B.9)
 - the establishment of baseline knowledge on the economic, social and cultural values of water and the potential impacts of climate change (NWC 2011d, 2014c).

Developments since 2014

Since 2014 the Australian, State and Territory Governments have progressed a number of initiatives to further improve their knowledge of, and capacity to manage, water resources. Some of those initiatives are detailed below.

New South Wales

New South Wales established the Water Management Science Review Committee in 2015. The Committee was established to ensure that activities of the water science team were integrated with the Department of Primary Industries water planning process.

Box B.9 A selection of Cooperative Research Centres (CRCs) and Centres of Excellence (CoEs)

CRC for Water Sensitive Cities

The CRC was established in 2012 and is focused on research and solutions that deliver more water sensitive communities. It involves over 150 researchers along with 7 Australian and international universities and research organisations (CRCWSC 2016).

National Centre for Groundwater Research and Training

The CRC was established in 2009. It works with universities, industry bodies, and Australian and State Governments to deliver research on Australia's groundwater systems. The CRC also runs programs aimed at increasing capacity of researchers and groundwater professionals (NCGRT nd).

National Centre of Excellence in Desalination Australia (NCEDA)

NCEDA (2009–2016) was formed in response to the Millennium Drought. It was focused on research into energy efficient desalination technologies and building the capacity of the desalination industry (NCEDA 2014).

eWater CRC

The eWater CRC was the result of a merger (in 2005) between the CRC for Catchment Hydrology, the CRC for Freshwater Ecology and a number of other water-focused organisations. It sought to develop tools and products to support water managers in decision making. The CRC transitioned to a not-for-profit organisation in 2012 (eWater 2012).

Victoria

Between 2015 and 2016 Victoria developed guidelines on groundwater management and assessing the impacts of climate change, and updated a statewide tool to identify high value systems by considering the environmental, social and economic values of waterways and the level of risk to those values — the information informs the setting of regional priorities outlined in Regional Waterway Strategies.

In 2016, the Victorian Government released Water for Victoria (DELWP (Vic) 2016) which identifies a number of areas where knowledge and capacity building is required. These areas include: climate change; waterways and catchments; Aboriginal values and objectives of water; and social and economic values associated with recreational uses of water. The strategy also includes a commitment of government resources to better understand these areas, including establishing a Waterway Research Hub to coordinate the research efforts in catchments and waterways, and commitments to build capacity to increase Aboriginal participation in water planning and management (section B.1).

Queensland

The Queensland Government released the *Water Planning Science Plan 2014–19* in August 2014 (DSITIA (Qld) and DNRM (Qld) 2014). The focus of the plan is to identify science requirements across five themes (asset requirements and threats, landscape ecohydrology, groundwater dependent ecosystems, environmental assessment and evaluation, and hydrology) to enable and support ongoing water resource management.

Western Australia

Western Australia has engaged in a number of research partnerships (state and national) to better understand groundwater resources, Indigenous social and cultural values relating to water, water supply options to support the expansion of irrigation areas and urban water issues (including drainage, wastewater treatment, future demands and challenges for the urban sector, and alternative water supply options for irrigating recreational areas). Western Australia has also pursued initiatives aimed at building capacity in water sensitive urban design and the management of groundwater resources (including developing modelling techniques for groundwater abstraction).

South Australia

South Australia has undertaken a number of knowledge building activities since 2014. These include:

- a scientific assessment of the risks to the condition of water resources to inform the five-year work program for water plan development and implementation
- the development of models (assessing impacts of water use on groundwater flows, and salinity and ecological impacts of environmental watering and other management options) for water planning areas
- commitment to fund research in partnership with the Goyder Institute for Water Research (investment of \$2 million per annum over four years 2015-16 to 2018-19)
- partnerships with research organisations including National Centre for Groundwater Research, University of Adelaide, University of South Australia, Flinders University and the South Australian Research and Development Institute.

Tasmania

Since 2014, there have been no material changes in Tasmania's approach to knowledge and capacity building. Tasmania continues to participate in national knowledge and capacity building initiatives.

Northern Territory

Since 2014, Northern Territory has engaged in a number of research partnerships to better understand their water resources and has held Public Water Forums in 2015 and 2016 to share information about water resources and identify research priorities. In 2017, the Northern Territory Government announced funding of \$9.9 million over five years for the Mapping the Future program commencing from 2017-18. The program aims to bring together land and water assessments with biodiversity mapping in areas of potential development across the Territory.

ACT

The ACT Government released the *ACT Water Strategy 2014–44* in August 2014 (EPD (ACT) 2014a). The Strategy promotes improved knowledge and capacity in water planning and management in the ACT through the development of new climate models and tools. It also aims to bring about a better understanding of likely future rainfall patterns, water quality, and the connectivity between the ACT's surface water and groundwater resources. A number of initiatives under the strategy have been completed including the Hydrogeological Landscape Framework and the NSW/ACT Regional Climate Modelling project (ACT Government 2016).

National initiatives — announced, progressed and ended

A number of past national initiatives have progressed since 2014 and others were funded/announced. Some are listed below.

- The Australian Government committed \$10 million over five years (2014-15 to 2018-19) to the Murray-Darling Basin Environmental Water Knowledge and Research project aimed at supporting needs of MDB environmental managers through a better understanding of environmental flow requirements and ecology within the MDB; a number of research projects are currently in progress (DEE 2015a; MDFRC nd).
- The Australian Government together with State and Territory Governments developed the *National Groundwater Strategic Framework 2016–2026* (Australian, State and Territory Governments 2017c).
- In 2017, the Australian Government together with State and Territory Governments developed the NWI module *Considering climate change and extreme events in water planning and management*. The module provides information and guidance to jurisdictions on how to consider and incorporate possible impacts from climate change and extreme events in water planning and management (Australian, State and Territory Governments 2017a).
- The Water Services Association of Australia released the *National Urban Water Research Strategy* in 2016. The strategy outlines common research priorities of the

Australian urban water sector and provides a framework for its implementation (WSAA 2016).

On the other hand, some initiatives have wound up in recent years.

- In 2008 COAG agreed to the development of a National Water Knowledge and Research Platform (the Platform) to establish priority research themes and ensure a coordinated research effort (NWC 2014c) — the Platform was released in 2012 (SCEW 2012). In 2016, the Platform disbanded as it was not delivering on its objectives.
- The NWC was abolished in 2015 with some functions and roles of the NWC being transferred to other institutions (for example, responsibility for the assessment of progress under the NWI was transferred to the Commission). While not an explicit function of the NWC, the national coordination of research and knowledge exchange carried out by the NWC also ceased with its abolition.

The Commission's view

Australian, State and Territory Governments have largely met their NWI commitments by continuing to identify and address knowledge and capacity needs (including those identified in the NWI) and by coordinating their knowledge and capacity building efforts and initiatives. However, since 2014 two mechanisms to support the coordination of knowledge and capacity building at a national level have ceased — the NWC was abolished in 2015 and the Platform was disbanded in 2016.

Since 2004, advancements in baseline knowledge and capacity have occurred across many areas that were required for the implementation of the NWI. However, knowledge and capacity needs have also evolved since then. This has largely been a result of emerging challenges facing the water sector such as climate change and population growth (chapter 2).

So, while the Australian, State and Territory Governments have largely met their NWI commitments, in light of emerging challenges, the Commission considers that there is further work to do to assess future knowledge and capacity needs required to support critical reforms and to adapt to imminent challenges. This is discussed further in chapter 8.

Summary

Table B.34 reflects the collective progress of all jurisdictions toward the completion of actions set out in the NWI.

Table B.34 Assessment summary: Knowledge and capacity building

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Knowledge and capacity building will assist in underpinning implementation of the NWI	Largely achieved	Australian, State and Territory Governments have largely met their NWI commitments by continuing to identify and address knowledge and capacity needs to underpin the implementation of the NWI (including those identified in the NWI) and by coordinating their knowledge and capacity building efforts and initiatives. However, there is further work to do to build knowledge and capacity to support future reforms and adapt to future challenges.
Identify key knowledge and capacity building priorities needed to support ongoing implementation of the NWI	Achieved	Australian, State and Territory Governments have continued to identify knowledge and capacity building needs to support the ongoing implementation of the NWI.
Identify and implement proposals to better coordinate the national water knowledge effort	Partially achieved	Australian, State and Territory Governments have worked together to coordinate their knowledge and capacity building efforts and initiatives. However, since 2014 two mechanisms to support the coordination of knowledge and capacity building at a national level have ceased.

^a **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

B.8 Community partnerships and adjustment

This section outlines the progress to date across two community related areas — 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 water planning. Assistance with structural adjustment relates to government programs and measures aimed at helping communities adjust to effects of water reform.

Community partnerships

The NWI commits parties to engage communities and stakeholders in achieving objectives of the NWI by:

- improving certainty and building confidence in the reform process
- being transparent in decision making
- ensuring sound information is available to stakeholders and communities at key decision points.¹²²

¹²² NWI paragraph 93.

More specifically, the States and Territories agreed to open and timely consultation with stakeholders in relation to: pathways for returning overdrawn surface and groundwater systems to environmentally sustainable levels; periodic review of water plans; and, any other significant decisions that may affect the reliability of water access entitlements or the sustainability of water use.¹²³ The States and Territories also agreed to provide timely and relevant information to all stakeholders as part of the consultation process.¹²⁴

This subsection outlines progress in relation to general stakeholder engagement and consultation in water planning. Indigenous representation in water planning is assessed in section B.1.

Progress to date

The level and form of community and stakeholder engagement in water planning varies between jurisdictions and generally depends on legislative requirements, polices, governance arrangements, type of plan and nature of change. Table B.35 outlines the legislative instruments that specify consultation requirements in each jurisdiction and provides selected examples of consultation and engagement practices.

In 2011, the NWC noted that in the development or review of water plans, States and Territories provided stakeholders with adequate opportunity to contribute to water planning decisions.

All jurisdictions have set in legislation or policy minimum requirements for notifying stakeholders that a plan is being developed or reviewed, publicly exhibiting a draft plan, and calling for and responding to submissions on a draft plan. In practice, state and territory agencies usually take steps beyond the minimum requirements, for example by engaging the community in gathering information on values, establishing stakeholder advisory committees to provide input, holding public information meetings [and] conducting targeted consultations. (NWC 2011d, p. 123)

However, in setting pathways for returning over allocated surface water and groundwater systems to environmentally sustainable levels of extraction in the MDB, stakeholder engagement and consultation was found to be inadequate in 2011 (NWC 2011d).

In 2014, the NWC found that the jurisdictions had continued to provide adequate opportunities for stakeholders to have input into water planning decisions and that since 2011 there was an improvement in consultation and engagement processes for the development of the Basin Plan (NWC 2014c, 2014d). This improvement was driven by measures including: meetings with communities, community leaders and wide range of stakeholders; calling for submissions on the proposed plan; and, establishing a greater presence for the MDBA (nd).

123 NWI paragraph 95.

124 NWI paragraph 96.

Table B.35 Stakeholder engagement and consultation in water planning

As at June 2017

	<i>Legislation that outlines consultation requirements</i>	<i>Examples of consultation and engagement practices in water planning</i>
Cwlth (MDBA)	Water Act 2007 (Cwlth) ^a	Publication of proposed plan, call for submissions, community meetings, roundtables, provision of relevant information, publication of consultation report.
NSW	<i>Water Management Act 2000</i> (NSW)	Targeted consultation (depending on the nature of the change), public meetings to disseminate information, public exhibition of draft water sharing rules, call for submissions.
Vic	<i>Water Act 1989</i> (Vic)	Pre-draft community workshops/meetings, media campaigns, surveys, advisory groups, public release of draft plans, post-draft submissions, post-draft workshops/meetings. ^b
Qld	<i>Water Act 2000</i> (Qld)	Public release of draft plans and statement of proposals, call for submissions, formation of consultation groups/committees, public information sessions, publication of consultation reports.
WA	<i>Rights in Water and Irrigation Act 1914</i> (WA)	Press releases, public exhibition of statements of intent, provision of method reports, newsletters, advertisements in media, public release of draft plans, formation of committees, public workshops, targeted consultation, multi-lingual information provision.
SA	<i>Natural Resources Management Act 2004</i> (SA)	Release of draft plans, establishment of advisory committees, call for submissions, publication of consultation reports.
Tas	<i>Water Management Act 1999</i> (Tas)	Formation of a consultative group, surveys, targeted consultation, public meetings, communication of supporting scientific assessments.
NT	<i>Water Act 1992</i> (NT) ^c	Release of draft plans, call for submissions, formation of advisory committees, public meetings, targeted consultation.
ACT	<i>Water Resources Act 2007</i> (ACT) ^d	Pre-plan consultation, call for public submissions on draft, feedback on trade-off decisions, workshops, meetings. ^e

^a For the Murray-Darling Basin Plan. ^b For the development of Regional Waterway Strategies and Sustainable Water Strategies. ^c While the *Water Act 1992* provides for the formation of water advisory committees, there is no legal requirement for consultation in preparing plans. ^d For the drafting of Environmental Flow Guidelines. ^e For the development of the ACT Water Strategy 2014–44.

Sources: MDBA (nd); NWC (2014d); Responses to State and Territory information requests.

States and Territories provide information to communities and stakeholders on the progress of water planning arrangements in their jurisdictions. For example, jurisdictions report progress on plan implementation and outcomes relative to the social, economic and environmental objectives set out in water plans (NWC 2014c). Reporting is done through various avenues such as: annual reports, evaluation reports and plan reviews. The timing and the detail of the reporting varies across jurisdictions (NWC 2011d).

In 2014, the NWC noted, however, that ‘reporting on progress was rarely done well in practice’ and that this affected the transparency of decision making (NWC 2014c, p. 27). For example, the NWC found that in New South Wales and Tasmania the achievement of plan

objectives was difficult to assess due to lack of coordinated monitoring and reporting, and limited reporting, respectively (NWC 2014d).

The States and Territories also publish scientific assessments and provide data in regards to the state of water resources — the latter is usually provided through published water reports or made available online.

Developments since 2014

While there have been some developments in stakeholder engagement and consultation since 2014, jurisdictions have advised that they have not made material changes to their approach to public consultation and stakeholder engagement in water planning. In 2016, a new water planning framework was implemented in Queensland, however, the approach to stakeholder engagement did not change significantly.

Similarly, in 2016, a new water strategy Sustainable Water Use came into effect in Northern Territory. A number of relevant commitments were briefly outlined including returning to a consultative approach to water planning that includes water advisory committees, open water planning processes and making all water decisions accessible under a new public portal (Gunner nd) — no further details on these commitments have been released.

Since 2014 numerous water plans have been developed, reviewed or revised across Australia (section B.1). Consultation on these plans has variously included the public release of draft plans or statement of proposals, call for submissions, formation of consultation groups or committees, public information sessions and publication of consultation reports. In addition:

- Victoria, Tasmania, Western Australia and the ACT have also engaged stakeholders in the development of jurisdiction-wide water strategies
- Western Australia has consulted widely on modernising their water legislation (including through calling for submissions on a position paper, holding public forums and creating a stakeholder reference group).

The National Farmers' Federation noted that in New South Wales, recent 'review processes [review and roll-over of inland water sharing plans in NSW] has been less than satisfactory for water users' (sub. 55, p. 11). They expressed disappointment with the 'lack of transparency and consultation with water users' through the review process. DPI (NSW) (DPI (NSW) 2016b) has noted that:

Consultation for the replacement of the inland plans was tailored to the needs of the stakeholders across the plan areas ... [and] included, broad scale mailouts to all licence holders and stakeholders in the replacement plan areas requesting submissions on whether the plans should be extended or replaced, [and] targeted consultation with individuals or groups who may be affected by changes to a plan being replaced.

NSW DPI Water has also noted that replacement plans for inland areas needed to consider implications of the MDB Plan (that is, the development of water resource plans) (DPI

(NSW) 2016b). Water resource plans will be developed in close consultation with stakeholders:

DPI Water will be undertaking extensive consultation with industry and key stakeholders in the development of water resource plans [and] is aware that there are a number of rule changes and issues that stakeholder groups are still wanting to be resolved for the inland water sharing plans, and they will be assessed as part of the development of the water resource plans [due in 2019] (DPI (NSW) 2016b).

Since 2014, jurisdictions have continued to make information available to the public to facilitate informed consultation and keep communities and stakeholders abreast of water planning outcomes (table B.36).

Table B.36 Examples of information provided to facilitate consultation and inform stakeholders of water planning outcomes

<i>Examples of information provided</i>	
NSW	Real-time data on the status of water resources is available online through the NSW Office of Water (data is used to develop and evaluate water plans).
Vic	Monthly Water Reports (summary of the status of Victoria's water resources and water supplies), Victorian Catchment Management Authorities Actions and Achievements Report and reporting through the DELWP's website (actions on statewide plans).
Qld	Minister's Performance Assessment Reports (assessing the effectiveness of plan outcomes/objectives), reviews of water resources/plans reports, assessment of environment reports, socioeconomic and cultural values reports, hydrogeological assessment reports.
WA	Evaluation statements have been published for five plans. Other initiatives in providing information to stakeholders about water resources include: <ul style="list-style-type: none"> • Water for Growth (released mid 2014) outlines by region the State's knowledge of water resources, along with plans for meeting future demand • Water Resources Inventory (released mid 2014) contains detailed information about the State's main water resources (location, amount and quality of water in the natural surface and ground water sources, related technical information).
SA	Groundwater and surface water status reports, Demand and Supply statements (include state and condition of all water resources, and list major demands on water resources), Natural Resource Management Reporting Framework Trial (produced 56 statewide report cards and 242 regional snapshots which assess the status and trends in condition of the State's natural resources).
Tas	Eco-hydrological assessment (draft River Clyde Water Management Plan).
NT	Review and monitoring report (Katherine Water Allocation Plan), announced allocation reports (Katherine Water Allocation Plan) and stream flow measurements for Katherine and Daly Rivers.
ACT	ACT Water Report (reporting against actions in the ACT Water Strategy 2014–44 and condition of ACT catchments), Commissioner for Sustainability and the Environment State of the Environment Report (condition of ACT catchments).

Source: Responses to State and Territory information requests.

There have also been changes in water plan evaluation guidelines and processes that aim to enhance reporting of the achievement of plan objectives in New South Wales and Tasmania (section B.1).

In 2016, the MDBA completed the Northern Basin Review. In undertaking the review the MDBA: held meetings with community representatives and stakeholders; consulted with advisory committees, working and representative groups; and toured regions to engage with the broader community providing them with opportunities to ask questions on the technical work undertaken for the review (MDBA 2016b). In November 2016, a summary of the consultation report was released and the MDBA proposed amendments to the Basin Plan.

Between November 2016 and February 2017, the MDBA also undertook community consultation for proposed amendments to the Basin Plan (MDBA 2017e). The MDBA: consulted with stakeholders, working groups and advisory committees; invited the public to provide written feedback on the proposed amendments (over 2000 submissions were received); and engaged with the public by holding briefings throughout the MDB (MDBA 2017e). In May 2017, the MDBA released a community consultation report summarising the themes and issues raised in submissions and throughout the consultation process, along with responses to the issues raised.

The Commission's view

As outlined above, the approach to consultation and stakeholder engagement in water planning varies across jurisdictions (table B.35) with some practices being more comprehensive and inclusive than others. Some variation in practices is to be expected as the approach to stakeholder engagement and consultation needs to vary according to: the nature of the issues under consideration and the potential consequences of decisions. Further, variation in practices does not necessarily imply that one practice is more effective than another — that is, more representative, informative and responsive (chapter 8). Similarly, disagreement by some stakeholders on the outcomes of the engagement process does not necessarily infer that stakeholder engagement practices are ineffective.

In the Commission's view, stakeholder engagement and consultation in water planning since 2014 has largely met NWI requirements. States and Territories have:

- provided opportunities to communities and stakeholders to express their views
- provided relevant information to support decision-making
- taken steps to respond to stakeholder concerns, document outcomes of water sharing plans and the achievements of objectives, and address previous concerns regarding the reporting of plan objectives.

The MDBA has continued to consult and engage with stakeholders and communities.

Stakeholder engagement will continue to play an important role in implementing future reforms and policies across the water sector and in managing future challenges such as growing community expectations. Chapter 8 considers the ongoing need for strong stakeholder consultation.

Assistance for structural adjustment

The NWI recognised that significant adjustment issues affecting water access entitlement holders and communities may arise from reductions in water availability caused by the reforms proposed in the NWI.¹²⁵ In response, the States and Territories agreed to consult with affected water users, communities and associated industries on possible responses to address these impacts, taking into account factors including:

- possible trade-offs between higher reliability and lower absolute amounts of water
- the fact that water users have benefited from using the resource in the past
- the scale of the changes sought and the speed with which they are to be implemented (including consideration of previous changes in water availability)
- the risk assignment framework set out in the NWI.¹²⁶

The Australian Government committed to considering assistance for regions on a case-by-case basis either in consultation with the States and Territories or of its own initiative.

The NWC (2009) found there was little understanding of the processes and causes of structural adjustment from water reform. This lack of information persisted into 2011 when it became accompanied by concern that the wide variety of assistance measures across the MDB could become ‘uncoordinated, ineffective or counterproductive, particularly where they attempt to artificially constrain adjustment’ (NWC 2011d, p. 128). At the same time, there was a recognition that water reform was benefiting some regional communities with water trading helping many to better manage their water resources and build resilience to change (NWC 2011, p. 127).

Surveys and associated reports by MJA (2012b, 2013) and Schirmer (2014) allowed the NWC (2014c) to make broader and more informed findings in 2014, including:

- water-dependent communities were not measurably better or worse off due to water reforms
- factors unrelated to water reform (such as population size) tended to be correlated with key measures of economic and social wellbeing, while exposure to water reform was not
- water recovery programs had delivered positive social and economic outcomes for most irrigators and irrigation communities as:
 - environmental water purchases had helped irrigators better manage their financial position and get through drought
 - the majority of the proceeds earned from the sale of entitlements had remained in the communities from which the water is sold
 - water entitlement sales had allowed structural change to occur.

125 NWI paragraph 97.

126 NWI paragraph 97.

In drawing these conclusions the NWC explained they should not be used to infer that water reform was not having an effect on individuals and communities. Rather, there was a need to recognise that the effects of water reform are not readily observed at an aggregate level because the influence of other factors is having a greater effect on the wellbeing of individuals and communities.

Progress to date

Government programs and measures to assist individuals and communities adjust to structural change have been largely focused within the MDB as this is where the impacts of water reform (and specifically water recovery for the environment) have been greatest due to a combination of overallocated water resources and a dependence on water within many regional economies.

Governments in Western Australia, Tasmania, the Northern Territory and the ACT have not reported to the Commission any significant adjustment issues due to water reform that have necessitated assistance for communities or water entitlement holders.

The assistance provided in the MDB has most often taken the form of government grants for water efficient infrastructure (both on-farm and within irrigation distribution networks). The Australian Government has spent over \$8 billion ‘to minimise any adverse impact of water recovery as a result of the Basin Plan’ (DAWR 2017c, p. 6). The Basin States have also undertaken a mix of projects focused on adjustment assistance and regional development but their spending has not been on the same scale as that of the Australian Government.

Developments since 2014

Structural assistance measures announced or committed since 2014 have included:

- the Victorian Government providing services such as rural financial counselling, hardship policies for water bills and farm planning advice (DELWP (Vic) 2016)
- the Victorian Government initiative to reduce administrative barriers to the re-development of dried-off properties (DELWP (Vic) 2016)
- the Murray-Darling Basin Regional Economic Diversification Program which committed \$98 million through to 2016-17 to assist Basin communities adjust to a water constrained environment. (Australian Government 2014a).

Opinions have varied on whether the various past and present programs have been successful in further assisting communities adjust to change, albeit some of these opinions incorporate considerations beyond the effect of those programs on communities (box B.10).

Box B.10 Differing views on adjustment assistance programs

The Murray-Darling Basin Regional Economic Diversification Program, which sought to expand the economic base of communities within the Murray-Darling Basin has been judged by the Gwydir Valley Irrigators Association Inc. to be a missed opportunity:

This program was designed to cover the whole MDB in NSW. For it to have been successful, it should have focused primarily on the communities impacted by water buy backs and / or water recovery, rather than simply communities in the basin ... In addition, the programme had too strong a focus on creation of new jobs and building skills capacity. A focus on maintaining employment and enhancing diversification of water use would have been significantly more beneficial to communities directly impacted by water recovery. (2017, p. 13)

Across a broader suite of programs Pettigrew believed that:

... funding support for industry and community transition during past water reforms and the implementation of the Basin Plan has been inadequate and ill planned, it has in many cases failed to achieve desired outcomes, and should be addressed. (sub. 39, p. 2)

While Crase has said:

Successful irrigation enterprises tend to adopt capital (including [water use efficiency]) up to the point that it is profitable to do so. To encourage adoption beyond this point, simply sets up business (and ultimately communities) to fail. Of course it does generate rents for providers of [water use efficiency] equipment and presumably benefits specific irrigators. It would be wrong to assume that it benefits all irrigators or the community at large. (2017, p. 1)

In response to views similar to those of Crase, the National Farmers' Federation has put a contrary view:

Many academic commentators have suggested that the 'purchase' of environmental water by investing in water use efficiency amounts to a public subsidy. This narrow view fails to acknowledge that in addition to just water recovery, other benefits are 'purchased' or other costs avoided by investing in infrastructure rather than straight buyback. These additional benefits include a more productive and efficient irrigation business, maintained productivity with associated benefits for input suppliers and downstream processing, and the social and economic flow on benefits associated with the spending stimulus. (2017, p. 3)

The Commission's view

The NWI foreshadowed possible adjustment issues for water entitlement holders and communities from water reform. Accordingly, the approach of governments to each group needs to be considered in turn.

The purchase of water entitlements from irrigators is an equitable and efficient response to the structural change arising from the recovery of water for the environment. Sales are voluntary and the use of market mechanisms ensures a reasonably consistent treatment of irrigators and supports an efficient allocation of water resources.

Water efficiency programs have been beneficial for irrigators but have arguably delivered less equitable outcomes than water purchases. For example, irrigators who had earlier spent their own money on improving water efficiency on their properties did not have viable water saving proposals to advance for funding. Others who had not made these investments could

pursue government grant funding. The gains for some of these irrigators are expected to be significant with DAWR (2017c) forecasting a 135 per cent increase in pre-tax profits for large cotton farmers in Trangie participating in the Private Irrigation Infrastructure Operators Program.

Financial counselling services (such as those initiated in Victoria) are, by their nature, well suited to helping individuals adjust to change.

Assistance for communities

There is an extended timeframe for the implementation of the Basin Plan — seven years from 2012. This, combined with the improved stakeholder consultation by the MDBA since 2011, will provide communities with time and information to adjust to the structural changes caused by the Plan. Further, and in line with their commitments under the NWI, governments have implemented other measures and programs to help communities adjust to change.

However, there is a mix of opinion on the outcomes from the different assistance programs (box B.10). Part of the reason for this is the difficulty in isolating the impact of assistance programs on communities from other influences such as broader economic and social trends, seasonal conditions, commodity prices and developments within other local industries. Also, many of the assistance programs have not been formally evaluated to determine whether or not they have achieved their objectives.

One of the arguments for water efficiency programs is that they help keep water in productive use in the district and so support the local economy. While this may be true in some instances, water efficiency programs will not always be beneficial to communities because:

- the water ‘saved’ will not necessarily remain in an irrigation district if it can be traded to another district
- opportunities to improve water efficiency may not be available in some districts or to the extent necessary to help with the adjustment to structural change.

Chapter 8 considers whether there is scope to revise the NWI in this area to better serve the overall goals of optimising economic, social and environmental outcomes.

Summary

Table B.37 reflects the collective progress of all jurisdictions toward the completion of actions set out in the NWI.

Table B.37 Assessment summary: Community partnerships and adjustment

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Community partnerships		
Engage water users and other stakeholders by: <ul style="list-style-type: none"> • improving certainty and building confidence in reform processes • transparency in decision making • ensuring sound information is available to all sectors at key decision points 	Largely achieved	Stakeholder engagement and consultation in water planning since 2014 has largely met NWI requirements. States and Territories have: <ul style="list-style-type: none"> • provided opportunities to communities and stakeholders to express their views • provided relevant information to support decision-making • taken steps to respond to stakeholder concerns, document outcomes of water sharing plans and the achievements of objectives, and address previous concerns regarding the reporting of plan objectives. Stakeholder engagement will continue to play an important role in implementing future reforms and policies across the water sector and in managing future challenges such as growing community expectations.
Community adjustment assistance		
Address adjustment issues raised by the implementation of the NWI	Largely achieved	Governments have implemented measures and programs to help individuals and communities adjust to the structural adjustment caused by water reform. These measures and programs have primarily been deployed in the MDB. <p>There are possibly some refinements to the NWI that would better serve its overall goals of optimising economic, social and environmental outcomes.</p>

^a **Achieved:** All requirements met. **Largely achieved:** Requirements generally met, with some exceptions. **Partially achieved:** Only some requirements met. **Not achieved:** No requirements met.

C The National Water Commission's recommendations from 2014

The National Water Commission (NWC 2014c) made 10 recommendations to Australian, State and Territory Governments in its final assessment of progress under the National Water Initiative (NWI). This appendix set out progress against those recommendations.

NWC 2014 assessment recommendation 1

Governments should not backtrack on water reform. All Australian Governments should fully embed National Water Initiative principles in water management decision making and maintain progress on reform.

Most jurisdictions have made good progress in meeting the objectives and outcomes of the NWI, with some of this progress having been made in the past three years. However, there have been some instances of jurisdictions acting in ways that could be characterised as backtracking on reform. For example, the Tasmanian Government plans to cease price regulation of Tasmania's main urban water utility and specify reduced rates of price increases in coming years. The Tasmanian Government's stated reasons for its proposal, primarily affordability, indicate that this change is unlikely to promote the objectives of the NWI, such as the efficient use of water infrastructure. Further, while price monitoring was in place for south-east Queensland retailer-distributors up to 2014, this is currently not occurring. In addition, there are a number of areas where some jurisdictions are yet to implement key areas of reform. These include:

- Western Australia and the Northern Territory are yet to introduce legislation required to create statutory-based entitlement and planning arrangements that provide for water entitlements that are long-term, defined as a share of the available resource, unbundled from land and tradeable.
- the use of independent bodies to set or review water prices is a key element of the NWI. For urban water service provision, these arrangements are not currently in place in south-east Queensland (for retailer-distributors) and the Northern Territory. Existing processes in Western Australia and for bulk water in south-east Queensland are not fully independent from government, and the current reporting processes for local water authorities in regional New South Wales and Queensland do not involve independent bodies.

-
- pricing practices for some urban water service providers are not consistent with the requirements of the NWI. For example, there is evidence of under-pricing in Tasmania, south-east Queensland (bulk water only) and regional New South Wales.

NWC 2014 assessment recommendation 2

Governments should not ‘mark their own scorecards’ on water reform. Independent oversight and public reporting of the progress of water reform in achieving economic, social and environmental outcomes should continue.

This recommendation was adopted through the Productivity Commission being assigned responsibility for conducting an inquiry every three years into progress towards achieving the objectives and outcomes of the NWI.

NWC 2014 assessment recommendation 3

The Murray-Darling Basin Plan should be implemented in full and independently audited. All Murray-Darling Basin governments should fully implement the Basin Plan and rigorous, regular and independent audits should be undertaken to build trust in its ability to secure enduring outcomes for the Basin and its communities.

In June 2017, the Murray-Darling Basin First Ministers confirmed their commitment to the Murray-Darling Basin Plan (Basin Plan) and stressed the importance of maintaining momentum to ensure it is implemented on time and in full. The Murray-Darling Basin Authority is conducting an evaluation of the Basin Plan, with early findings expected to be published in December 2017.

The Productivity Commission will conduct inquiries into the effectiveness of the implementation of the Basin Plan in 2018 and 2023.

NWC 2014 assessment recommendation 4

Reforms to water rights and markets should be completed and expanded. Entitlement and market reforms should be expanded to enhance market performance and extend productivity gains.

In 2014, the NWC noted that:

1. surface water trading in the Murray-Darling Basin (MDB) is an increasingly mature market; however, additional benefits could be realised from further improvements to market systems and access to information

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2. further tradeable products are expected to emerge, either as new entitlement and allocation products or for related commodities such as capacity share and storage rights
 3. outside the MDB, and for groundwater systems, changes to the regulatory framework could allow trading to develop where water resources are scarce and hydrologically connected
 4. innovation in market products and in the technology underpinning market operations, such as common registry systems, should continue to be pursued, including through the private sector
 5. applying market-based approaches to the release of unallocated water also facilitates more economically robust decision making
 6. Governments need to ensure that entitlement and market reforms are completed and expanded to facilitate the economically efficient use of water.

Appendix B discusses progress against these issues. In particular:

- section B.2 (Water Markets and Trading) addresses items 1 and 2
- section B.1 (Water Access Entitlements and Planning Framework) addresses items 3 and 6
- section B.3 (Best Practice Water Pricing and Institutional Arrangements) addresses item 5.

Key points include:

- Western Australia and the Northern Territory are yet to establish statutory-based water entitlement and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable
- further progress could be made in Western Australia and the Northern Territory toward having a flexible approach to the release of unallocated water
- some progress has been made in developing new and emerging water markets and improving access to market information.

NWC 2014 assessment recommendation 5

Urban water reform should be accelerated to drive greater efficiency and innovation. A contemporary urban water reform agenda should be developed by governments to improve economic efficiency and encourage innovation through independence of price setting, clearer performance objectives, contestability, and customer engagement.

Although individual jurisdictions have continued to pursue a range of urban water reforms, a comprehensive national urban water reform agenda has not been developed and agreed by State and Territory Governments.

The Commission's terms of reference specifically require it to consider whether NWI reforms are adequate to address emerging challenges in the urban water sector. The Commission's analysis in this inquiry indicates that there is scope for further reform, including matters that go beyond reforms included in the NWI, to address matters highlighted by the NWC in 2014.

The Commission's proposed suite of recommendations in chapter 6 represents a sensible reform program which, if pursued, will improve outcomes in the urban water sector. Development and inclusion of some of these recommendations in a renewed NWI by State and Territory Governments would represent a significant step towards the achievement of the NWC's 2014 recommendation.

NWC 2014 assessment recommendation 6

Water quality objectives should be integrated into decision making. Water quality should be incorporated into water planning to achieve more resilient environmental and economic outcomes.

In 2014, the NWC noted that the National Water Quality Management Strategy (NWQMS), which was incorporated into COAG's 1994 Water Reform Framework, aims to achieve the sustainable use of water resources by protecting and enhancing the quality of these resources. It further noted that the NWQMS has non-mandatory guidelines for managing a range of water resources, and proposes the development of water quality plans for inclusion in present-generation water allocation plans.

Since 2014, work has been undertaken to revise the strategic directions of the NWQMS (including a focus on the integration of water quality and quantity in planning). The Commission understands that this work is near completion and will culminate in the publishing of a new website (www.waterquality.gov.au) during 2017. The Commission understands the website will include:

- the updated national guidance documents (including the NWQMS Charter)
- revised Australian and New Zealand Guidelines for Fresh and Marine Water Quality, including associated technical briefs.

As noted in chapter 3, the Commission considers the integration of natural resource management with water planning as an important issue because the management of land within catchments can impact on both the quality and quantity of surface and groundwater resources. However, it will be important for the Commission to understand the work to revise the strategic directions of NWQMS and its implications before addressing this issue. Therefore, the Commission intends to consider this issue further once this material has been released.

NWC 2014 assessment recommendation 7

Water information collection and sharing should be streamlined. The Australian Government should review reporting associated with the National Water Account, the Water Act 2007, the Murray–Darling Basin Plan and the Water Account Australia to ensure efforts are well targeted to stakeholder needs and information is shared and reused among jurisdictions and agencies.

As noted in appendix B (section B.5), an interagency working group analysed the data needs of the relevant Commonwealth agencies (including the costs of providing that information and the benefits of the information based on it) and recommended amendments to the water regulations in order to streamline data requirements (IWG 2016). The recommendations of the interagency working group were accepted by the Australian Government and implemented through the *Water Amendment (Water Information) Regulations 2017* (Cwlth) (BOM 2017).

NWC 2014 assessment recommendation 8

Governments should invest in water infrastructure only after rigorous cost-benefit analysis. All government water infrastructure investment should generate a return for the community and be subject to robust water planning and transparent cost-benefit analysis.

Progress against this recommendation is considered in appendix B (section B.3). In summary, there have been 10 major projects¹²⁷ announced since 2014 that will in some way provide water for irrigated agriculture. Not one of those projects has met the NWC's recommendation for a transparent cost-benefit analysis.

Benefit-cost ratios are available for seven of the projects and those ratios indicate the projects are worthwhile. However, the Commission has been unable to confirm the veracity of those ratios as the full analysis for each project is not available.

NWC 2014 assessment recommendation 9

The National Water Initiative principles should underpin resource development decisions. NWI principles, including best practice water pricing, should underpin all new water developments including those in northern Australia.

¹²⁷ Each project has a total cost in excess of \$5 million. The 10 projects are: the Broken Hill Pipeline project (NSW); Dungowan Dam (NSW); South West Loddon Rural Water Supply (Vic); Macalister Irrigation District Modernisation (1A) (Vic); Macalister Irrigation District Modernisation (1B) (Vic); Werribee Irrigation District Modernisation (Vic); Rockwood Weir (Qld); Southern Highlands Irrigation Scheme (Tas); Swan Valley Irrigation Scheme (Tas); and, Duck Irrigation Scheme (Tas).

Progress against this recommendation is considered in appendix B (section B.3). In summary:

- there have been 10 major projects (as above) announced since 2014 that will in some way provide water for irrigated agriculture
- nine of the 10 projects have already complied with, or are required to comply with, NWI principles. The exception is the Broken Hill pipeline project where the position in relation to NWI compliance is unclear (appendix B, section B.3).

NWI compliance has also been made an eligibility condition of the Australian Government's water infrastructure programs: National Water Infrastructure Development Fund and National Water Infrastructure Loan Facility. In contrast, NWI compliance is not a requirement under the Northern Australia Infrastructure Facility's investment mandate. This is despite the *White Paper on Developing Northern Australia* noting:

New investments in water infrastructure will only go to projects where there is a commitment to accelerate water reform through securing water rights for farmers and other investors. (Australian Government 2015, p. 47)

Projects should align with the National Water Initiative principles ... (Australian Government 2015, p. 51)

DAWR (2016b) is leading the delivery of the White Paper measures. Among its criteria for recommendations to the Australian Government on project financing is consideration of whether the project will be located in areas where NWI compliant water entitlement and planning frameworks are or *will be* put in place. This remains a key risk area and is addressed in chapter 7.

NWC 2014 assessment recommendation 10

The National Water Initiative should guide the way water is allocated and managed for all users, including extractive industries. Water for extractive industries needs to be planned and managed by jurisdictions within NWI-consistent regional water frameworks to mitigate potential impacts on other water users and the environment.

Since the 2014 assessment, there have been some key developments relating to water rights arrangements for extractive industries. The Northern Territory Government has announced plans to remove entitlement exemptions for mining and / or petroleum operators. The Queensland Government has made changes to apply consistent water rights arrangements across mining and petroleum (appendix B, section B.1 and chapter 3).

While water management is primarily a State and Territory responsibility, the Australian Government has introduced initiatives in response to community concern over large coal mines and coal seam gas (CSG) coupled with a lack of social licence for the CSG industry:

- the National Harmonised Regulatory Framework for Natural Gas from Coal Seams

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- the establishment of the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining in 2012 — which provides scientific advice to Australian, State and Territory Governments about relevant CSG and large coal mining approvals where they have significant impacts on water
 - the Bioregional Assessment Programme for understanding the impacts of large coal mines and CSG operations
 - the introduction of the water trigger under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act) in 2013, which requires the Australian Government to assess and approve CSG and large coal mining developments which may have significant impacts on the water resource.

An independent review of the water trigger outcomes found it was too early in the life of the legislation to quantify the benefits arising from the water trigger. However, the review was confident that the legislation is capable of delivering a net benefit (Hunter 2017).

To minimise duplication of assessment processes for development projects related to the water trigger, assessment bilateral agreements are in place with every jurisdiction which allow State and Territory Governments to assess proposals using an Australian Government accredited process consistent with the EPBC Act (Hunter 2017). Legislation introduced before the Parliament in 2014 to facilitate a ‘one stop shop’ for both assessment and approval processes via ‘approval bilateral agreements’ lapsed in 2016 when Parliament was dissolved prior to the election (Hunter 2017). It has not been re-introduced.

Since 2014, a number of projects have been completed under the Bioregional Assessment Programme. Results for the completed assessments have been released and are available online (www.bioregionalassessments.gov.au). The assessments aim to further knowledge on the risks and potential impacts associated with Australia’s CSG and coal mining activities on water and water-dependent assets.

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