



Australian Government
Productivity Commission

National Water Reform

Productivity Commission Inquiry Report

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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).



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19 December 2017

The Hon Scott Morrison MP
Treasurer
Parliament House
CANBERRA ACT 2600

Dear Treasurer

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

Yours sincerely

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

Dr Jane Doolan
Commissioner

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

John Madden
Associate Commissioner

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]

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.

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Acknowledgments

The Commission has used a range of information sources in preparing the 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 Commissioners express their appreciation to the staff who worked on the inquiry report and underlying analysis.

Abbreviations

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ABS	Australian Bureau of Statistics
ACCC	Australian Consumer and Competition Authority
ANAO	Australian National Audit Office
AWI	Aboriginal Water Initiative
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 Centre
CSO	Community Service Obligation
DAWR	Department of Agriculture and Water Resources (Australian Government)
DENR	Department of Environment and Natural Resources (NT)
DEWNR	Department of Environment, Water and Natural Resources (SA)
DPI	Department of Primary Industries (NSW)
DPR	Direct potable reuse
EPSDD	Environment, Planning and Sustainable Development Directorate (ACT)
ERA	Economic Regulation Authority (WA)
ERRR	Economic real rate of return
ESC	Essential Services Commission (Vic)
GABSI	Great Artesian Basin Sustainability Initiative
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
kL	Kilolitre
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
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
QWRAP	Queensland Water Regional Alliance Program
RMC	River Murray Commission
RMO	River Murray Operations
SCA	State Constructing Authorities
TLM	The Living Murray
VEWH	Victorian Environmental Water Holder
WSUD	Water sensitive urban design
WSP	Water Sharing Plan

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 waterways, 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 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 waterways such as rivers, wetlands and estuaries, whether fed through surface water or groundwater. 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 waterway.
Environmental flow	A flow regime applied to a river, wetland or floodplain to improve or maintain environmental outcomes (and other public benefit outcomes, where possible).
Environmental outcomes	Maintaining ecosystem function (for example, through periodic inundation of floodplain wetlands); biodiversity; water quality; and river health targets (defined under the National Water Initiative).
Environmental transfers	Water allocations owned by an environmental water holder that are transferred within or between water systems to achieve environmental watering objectives.
Environmental water	The water provided to achieve environmental outcomes (and other public benefit outcomes, where possible), which may derive from surface water or groundwater and be provided as planned environmental water or held environmental water.
Environmental watering	The delivery or use of held environmental water to achieve environmental outcomes (and other public benefit outcomes, where possible).
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 entitlements held and used (usually by governments) for the purpose of achieving environmental outcomes (and other public benefit outcomes, where possible).
Indigenous Australians	The term ‘Indigenous’ is used throughout the report to describe Aboriginal and/or Torres Strait Islander people of Australia.
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 water or groundwater that would otherwise flow, directly or indirectly, into a waterway, 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.
Merits review	Reconsidering an administrative or regulatory decision, where the review body has the ability to impose a preferable decision in place of the original decision, and has the same powers and discretions as the original decision maker.
Outcomes-focused regulation	Regulations that specify the outcome to be achieved without prescribing the means to achieve that outcome.
Other public benefit outcomes	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 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, cease-to-pump rules and groundwater access rules.
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.
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 or collects on land and in natural or artificial waterways.
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 separation of historic water entitlements (which bundled together water, land, water use, delivery and works approvals) into 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 surface water or groundwater between the environment and consumptive water users, and also between different types of consumptive 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 providing 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 persists in managing its water resources well, given our dry and highly variable climate, and the importance of water to our economy. Some jurisdictions have become complacent.
- Since its creation in 2004, the National Water Initiative (NWI) has made a significant contribution to this objective.
- While much of the attention has been on reform within the Murray-Darling Basin, the NWI remains nationally relevant and the principles it contains are sound.
- There has generally been good progress by States and Territories in implementing the NWI, and most of its objectives and outcomes have 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.
 - Urban water and irrigation infrastructure services have been improved through institutional and pricing reforms.
- Water reform has delivered substantial benefits to irrigators, other water users and the broader community.
 - The expansion of water trading has provided irrigators with greater flexibility to manage change and has encouraged greater efficiency.
 - There is emerging evidence of improved ecological outcomes from increased environmental water, 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, including fully implementing entitlement and planning reforms, and economic regulation in some jurisdictions
 - respond to the challenges posed by population growth, climate change and changing community expectations.
- Reform priorities include:
 - maintaining the key foundations of water management, preventing the re-emergence of outdated policies and avoiding the erosion of hard-won reforms through backsliding
 - revising national policy settings in a range of areas, including entitlement and planning arrangements for extractive industries, and the water needs of Indigenous Australians
 - significantly enhancing national policy settings in:
 - ... urban water management, including clearer roles and responsibilities for supply augmentation planning, improving economic regulation, enabling decentralised solutions and more outcomes-focused environmental regulation
 - ... environmental water management, including better integration with waterway management, strengthened and streamlined institutional, governance and management arrangements, and improved monitoring and evaluation for adaptive management
 - ... new infrastructure, where the focus needs to be on ensuring environmental sustainability and financial viability *before* any government resources are committed for construction.
- Water reform requires perseverance, continuity and long-term commitment from governments. To ensure that Australia's water resources are managed sustainably to meet changing community needs, the priorities above should be incorporated into a renewed NWI by 2020.
- Failure to act now risks the gains made to date and means opportunities for greater efficiency, improved liveability and more sustainable environments would be lost.

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 extreme scarcity.

Our reputation on the world stage is the result of forward thinking and, for the most part, co-operation by the Australian, State and Territory Governments in developing a national water reform agenda that has been pursued over the past 20 years. The cornerstone of Australia's most recent phase of 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, and provide greater certainty for the environment. The NWI is backed by regular reporting and independent assessment of progress.

The efforts of the Australian, State and Territory Governments in water reform have delivered more sustainable water use and efficient provision of water services. Key foundations have been built in the areas of water entitlements and planning, water markets, water accounting and compliance, water quality, water pricing and institutional arrangements. As a result of the NWI and its predecessor policies, we have seen the value of water to the Australian economy first understood and then significantly increase over time. These reforms also enabled Australia to weather the effects of the Millennium Drought (1997 to 2009) — the longest and most severe drought on record — with economic, social and environmental impacts that were less severe than would otherwise have been the case.

However, perseverance and continuity in the process of water reform is required to ensure these gains can be maintained and built upon. The relatively benign climate conditions in most parts of Australia over the past few years are not expected to last — it is time to move into the next phase of water reform so that we are prepared for the challenges that lie ahead.

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 Australian Government broadened the terms of reference to consider future reform priorities and the scope for improving the NWI to enable necessary reform.

Australia needs a new phase of water reform

Australia is now facing the dual challenges of population growth and climate change. In many areas, water managers will need to meet the demands of significantly more people with potentially less water available from existing sources. Added to this, community demands on water managers are growing as the contribution of water management to liveability, amenity, recreation and regional tourism is increasingly recognised.

Reliance on past reforms will not be enough to manage these challenges. Further reform is required in three priority areas.

In the urban water sector, we need to ensure that the demands of growing cities can be met efficiently and that water services remain affordable over the long term. The infrastructure used to provide water to our cities generates value to customers worth billions of dollars. Our cities are the key drivers of economic activity — 80 per cent of Australia's GDP is produced in cities, while 80 per cent of Australia's population growth to 2050 is expected to occur in capital cities. Further, given the size of the urban water sector (box 1), even small improvements in the efficiency of the sector will provide substantial gains.

During the Millennium Drought some costly and highly contentious decisions to expand water supply were made in Australia's major cities, and these substantially increased costs to water customers. Improvements in planning and decision-making processes for urban water supply are needed to avoid late, rushed or inefficient investments and ensure that all options for expanding water supply are considered fully and transparently, including emerging decentralised options. Unless we refocus water reform in this way, we risk imposing excessive water bills on customers and we may also miss opportunities to improve liveability when planning our urban environments.

Governments are committed to making significant investments in new water infrastructure in rural and regional areas through programs such as the Northern Australia Infrastructure Facility. These investments need to be preceded by robust project selection processes. Poor past project selection processes have resulted in the construction of economically unviable infrastructure that has created substantial legacy costs for taxpayers, industry, communities and the environment, and there is no excuse for repeating these mistakes.

It is also important that governments focus on generating the greatest possible benefits from the billions of dollars they have invested in environmental water provision, and ensure environmental sustainability in a changing climate.

These three priority areas, together with a renewed commitment to maintaining and improving the key foundations already established, should form the next phase of national water reform. It is critical that governments act now given the urgency of the challenges facing the water sector and the opportunities for increased productivity and efficiency. Doing nothing, or waiting until the next drought, could create a major legacy of future problems.

Box 1 **Key facts about the water sector**

Overview

- In 2015-16, 18 per cent of harvested water was supplied for urban use and 72 per cent was supplied for agricultural, industrial and other uses (the remaining 10 per cent was supplied for environmental purposes).
- Expenditure on services provided by the water sector was about \$17 billion in 2014-15. About 60 per cent of this expenditure was by households, and about 40 per cent by industry and agriculture.

Urban water services

- The urban water sector provides Australian cities and towns with potable (drinking quality) water, wastewater services and stormwater management.
- In 2014-15, the average household spent \$1100 on urban water, wastewater and drainage services and consumed 189 kilolitres of potable water.
- The urban water sector is capital intensive — water and wastewater assets were valued at more than \$160 billion in 2015-16, and investment in these assets has averaged about \$5 billion over the past five years.
- Estimated revenue for water and wastewater service providers was about \$16 billion in 2015-16.

Water services for agriculture

- The asset base providing water services for agriculture was valued at almost \$11 billion in 2012-13.
- Expenditure on rural distribution services was over \$600 million in 2014-15.
- These services contributed to irrigated agriculture production worth \$15 billion in 2015-16, comprising 27 per cent of total agricultural production.
- In 2015-16, the value of entitlements on issue in the southern Murray-Darling Basin was at least \$13 billion.

Water for the environment

- Governments have provided water for the environment through water plans ('planned environmental water') and have also acquired entitlements that are managed for environmental benefit ('held environmental water').
- The total volume of held environmental water entitlements (of varying reliabilities) in the Murray-Darling Basin in 2015-16 was 4315 gigalitres, or 24 per cent of all entitlements on issue. The Commonwealth Environmental Water Holder held 56 per cent of this water (2432 gigalitres) on behalf of the Australian Government.
- The Commonwealth holdings have since grown to 2638 gigalitres and may be valued at up to \$5 billion once water acquisition is finalised under the Basin Plan.

Water reform and the National Water Initiative

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 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; institutional reform (including ensuring that government-owned water utilities have a commercial focus, achieved through corporatisation); the clarification of property rights; allocation of water to the environment; and the development of water trading. The reform agenda also incorporated improvement of health outcomes through provision of high quality drinking water achieved through the development of the Australian Drinking Water Guidelines.

The NWI was developed in 2004 as an extension of the 1994 reforms, to maintain the momentum of reform, respond to overallocation, and address water scarcity issues arising from the early years of what was later to become known as the Millennium Drought. The aim of the NWI is to provide greater certainty for investment and the environment (box 2).

In 2007, the Australian Government introduced the *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.

Box 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 that 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.

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 is in table 1. Most of the objectives and outcomes have been

met. However, there are some areas where further work is required or where there is potential for improvement.

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 (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 service providers in New South Wales, Victoria, South Australia, Tasmania and the ACT. Western Australia, the Northern Territory, Queensland and regional New South Wales do not have independent economic regulation.
- Cost-reflective pricing is generally being used 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 water provision, and some arrangements are in place to coordinate water use for water resources shared across jurisdictions.

5. Water resource accounting

- Water metering, accounting and compliance systems are in place in all jurisdictions.
- Evidence of poor compliance arrangements in some MDB jurisdictions has come to light.

6. Urban water reform

- Water reuse, water use efficiency, water sensitive urban design and innovation have improved since the introduction of the NWI.
- Drinking water quality generally meets existing guidelines. Issues remain, particularly in some remote communities, but action is being taken.

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.
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Past water reform has been beneficial

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

Water resource management

The introduction of NWI-consistent *water entitlements 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 prerequisites to establishing water markets and trading. The system of property rights and water planning has also underpinned the move towards improved environmental sustainability.

There is widespread agreement that these reforms have produced significant financial benefits for entitlement holders. 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 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 GDP by \$220 million in 2008-09 (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 8 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. Consequently, new industries, such as nut growing, have developed rapidly and established industries have become 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 most trading occurs 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 sectors is still restricted in various ways, but it has benefited the community 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

water 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 the recovery of large quantities of water for the environment within the MDB, its holdings have grown to 2638 gigalitres of entitlements, with a long-term average annual yield of 1811 gigalitres (as at 30 September 2017). These entitlements 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. For example, provision of environmental water has 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 separation of service delivery from policy making and regulation through the corporatisation of water utilities, and the introduction of independent economic regulation in many major urban areas, has improved efficiency, increased the transparency of investment decisions and promoted more efficient pricing. The Commission has previously estimated that Australia's GDP 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 have been maintained through to today, this would represent an annual economic gain of over \$5 billion (in today's dollars).

The widespread introduction of consumption-based pricing (along with restrictions and awareness campaigns during droughts) changed consumer behaviour and led to lower 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.

Drinking water quality generally meets existing guidelines. New South Wales, Victoria, South Australia and the ACT all achieve good water quality results, with New South Wales in particular having made significant progress in improving regional drinking water quality over several decades. Some issues remain in Queensland, Western Australia, Tasmania and the Northern Territory, particularly in remote areas, but these jurisdictions are all taking steps to address remaining concerns.

In the *irrigation infrastructure sector*, corporatisation and economic regulation of bulk water assets now cover the vast majority of water delivered, with prices set by the economic regulator in New South Wales, Victoria and Queensland. 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, has 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 due in part to improvements in operational efficiency.

Overall, water reform under the NWI has delivered significant benefits to irrigators, other water users and the broader community. The reforms are generally well accepted and supported by key stakeholders. However, the continuation of these benefits is dependent on governments maintaining their commitments to these reforms and not eroding or unwinding them. Reform is an ongoing process and requires perseverance and commitment by governments to ensure that gains are maintained and water management and service delivery continues to improve to meet emerging challenges.

Why is further reform needed?

Notwithstanding the benefits of the NWI water reforms, there are four strong reasons for governments to commit to a third phase of national water reform.

- There is still unfinished business from the NWI that needs completion.
- There is evidence of backsliding against early reform commitments, with some governments appearing to have forgotten the reasons for those reforms and taken for granted the benefits they generated. We are starting to see the re-emergence of outdated public policy.
- Reviewing the experience of implementation provides the opportunity to take an adaptive management approach to national water reform. This has already revealed some gaps and limitations in the NWI.
- Challenges, such as those posed by climate change and population growth, will have major implications in the future, particularly for the urban water sector.

Progressing unfinished business from the NWI

There are several areas of reform that remain unfinished in some jurisdictions. The most urgent and important of these are discussed below.

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 undermine long-term environmental outcomes.

It is particularly important that these jurisdictions undertake these reforms now, given the prospect of new water infrastructure 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.

Improving 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. Where independent economic regulation has been introduced, there have been improvements in the rigour and transparency of water utility decision making, and this has reduced the politicisation of water supply decisions. Moreover, there is broad support from the water industry for strengthening economic regulation across jurisdictions to provide certainty and encourage private investment.

Independent economic regulation should be applied to all urban water service providers of a sufficient scale. As such, it should be extended to retailer-distributors in south-east Queensland (though price-monitoring was in place up to 2014) and the main provider in the Northern Territory. There is also a need to strengthen existing processes in Western Australia and for bulk water in south-east Queensland — in these cases the occurrence of reviews is subject to ministerial discretion. Both of these issues need to be addressed to ensure there is robust independent economic regulation governing all major urban utilities across the country.

The performance of regional urban water utilities needs to improve in New South Wales and Queensland

Small regional water service providers may have higher costs because they serve small and highly-dispersed population centres, and can find it difficult to attract skilled staff. This makes it harder to provide affordable services that meet relevant health, safety and environmental standards. In New South Wales and Queensland, a number of smaller providers are dependent on government grants to maintain services, which can distort

decision making and reduce efficiency. Grants also increase the risk of underpricing, which is currently occurring in New South Wales.

One way to overcome some of the challenges faced by small regional providers is to amalgamate them into larger entities to achieve economies of scale. However, collaboration — which can range from knowledge sharing to joint planning and shared services — is an alternative, and more flexible approach to achieving economies of scale. It also avoids some of the problems with amalgamating local government owned water providers, such as loss of synergies with other services provided by local governments.

In some cases, even where collaboration allows small regional providers to operate as efficiently as possible, it will not be feasible to deliver services of an adequate quality at a price that consumers can afford to pay. The NWI recognises that such communities will require assistance in the form of transparent Community Service Obligation (CSO) payments (box 3). However, New South Wales and Queensland provide assistance through poorly targeted capital grants. The Australian Government has also provided capital grants for urban water projects, contrary to NWI principles. These capital grants should be replaced by CSO payments that are tightly targeted at high-cost service areas and not tied to capital expenditure. CSO payments should be made contingent on the recipient providers exploring all opportunities to improve the efficiency of their services, taking into account the future viability of services and alternative options.

Box 3 Community Service Obligation (CSO) payments

Governments provide payments to service providers to provide non-commercial services in a range of contexts, including utilities and social services. These 'CSO' payments can be designed in a range of ways to suit the task at hand. For urban water services, CSO payments are typically:

- subject to minimal conditions and not tied to specific investments or operational decisions
- made by the relevant State or Territory Governments
- calibrated to make up the difference between the efficient cost of delivering the desired service (including compliance with relevant regulations) and the assessed ability of the community to pay for that service.

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

Ensuring that cultural values are recognised and provided for in water plans has been an ongoing aspiration for Indigenous communities, leading to the inclusion of provisions in the NWI to meet that goal. In recent years, some States and Territories have made progress in ensuring that water planning includes adequate consultation with Indigenous communities, but this is yet to translate into explicit detailing of cultural values and outcomes in water plans. To date, Western Australia has not yet established specific mechanisms for engaging Indigenous communities in water planning. The complementary issue of providing Indigenous communities with access to water for economic development is not explicitly

addressed by the NWI, although several States and Territories have established or are consulting on specific provisions in this area.

Evidence of backsliding

It is essential to maintain the achievements of hard-won reforms under COAG's 1994 Water Reform Framework and the NWI. The work on water entitlements and planning, water markets, water accounting and compliance, water quality, water pricing and institutional arrangements form the key foundations underpinning sustainable water resource management and efficient service delivery. It would be a mistake to assume that today's relatively benign climate conditions will persist indefinitely. There must be no backsliding if we are to retain the benefits of these past reforms and build on these gains.

Recent policy changes proposed in South Australia and Tasmania are cause for concern in this regard. The South Australian Government's proposal to decorporatise SA Water risks undermining the efficiency gains in service delivery achieved in that State through governance arrangements that give service providers a clear commercial focus and separate service delivery from policy development. The Tasmanian Government's proposal to constrain the role of the economic regulator could slow progress towards cost-reflective pricing in that State, and risks politicising the price-setting process.

There is also a risk of slow erosion of reforms. Confidence in accounting and compliance processes is critical to maintaining the integrity of entitlement systems and water markets. As such, concerns about non-compliance warrant close examination by governments. For example, recent unresolved allegations of non-compliance with water laws and regulations in New South Wales, and broader questions about the effectiveness of state-based compliance and enforcement regimes, risk undermining the benefits of water reform.

A number of reviews have been commissioned, including a Basin-wide review of compliance by the Murray-Darling Basin Authority and a specific review of the water compliance functions in New South Wales. To date these reviews have found a lack of comprehensive reporting on compliance, deficiencies in the compliance efforts of some water regulators (including the commitment to accurate metering and measurement of water take) and relatively low levels of resourcing for compliance in some MDB jurisdictions. In responding to the findings of these reviews, government actions should be proportionate and well-targeted, and the Commission will examine these issues in more detail in its inquiry into the implementation of the Basin Plan in 2018.

Learning from experience

The experience of 13 years of implementation has 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.

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 often 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 entitlements 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 does not provide adequate direction on the contemporary issues faced by environmental water managers in managing a large and growing portfolio of environmental water
- while the NWI provides high-level outcomes for urban water management, it provides little policy guidance to the sector on issues other than pricing.

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. These will need to be maintained to ensure that we learn from experience when delivering future reforms.

Key challenges

There are significant challenges facing the water sector that have emerged or intensified since the NWI was signed. Policy frameworks must address these challenges if they are to 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

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- changing community expectations — these have changed significantly in recent years, in many cases, reflecting community experience during the Millennium Drought. The drought highlighted the social dependence of urban and rural communities on water and water environments when many of these environments dried up and the related services ceased. Accordingly, there is now far more appreciation of the contribution that water management and water environments can make to amenity, liveability, recreation and regional tourism.

In essence, water managers in the future will have to manage potential reductions in water in key parts of Australia to meet the demands of a rapidly increasing population for a wider range of water services. Our national policy settings will need to adapt and change to ensure these challenges can be met.

Priorities for future reform

The Commission has identified three key priorities for the next phase of water reform. Progressing these key priorities requires:

- maintaining the key foundations
- revising policy settings in a number of areas, including planning and entitlements frameworks, water trade and adjustment assistance
- significantly enhancing policy settings for urban water, environmental management and new infrastructure investment.

Maintaining the key foundations

As discussed above, it is important that the key foundations of water reform in the areas of water entitlements and planning, water markets, water accounting and compliance, water quality, water pricing and institutional arrangements, are maintained. Failure to do so will result in erosion in stakeholder, investor and community confidence in our water management system.

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 State and Territory Governments 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 entitlements and planning frameworks, raising concerns about risks to the supply to other water users and the environment. There are also concerns that alternative water rights arrangements may inhibit water trading.

Water entitlements and planning frameworks should more fully incorporate major water uses. Governments should remove entitlement exemptions for extractive industries (unless there is a compelling reason otherwise), so that they are issued entitlements under the framework applying 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 recharge 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 simply add to the pool available for all groundwater users. This could undermine the incentive for any party to invest in a managed aquifer recharge project.

Developing contemporary water entitlements 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 this impact is significant and detrimental, the next water plan review should re-examine the fundamental objectives of the plan (including environmental objectives and those for consumptive use). The consequent balance between environmental and consumptive uses of water should ensure that the plan is suited to a drier climate.

Water quantity and water quality management are both critical for maximising the economic, environmental and social benefits the community derives from Australia's water resources. Currently water planning is more heavily focused on water quantity. Water planning provisions should be updated to more explicitly provide for water quality and the interaction with water quantity.

More fully recognising the water needs of Indigenous Australians

Accommodating the cultural water needs of Indigenous Australians is a key feature of the NWI. However, all governments must undertake further work 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 managers should also take into account the protection of cultural values wherever this is compatible with their primary objectives.

The provision of water for Indigenous economic development is not specifically covered by the NWI. It is important that where State and Territory Governments provide access to water for Indigenous economic development, they 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 maximise the value of the resource for Indigenous communities, involve Indigenous communities in program design, and carefully consider governance arrangements.

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 trading, 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 — the current household capacity to pay for water can be between 10 and 100 times more than the willingness of irrigators to pay. Restrictions on trade between the two sectors have instead resulted in the development of higher-cost sources of urban water — for example, desalination plants.

There are concerns that promoting urban-rural trade would adversely affect communities reliant on irrigation. However, the Commission has assessed that these effects are likely to be modest, and more easily addressed with today's much larger trading volumes and market. 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.

Improving the quality and consistency of economic regulation

There is scope to improve the quality and consistency of economic regulation through the adoption of a set of national principles including:

- the objective of regulation should be to promote the long-term interests of consumers

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- regulatory decisions should include transparent customer engagement
 - prices should reflect the full efficient cost of service provision
 - utilities should have incentives to innovate and improve their efficiency
 - regulatory decisions should consider the long-term viability of utilities
 - regulatory frameworks should be adaptable and flexible, and allow the economic regulator to incorporate feedback into its approach
 - the economic regulator should be transparent and detail the rationale underlying their decisions
 - regulatory decisions should facilitate effective competition in potentially contestable parts of the industry.

Addressing future knowledge and capacity building needs

Ongoing research and capacity building will be central to Australia's ability to deliver sustainable management of water resources, and efficient and affordable water services, into the future. There are sound reasons for government funding of water research, and value in maintaining knowledge and capacity in the public sector. To achieve the greatest benefits from investment, governments, water utilities and research institutions should work collaboratively on areas where new knowledge is most needed, such as:

- adjusting water resource management to respond to climate change
- facilitating an adaptive approach to managing environmental water
- supporting the adoption of outcomes-based environmental regulation for the urban water sector.

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.

Since 2008, the Australian Government has spent over \$8 billion on infrastructure and water efficiency measures to minimise the adverse impacts on individuals and communities from rebalancing under the Basin Plan. It has also recovered water for the environment through the direct purchase of water entitlements on the water market (as opposed to through the uncompensated attenuation of water rights). MDB jurisdictions have also funded projects focused on adjustment assistance and regional development.

In addition to 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 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 consider all factors affecting communities (not just water reform).

Enhancing national policy settings

There are three priorities for inclusion in 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 liveability 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 that decisions to invest in expensive desalination plants to supply Sydney, Adelaide, Perth and Melbourne were potentially unnecessary or ill-timed. Given the plants in question cost over \$9 billion to construct (in today's dollars), alternatives to some of these investments could have significantly reduced the cost of water services in some cities. Jurisdictions should improve arrangements for major supply augmentation planning in cities by:

- ensuring that roles and responsibilities are clearly allocated between governments and utilities, recognising that ultimate accountability rests with government
- requiring that decision-making processes are consistent with good planning principles — which require transparency, early adaptation to new information, and consideration of all options for augmentation. In the latter case, this would encompass both centralised systems (such as dams and desalination plants) and decentralised approaches (such as indirect and direct potable reuse and use of stormwater).

Decentralised approaches to providing water and wastewater services include onsite 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). IWCM can offer social, environmental and liveability benefits at the local level, and these are becoming increasingly important to the community. However, it can be difficult to

measure and value some of these benefits and therefore identify appropriate funding arrangements for these projects. As population increases and cities grow, there may be opportunities to implement IWCM cost-effectively at the local level. If implemented widely, their combined effect on the urban water system and liveability of towns and cities 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.

Implementation of decentralised IWCM approaches can sometimes be constrained by current environmental regulations for the management of wastewater and sewerage. These may not be flexible enough and may preclude the adoption of alternative approaches 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, or to supplement environmental flows. The Commission considers that there is potential for greater community benefits by taking a more outcomes-focused approach to environmental regulation.

Urban water management can also benefit from the introduction of competition to promote efficiency and innovation. 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 allowing 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 enhancing regulatory frameworks to enable new ideas to promote alternatives.

The Commission has previously highlighted the potential for more flexible pricing, such as ‘scarcity pricing’, to achieve greater efficiency in balancing water supply and demand. While current policy does not preclude going beyond long-run marginal cost pricing, there may be value in considering the case for further policy guidance on this issue. It will be too late to do this once we again enter into a drought phase.

Consideration should also be given to pricing for different levels of service and approaches to pay for other worthwhile benefits of projects — for example, the use of developer charges.

Improving environmental management

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, water for the environment needs to be managed efficiently and effectively. This requires additional work in three key areas.

- Integrated management of environmental water and waterways.
- Strengthened governance and streamlined institutional and management arrangements for entitlement-based environmental water.

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- Monitoring, evaluation, reporting and adaptive management of water for environmental outcomes.

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. Efforts to deliver environmental water and manage rivers, wetlands and floodplains must therefore be coordinated and aimed at common objectives at the local scale.

These activities are usually managed by separate bodies, which 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 and having the same local organisation set objectives for environmental water 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. They make decisions on the use and trade of water that can affect regional environments and communities, and are of significant interest to other water users. It is critical that the community has confidence in the objectivity of the body making these decisions and that decisions are free from real or perceived political influence. To ensure this, decisions on water use and trade should be made by independent bodies at ‘arm’s length’ from governments, and governments should ensure that the logic and rationale for decisions are easily accessible to the public.

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

The Commission proposes 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 winding down The Living Murray program. Now that the Basin Plan provides a framework that seeks to benefit the entire system, the program adds unnecessary complexity to an already difficult task.

There will be further opportunities to streamline management arrangements over time as environmental water managers learn from experience. Where the CEWH’s involvement is not required to achieve whole-of-system outcomes and local capability exists, decision making should be devolved to the local or state level. Management should initially be

devolved where an environmental asset has well-specified, relatively routine water requirements, but arrangements could evolve to encompass more complex management needs. The New South Wales, Victorian and South Australian Governments should also devolve the management of held environmental water where equivalent conditions apply.

Effective and efficient management of environmental water also requires adaptive management to ensure continuous improvement over time. This particularly applies to held 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 water provision.

The Commission recognises that 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 water resources shared across jurisdictions), more consistent methods, and long-term investment. Governments should also provide for independent auditing to increase accountability.

Delivering new infrastructure that is viable and sustainable

With over \$4 billion of Australian Government grants and loans available for water infrastructure projects, and funding also available from State and Territory Governments — the majority of which is likely to be sought for irrigation projects — 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 left with assets they cannot afford and costly environmental damage imposed on future generations.

Provision of government funding for infrastructure in the past has been justified by benefits that have overwhelmingly been captured by private individuals, without requiring capital costs to be recovered from them. An important check on the viability of those projects — users' preparedness to pay — was therefore missing.

Where governments wish to provide funding for water infrastructure they should ensure that:

- NWI-consistent entitlement and planning frameworks are in place *before* any new infrastructure is considered, including in northern Australia where such structures are often weak or nonexistent
- an independent analysis is completed and made available for public comment *before* any government announcement on new infrastructure is made. The analysis should:
 - assess the economic and financial viability of the new infrastructure
 - quantify the economic benefits delivered and the recipients of those benefits
 - assess users' willingness to pay for the infrastructure through a combination of ongoing infrastructure charges and the purchase of water entitlements

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- they do not provide grant funding for infrastructure, or that part of infrastructure, that is for private benefit. 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 is 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 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.

The imperative for reform

The issues discussed above show the imperative to continue with national water reform. Relying on our past efforts will not be enough to meet our future challenges. Unless we ramp up our efforts on water reform and take the next steps, we will see many of the hard-won economic and environmental benefits erode over time and the cost to water customers and taxpayers will rise. Governments should act now to establish the next phase of water reform, rather than wait for the next severe drought.

Progressing reform

The NWI has served Australia well. It has spurred difficult reform across the water sector, produced sizable 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 of the NWI 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 key elements of the NWI. 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 build on its strengths as a 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
- 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 implementing the Commission’s recommendations. 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.

As State and Territory Governments stand to benefit from the reforms proposed in this report through improvements in the efficiency of water service delivery and better water resource management practices, this should be the primary reason for undertaking further reform. However, where the Australian Government provides any funding and financing of water-related projects, this should be made contingent on States and Territories complying with the current, and any future renewed, NWI. This should apply *now* to the current infrastructure development programs (such as the Northern Australia Infrastructure Facility) and any funding made available as part of City Deals (an initiative to create partnerships between the three levels of government, the community and the private sector to support future development in our cities).

Where specific issues exist with the capacity of individual jurisdictions to comply with their reform commitments, targeted funding to address the underlying resourcing and/or information gap, may be warranted. There may also be a case for the Australian Government to provide support for activities that encourage 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.

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 a public manner. Indigenous communities should be 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, it provides each government with greater confidence 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.

Recommendations and findings

Chapter 2 — Water reform — past, present and future

FINDING 2.1

Water reform has brought about significant benefits to communities and stakeholders; however, further work remains. 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 reform.

Chapter 3 — Water entitlements and planning

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, further reforms and/or ongoing efforts are 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.

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, including ensuring that 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, 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 explore opportunities to better incorporate water quality issues in water planning, particularly as water plans come up for review and renewal
- f. 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 (f).

FINDING 3.2

Access to water resources to achieve cultural values is increasingly being addressed by using specific mechanisms for engaging with Indigenous communities in the development of water plans — the exception is Western Australia.

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

There is evidence that environmental water managers have used held environmental water to achieve Indigenous cultural objectives, without forgoing environmental benefits.

RECOMMENDATION 3.2

State and Territory Governments should ensure that:

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

RECOMMENDATION 3.3

Where State and Territory Governments provide access to water for Indigenous communities for 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. specify and implement future governance arrangements
- e. regularly monitor and publicly report on these provisions (such as the volume of entitlements sourced, water used and supporting arrangements) and their outcomes.

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

Chapter 4 — Water trading

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 water resource, market rules and basic trade 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

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.

RECOMMENDATION 5.2

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

To achieve this:

- a. State and Territory Governments should ensure that consistent management objectives 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).

RECOMMENDATION 5.3

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

The Australian and New South Wales Governments should review current governance arrangements to ensure that held environmental water and environmental contingency allowances 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.

RECOMMENDATION 5.4

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

Consistent with this principle, The Living Murray program should be wound down as there is no clear rationale for its continued existence in the context of the 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.

RECOMMENDATION 5.5

Over time, the Australian Government should devolve the management of Commonwealth environmental water to the lowest practicable level in situations where:

- the environmental water could be effectively managed by an accountable local or state and territory partner
- the involvement of the Commonwealth Environmental Water Holder is not required to achieve whole-of-basin outcomes, including by managing trade-offs between catchments and jurisdictions.

Management should initially be devolved where an environmental asset has well-specified, relatively routine water requirements, but arrangements could evolve to encompass more complex management needs.

The New South Wales, Victorian and South Australian Governments should also devolve the management of held environmental water where equivalent conditions apply.

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

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 water provision — 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 approaches 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 water provision, both planned and held
- c. all managers of environmental water should publicly report on outcomes that are not achieved, in addition to those that are, and the reasons why
- d. to improve transparency, Australian, State and Territory Governments should establish arrangements for independent auditing (at least triennially) of environmental water outcomes and supporting management arrangements
- 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, responsibility for adaptive management should be clearly allocated and adequately resourced.

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

Chapter 6 — Urban water

RECOMMENDATION 6.1

State and Territory Governments should:

- a. ensure that roles and responsibilities for system and major supply augmentation planning are clearly allocated between governments and utilities, recognising that ultimate accountability rests with government
- 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 6.1 (b).

FINDING 6.1

In some cases integrated water cycle management 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.

FINDING 6.2

Governments should ensure that any significant barriers to the adoption of integrated water cycle management approaches are removed from the general policy framework.

RECOMMENDATION 6.2

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 urban 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 6.2 (a) to 6.2 (d).

FINDING 6.3

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.

RECOMMENDATION 6.3

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.

RECOMMENDATION 6.4

State and Territory Governments should ensure that independent economic regulation is in place for all urban water service providers of a sufficient 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
- c. establishing common national principles to raise the standard of economic regulation across all jurisdictions. These should include that:
 - ... the objective of regulation is to promote the long-term interests of customers
 - ... regulatory decisions should include transparent customer engagement
 - ... prices should reflect the full efficient cost of service provision
 - ... utilities should have incentives to innovate and improve their efficiency
 - ... regulatory decisions should consider the long-term viability of utilities
 - ... regulatory frameworks should be adaptable and flexible, and allow the economic regulator to incorporate feedback into its approach
 - ... the economic regulator should be transparent and detail the rationale underlying any regulatory decisions
 - ... regulatory decisions should facilitate effective competition in potentially contestable parts of the industry.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendation 6.4 (c).

RECOMMENDATION 6.5

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

Priorities are that:

- a. the Queensland Government extend the public reporting of financial information to service providers with fewer than 10 000 connections
- b. the New South Wales and Queensland Governments require 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. State and Territory Governments, through the National Performance Report and state-based reporting processes, require providers to report a financial return metric that excludes developer charges and contributed assets alongside the economic real rate of return metric.

FINDING 6.4

The pricing practices of metropolitan and jurisdiction-wide providers are generally consistent with the requirements of the National Water Initiative. However, there is some evidence of underpricing in Tasmania.

Some providers in regional New South Wales are persistently 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.

FINDING 6.5

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.

FINDING 6.6

Many capital subsidies available for regional urban water and sewerage projects from the New South Wales, Queensland and Australian Governments are inconsistent with the National Water Initiative.

RECOMMENDATION 6.6

Governments should not use capital grants to address affordability concerns for urban water users. These concerns should be addressed through Community Service Obligation payments.

To give effect to this principle, the New South Wales and Queensland Governments should replace existing capital grants to regional water utilities with transparent Community Service Obligation payments that are not tied to capital expenditure, and that are targeted at unviable (high-cost) regional and remote services.

FINDING 6.7

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. Although these jurisdictions have made progress, there is likely to be further scope for them to capture economies of scale through collaboration.

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 for agriculture

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.

RECOMMENDATION 7.1

State and Territory Governments should ensure that 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 reasons 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 independent regulator in Western Australia and Tasmania.

RECOMMENDATION 7.2

Relevant jurisdictions should ensure that the efficient cost of joint state infrastructure, such as River Murray Operations (RMO) and the Border Rivers Commission (BRC), are recovered from water users. RMO and BRC costs should also be subject to a periodic independent review. Specifically:

- a. South Australia should improve transparency on how RMO costs are recovered in their jurisdiction by publishing information on how costs are apportioned between different users and the extent to which current mechanisms are achieving full cost recovery
- 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
- c. BRC costs should be subject to a coordinated review process conducted by economic regulators in New South Wales and Queensland to inform pricing decisions.

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.

Chapter 8 — Water infrastructure

RECOMMENDATION 8.1

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

- a. National Water Initiative-consistent water entitlements and planning frameworks are in place before any new infrastructure is considered (including infrastructure being financed under the Northern Australia Infrastructure Facility)
- b. government grant funding is limited to those projects, or parts of projects, delivering a public good. Grant funding should not be provided until after an independent analysis of the project has been completed and made available for public comment. This analysis 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 8.1 (a) to 8.1 (c).

Chapter 9 — Key supporting elements of the NWI

FINDING 9.1

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.

RECOMMENDATION 9.1

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 revise relevant provisions in the National Water Initiative to align with recommendations 9.1 (a) and 9.1 (b).

FINDING 9.2

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.

RECOMMENDATION 9.2

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 affecting 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 9.2 (a) to 9.2 (d).

Chapter 10 — Progressing reform

RECOMMENDATION 10.1

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 and compliance, water pricing and institutional reform, 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
 - ... improving the quality and consistency of economic regulation
 - ... key knowledge and capacity building priorities
 - ... 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.

RECOMMENDATION 10.2

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 undertake an inquiry into Australia’s water sector.¹ This inquiry is the first of the Commission’s triennial assessments of progress toward achieving the objectives and outcomes of the National Water Initiative (NWI).

This inquiry report outlines the Commission’s findings and recommendations.

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.² 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 in 2005 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 responsible for undertaking reviews of the implementation of the Basin Plan following its 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 the Basin Plan to the 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, commencing in 2018.

This report relates to the first Commission task — the National Water Reform inquiry and forms the fifth report undertaken assessing progress under the NWI.

¹ The terms of reference are contained at the front of this report.

² Seven jurisdictions agreed to the NWI in 2004 and all parties had agreed by 2006.

1.2 What has the Commission been asked to do?

The terms of reference give the 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 NWC's 2014 National Reform Assessment
- 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 has not considered:

- the development of the State and Territory water resource plans called for by the Basin Plan
- the Environmental Watering Strategy developed under the Basin Plan
- the progress against Sustainable Diversion Limits.

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 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 is detailed in appendix B. Progress against the recommendations of the NWC (2014b) is set out in appendix C.

Chapter 2 *water reform – past, present and future* gives an overview of Australia's water resources sector and outlines the path of water reform from the 1980s, describing 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 four broad areas relating to water management:

- *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)
- *infrastructure for water* which considers the role of government investment in infrastructure development (chapter 8)
- *key supporting elements of the NWI* including: water accounting, measurement and compliance; community engagement, consultation and adjustment; and, the generation of knowledge and water management capacity (chapter 9).

In each of the chapters 3 to 9, 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 as well as areas where jurisdictions have unwound reform. 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,

findings and recommendations for future policy actions have been made. In determining 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. 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 10), the Commission has examined the value of the NWI as a policy vehicle for achieving reform and its role in progressing the reform agenda set out in this report.

1.4 Conduct of this inquiry

The inquiry was 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).

The Commission released a draft report on 15 September 2017. The Commission has subsequently undertaken further consultation, drawing on input from participants through bilateral meetings, written submissions and public hearings held in Canberra, Sydney, Melbourne and Adelaide (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 met four times: on 23 February; 23 May; 15 September and 11 October 2017. The members of the group are listed in appendix A.

2 Water reform — past, present and future

Key points

- The development of Australia's water resources has been concentrated in the east, south-east and south-west, where the majority of Australians reside and where major irrigation systems are located. Irrigated agriculture is the major water user in Australia, 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.
 - Water planning arrangements are in place for most areas where water is used intensively. By balancing consumptive and environmental water use, water 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 water provisions.
 - 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. Benefits of water trading have included:
 - ... flexibility for irrigators in managing their businesses through the ability to trade water and obtain loans using water entitlements as collateral
 - ... strengthening of incentives for efficient water use
 - ... water being traded to higher value uses. This has helped maintain the value of agricultural production in dry years and supported production growth in other years.
 - The move toward cost-reflective infrastructure pricing has seen a reduction in government subsidies. 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, to some extent. This has delivered more cost-efficient water services and allowed governments to become more focused on policy making.
- Although much has been achieved, water reform is an ongoing process; therefore further work remains. There is unfinished business from the commitments made under the NWI that jurisdictions should progress without delay and there are a range of current and future challenges facing the water sector that will require further 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 outline 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 State and Territory Governments. 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 state and territory borders, such as the Murray-Darling Basin (MDB).

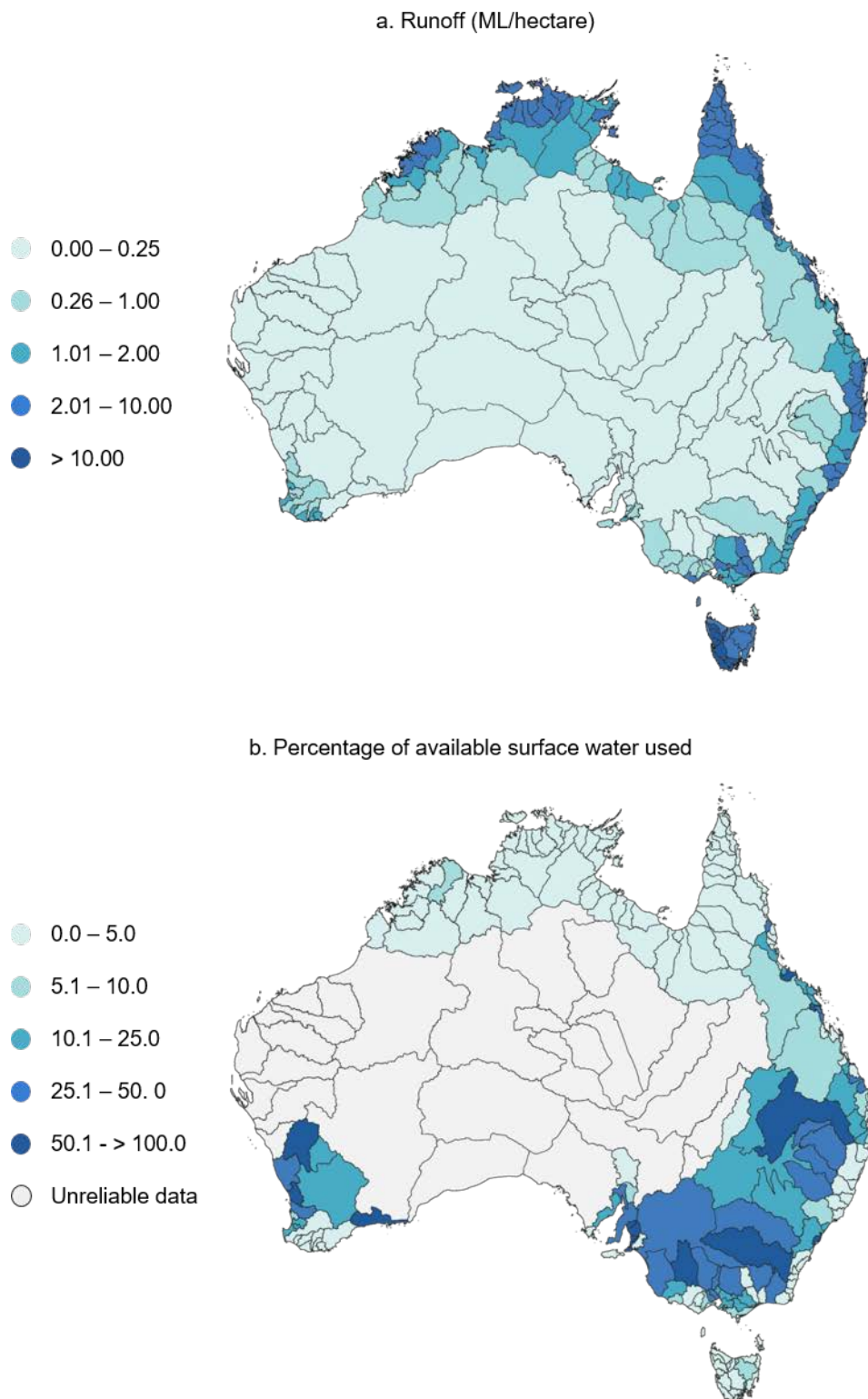
However, not all water services are delivered by State and Territory Governments. In some cases, water services are delivered by local governments and local authorities, while in other (regional) areas people self-supply. Also, in New South Wales, Western Australia, South Australia and parts of Queensland,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

How is Australia’s water 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); groundwater resources, on the other hand, are more dispersed (figure 2.2). Much groundwater in Australia is unusable for urban use and irrigation because of high salinity levels (Johns 2016).

Most water resource development and use has occurred in east, 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(b) and 2.2(b) highlight that relatively little water development has occurred across Tasmania, in the north of Australia and in some small coastal catchments.

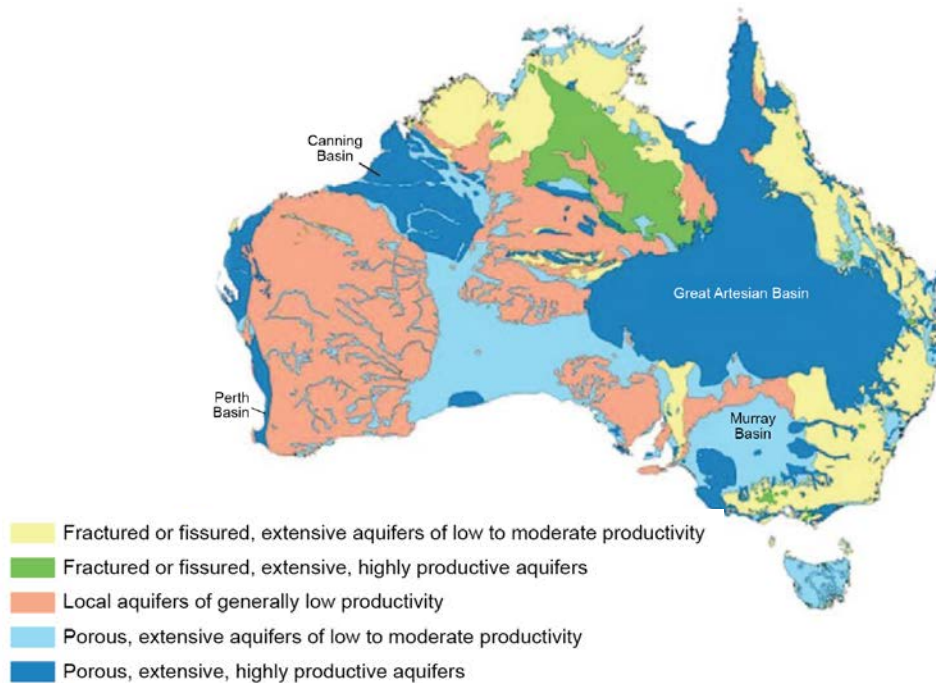
Figure 2.1 **Surface water in Australia**



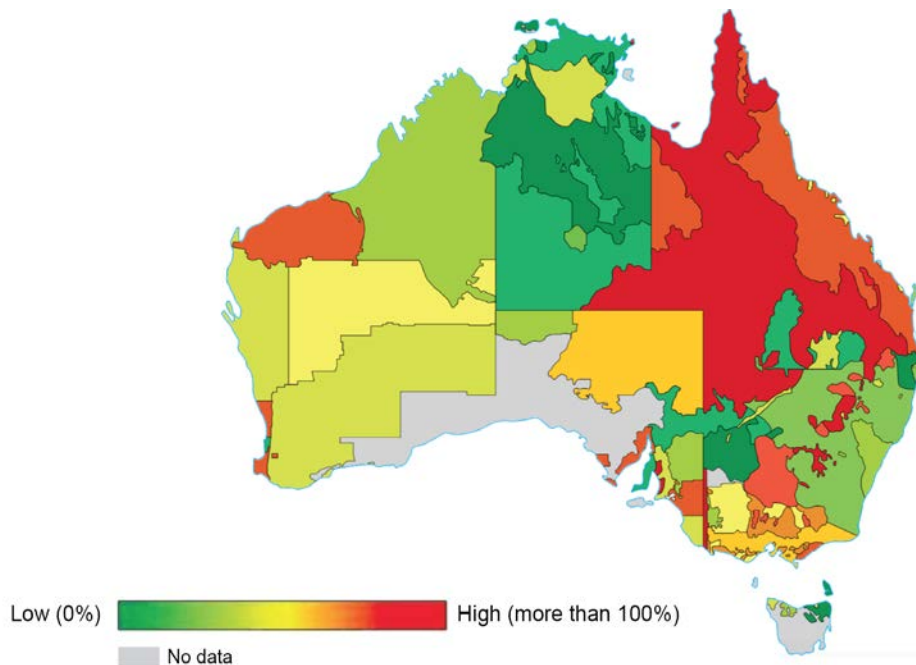
Source: Prosser (2011).

Figure 2.2 Groundwater in Australia

a. Aquifer productivity



b. Level of development^{a,b}



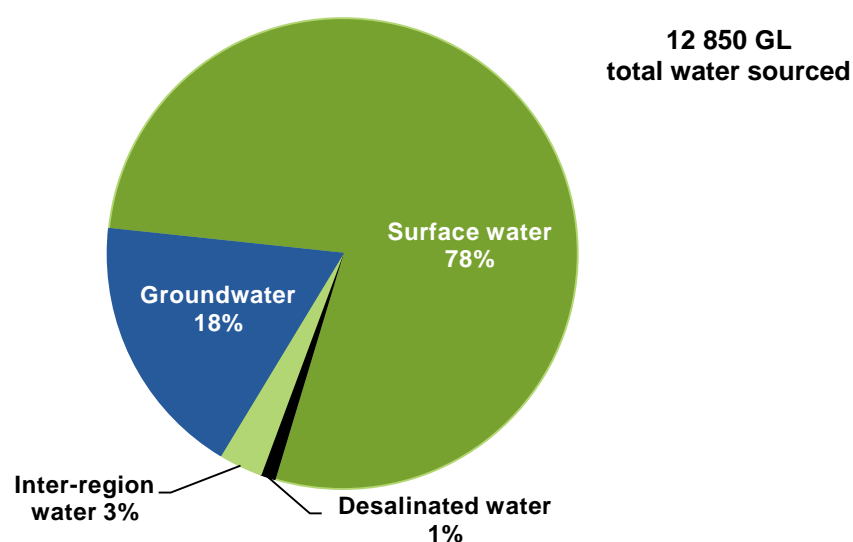
^a Ratio of use to sustainable yield for Australian groundwater management units. ^b The figure does not show the effects of management changes made in the Murray–Darling Basin since 2010. As a result, a number of the Murray–Darling Basin high use systems in New South Wales would no longer be as red.

Sources: Harrington and Cook (2014); Johns (2016).

In 2015-16, 12 850 GL of water were extracted from the environment — 78 per cent was surface water while 18 per cent was sourced from groundwater (figure 2.3). Irrigated agriculture and industry (outside of urban areas) combined, accounted for 72 per cent of Australia’s water use in 2015-16 (figure 2.4). By comparison, urban water uses³ accounted for 18 per cent of the water consumed in 2015-16.

While many of Australia’s major urban centres rely primarily on surface water to meet urban needs, there are cities where other sources play a larger role. For example, due to low surface water availability in Perth (as a result of a long-term reduction in rainfall since the 1970s), groundwater and desalinated water play a major role in supplying water for urban use (BOM 2016b, 2017h). Likewise, to supplement water from local catchments and inter-region transfers from the River Murray, Adelaide sources water from groundwater and desalinated water to meet urban needs (BOM 2017f).

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

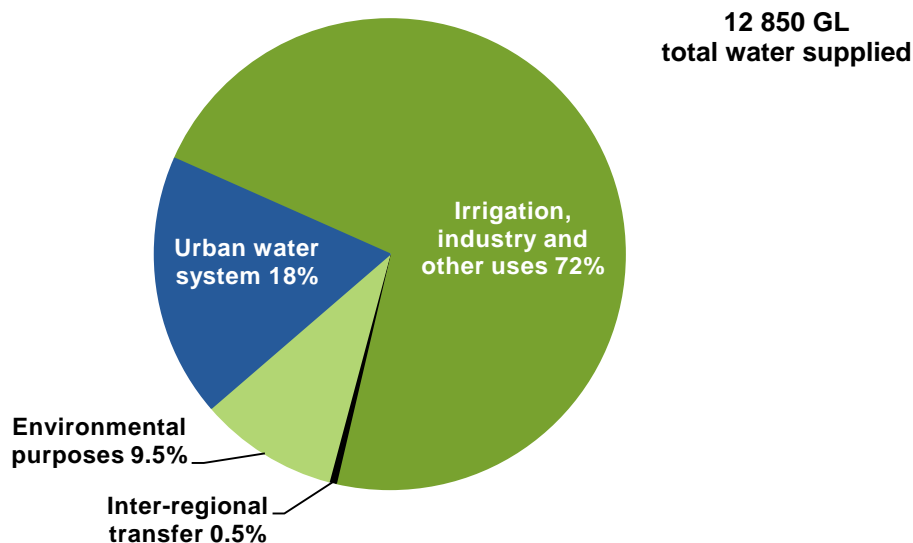


^a Inter-region water comes from either groundwater or surface water; it includes, for example, River Murray water supplied to Adelaide.

Source: BOM (2017g).

³ Urban water uses include water for household consumption and the use of water by industry in urban areas.

Figure 2.4 Australia's water uses: 2015-16^{a,b}



^a Urban water system also includes the use of water by industry in urban areas. ^b Environmental water refers to held environmental water, not planned environmental water.

Source: BOM (2017g).

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 water to meet 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, 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 operational efficiency over time (Doolan 2016).

In response, some States and Territories began reforming aspects of their water policy. Moreover, the MDB jurisdictions (New South Wales, Victoria, Queensland, South Australia and the ACT) worked together on issues affecting their shared water resources. In 1994 COAG agreed on a comprehensive national Water Reform Framework. The 1994 COAG Water Reform 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 by reforming:
 - pricing — introducing cost-reflective and consumption-based pricing
 - institutional arrangements — separation of service delivery from policy making and the corporatisation of major water utilities.

The 1994 COAG Water Reform Framework complemented the National Water Quality Management Strategy and associated guidelines (including the Australian Drinking Water Guidelines) that have since been updated and used by jurisdictions to guide the development of water quality management policy (KPMG 2011).

In 1995, the 1994 COAG Water Reform Framework was brought into the broader National Competition Policy (NCP) reforms. 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 in implementing reforms was undertaken by the National Competition Council. This provided significant incentives for States and Territories to meet their water reform commitments under the NCP.

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

The NWI aims to increase the productivity and efficiency of water use in Australia 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 2.1). To provide more detailed policy guidance on some aspects of the NWI, in 2008, 2009 and 2013 COAG agreed to a range of specific reform measures, 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 (NCC 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 was transferred to the Productivity Commission.

Box 2.1 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 consisted of 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.

Source: COAG (2004).

The Murray-Darling Basin Plan

In 2007, the worst year of the Millennium Drought, the Australian Government introduced the *National Plan for Water Security* which led to a range of reforms to the management of the MDB, including resetting the balance between consumptive and environmental use of water. The Plan was a response to the drought and the continuing overallocation of MDB water resources by the MDB jurisdictions (Australian Government 2013), and was given effect by the *Water Act 2007* (Cwlth) and the Murray-Darling Basin Plan (the Basin Plan) which came into effect in 2012.

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 2017c). Part of this process also involved establishing a new authority — the Murray-Darling Basin Authority — to develop the Basin Plan and oversee its implementation.

2.3 Outcomes and benefits of national water reform

Water reform at the national level has aimed to achieve:

- 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 by:
 - moving to cost-reflective and consumption-based pricing
 - separating service delivery from the broader role of government
 - corporatising major water utilities
 - establishing independent economic regulation of monopoly water service providers
- 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, overall, good progress has been made 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, water 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 key building blocks 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 (ABARES 2017). The value of entitlements, their legal backing and developed markets for those entitlements has enabled financial institutions to accept them as collateral for loans. Based on a 2013 survey of New South Wales irrigators, about 20 per cent 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. Where established, water markets have become increasingly important to irrigators for managing their businesses, especially in periods of low water availability.

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 southern Victoria, the northern MDB, cane growing areas of Queensland and groundwater systems in South Australia. 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 opening up of water markets has benefited irrigators, other water uses and the broader community in a range of ways. 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 with perennial crops), which has been particularly important during periods of drought
- facilitated longer-term investment planning, including decisions to change production or exit irrigated agriculture (NWC 2011d)
- strengthened incentives for efficient water use and infrastructure investment, which is likely to have contributed to improved water use efficiency in industries such as cotton growing (chapter 4)
- provided a cost effective and equitable means through which governments can recover water for the environment.

Evidence on the benefits of trade-enabling reforms is available from a range of sources. First, many submissions to this inquiry listed water trading as a successful area of reform (chapter 4). Second, a survey by ABARES found that over 90 per cent of irrigators in the southern MDB agreed that both allocation and entitlement trading were beneficial to their farm businesses (NWC 2012e, pp. 23–28). Finally, the results of a range of studies suggest that water trading has provided benefits to the Australian economy. For example:

- a 2010 study by the NWC estimated that water trading in the southern MDB increased Australia's GDP by \$220 million in 2008-09 (NWC 2010b, p. v)
- a 2012 study by the NWC 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 (NWC 2012e, p. xii)
- the ABS estimated that between 2005-06 and 2008-09, gross value of irrigated agricultural production fell by only 29 per cent (from \$5.5 to \$4.3 billion) while water availability dropped by 53 per cent (NWC 2011e), which indicates that water trading played an important role in maintaining production during drought.⁴

Improved environmental management

Entitlement and planning reforms have significantly improved 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 the environment 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 long-term annual average target of 2750 GL has been set for water to be

⁴ As discussed in chapter 4, for various reasons the latter two studies give a partial picture (by focusing respectively on regional GDP and water inputs) and may overstate overall benefits to the economy.

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 public benefit outcomes.

While remediation is a long-term process, the benefits of having more water available for the environment are starting to show. Environmental water provisions 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; MDBA 2017d, 2017k; Watts et al. 2016). Also, without the increased environmental water provisions, there would have been greater environmental degradation in the MDB during the Millennium Drought (MDBA 2011).

Best practice water service delivery

Many reforms have been undertaken within the water services sector. The two most significant have been the move to cost-reflective pricing and the separation of service delivery from the broader role of government, including through corporatisation of major water utilities, and in some cases privatisation of irrigation distribution networks.

Cost-reflective pricing reduces subsidies and improves outcomes

Urban and irrigation water services were heavily subsidised by governments prior to the pricing reform that took place in the 1980s and 1990s. Since then, moves toward cost-reflective pricing have seen a reduction in government subsidies. 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 led to lower water use. For example, between 2000 and 2016 residential water consumption (median annual residential water supplied) in cities and towns decreased from 280 kL to 182 kL per property (BOM 2015, 2017d).

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 that supply 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:

- most urban water services and irrigation bulk water services provided by State and Territory Governments were corporatised⁵
- 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.

Separating urban water service delivery from the broader role of government (for government-owned utilities) has assisted with de-politicising water service delivery and enabled more focused policy making to occur. Corporatisation has also allowed government-owned urban water utilities to develop a stronger commercial focus and compete with private providers on a level playing field. Water users and the broader community have benefited through more efficient water services. Given these advantages, the South Australian Government's recent proposal to decorporatise SA Water presents a substantial risk to the transparent and efficient delivery of water services in that State.

Local ownership and management of irrigation 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).⁶

⁵ The South Australian Government has recently announced an intention to move away from this approach. Specifically, it has proposed to incorporate SA Water within a government department covering both energy and water supply (Weatherill 2017a).

⁶ 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.

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 account. These investments underpin the integrity of water entitlement frameworks and water markets. They have provided credible and reliable information, transparent reporting and compliance regimes and access to information to assist in water management decisions. Having said that, recent unresolved allegations of non-compliance with water laws and regulations in New South Wales, and evidence of poor compliance arrangements in some Basin jurisdictions have come to light (chapter 9).

There has also been substantial investment in research and capacity building to deliver evidence-based water planning and management decisions. These investments have led to advances in technology, innovation and knowledge of water resources that were critical to Australia's response to the Millennium Drought (chapter 9).

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. In establishing the priorities for the next phase of Australian water reform, the following need to be taken into account:

- unfinished business from the NWI (set out in appendix B)
- 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.

This section sets out some of the lessons from the Millennium Drought and the broad details of key current and future challenges. It aims to provide context for the analysis undertaken in chapters 3 to 9, where the Commission details the gaps and limitations in the NWI and outlines the case and priorities for future reform.

The lessons from the Millennium Drought

The NWI was developed and signed before the severity of the Millennium Drought became apparent. Overall, the Millennium Drought tested the reform agenda and highlighted some shortcomings in the collective ability of the water sector to adapt to the type of severe challenges that may arise in a changing 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).

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 2017 was about 24.5 million people with approximately 58 per cent of these people living in New South Wales and Victoria (and the majority of them living in metropolitan areas) (ABS 2017a). Australia's population is projected to be 34.3 to 41.9 million people by 2050⁷ (ABS 2013). Also, there is expected to be an additional 8.3 to 13.3 million people living in Australia's capital cities by 2050 (ABS 2013).

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.

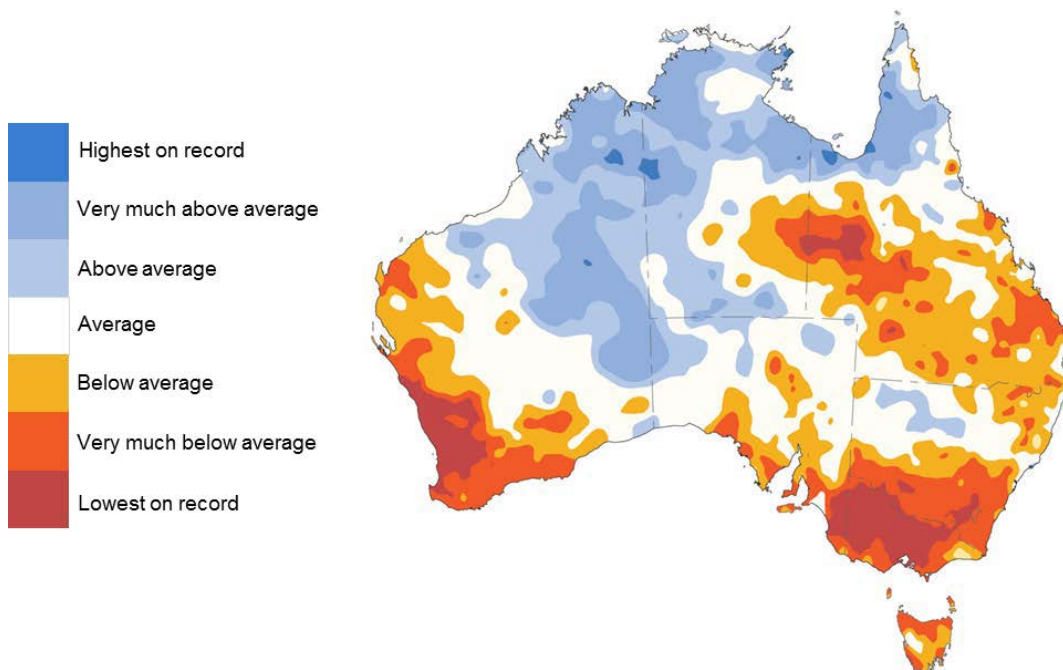
⁷ Projections are based on assumptions of immigration (overseas and interstate), fertility and mortality. The estimate of 34.3 million people is based on a low immigration and fertility rate, and a medium life expectancy; while the estimate of 41.9 million people is based on high immigration, fertility, and life expectancy (ABS 2013).

Taking climate change into account

The Bureau of Meteorology's *State of the Climate* report (2016b) 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 2016b, p. 2). This has resulted in a reduction of streamflow in the south-west by more than 50 per cent. In the south-east of the country, streamflows are now half of their long-term average (BOM 2016b, p. 11).

Figure 2.5 Australia's rainfall

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



Source: BOM (2016b).

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. Modelling suggests that streamflows will substantially reduce in much of southern Australia. Under a medium scenario (1°C global warming relative to 1990), projections suggest that by 2030 average annual runoff will decline in south-west Australia

by 25 per cent and in the southern MDB and Victoria by 10 per cent (Chiew and Prosser 2011; Teng et al. 2012). Also, there is expected to be an increase in the frequency and intensity of extreme weather events.

Australian temperatures are projected to continue increasing with more extremely hot days and fewer extremely cool days. ... Extreme rainfall events are likely to increase in intensity by the end of the century across most of Australia. (BOM 2016b, p. 22)

This will have significant impacts on all water users — urban, irrigators and the environment.

Climate trends (for example, the reduction in rainfall in Western Australia since the 1970s), future predictions and the experience of the Millennium Drought 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.

Adapting to evolving community expectations

The 1994 COAG Water Reform 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. This broadened as the Millennium Drought highlighted the dependence of both urban and rural communities on water and water environments — 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.

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 depleting water resources in key parts of Australia while trying to meet demands from an increasing population for a wider range of water services. This 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:

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. (sub. 35, p. 13)

FINDING 2.1

Water reform has brought about significant benefits to communities and stakeholders; however, further work remains. 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 reform.

3 Water entitlements and planning

Key points

- Water access entitlement 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 entitlements 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
 - better incorporating water quality issues into water planning
 - more work to recognise the water needs of Indigenous Australians for cultural purposes through water planning
 - establishing appropriate supporting arrangements where State and Territory Governments decide to provide access to water to support Indigenous economic development.

Effective water resource 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 resource 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 entitlement 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 entitlements 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).⁸ It then considers areas that warrant further attention (sections 3.2 to 3.7).

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 and South Australia initiated state-based reforms (NWC 2011e). These involved the

⁸ Appendix B provides more detail on jurisdictions' progress in achieving the specific outcomes and objectives for water access entitlements and planning under the NWI.

establishment of secure water access entitlements and the development of a market-based system of water allocation.

In 1994, 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 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

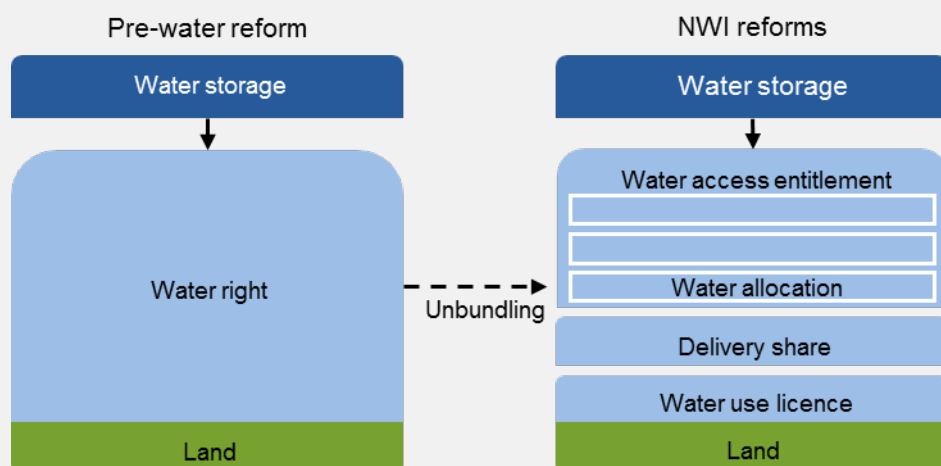
Water rights can be thought of as comprising several components including:

- *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).

Separating water access entitlements from land title 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 (2011c, 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 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 the outcomes and objectives of the NWI related to water access entitlements and planning frameworks as presented in appendix B, section B.1.

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 practicable)	Largely achieved	Important exceptions include entitlement exemptions for extractive industries in the Northern Territory and Queensland.
Water plans^b		
Statutory	Largely achieved	Western Australian 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 water 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	In Western Australia, water allocation plans and extraction limits are non-statutory.
Tradeable (where held as an entitlement)	Achieved	All governments with held environmental water (Australian, New South Wales, Victorian and South Australian) are legally able to trade water allocations and entitlements.
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 Western Australia — have established and/or committed to specific mechanisms for engaging Indigenous communities in water planning.
Identification of objectives for Indigenous Australians 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.⁹ While noting this, several participants considered that developing an understanding of groundwater systems to inform water planning decisions remains very much a work in progress (International Association of Hydrogeologists, sub. DR91; Nelson, sub. DR109; Ross,

⁹ The International Association of Hydrogeologists (sub. DR91) noted that the commitments in the *National Groundwater Strategic Framework*, which was released in March 2017, are at a high level and highlighted a need for a more practical focus. The next NWI assessment will provide an opportunity to examine jurisdictions' progress against these commitments.

sub. DR121). Chapter 9 considers information and knowledge, including about groundwater, in more detail.

Overall, the reforms to water access entitlement 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 entitlement 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 and facilitated longer-term investment planning, including decisions to change production or exit the industry (NWC 2011e). 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 GDP 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 entitlements 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 2012f). 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 2012f, 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 (NWC 2014b) (appendix B, section B.1).

... 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 the environment 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 over time. 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.

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, further reforms and/or ongoing efforts are 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 an assessment of 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 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, such as stormwater, wastewater, and managed aquifer recharge
 - better incorporating water quality issues into water planning
 - more work to recognise the water needs of Indigenous Australians for cultural purposes through water planning
 - establishing appropriate supporting arrangements where State and Territory Governments provide water access to support Indigenous economic development.

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. For example, one participant noted:

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 8).

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.¹⁰ 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 invest:

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, section B.1).

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. (This does not imply Western Australia’s current legislative provisions and water allocation plans, and compliance and enforcement activities, are not delivering benefits.)

¹⁰ 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.

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 \$4000 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. As recognised by the Western Australian Government, risk-based assessments could inform decisions about if and when to introduce statutory water allocations plans and water access entitlements in specific areas, enabling staged implementation.

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).

Historically, legislative reforms to facilitate NWI-consistent entitlements in the Northern Territory (such as allowing for unbundling of access, delivery and use 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 focused 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 (2011c) observed that unbundling of water rights 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 entitlements 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. comm., 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 release of the *Our Water Future* discussion paper.¹¹ 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. The timing for rolling

¹¹ 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. comm., 13 June 2017).

out entitlements in specific water planning areas would depend on factors such as the existing and expected future demand pressures and the level of understanding of available resource.

A broad legislative reform agenda to better align the Water Act (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 was 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, section B.1). 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 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]

The intent of special provisions for extractive industries under paragraph 34 of 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 2014b).

Since 2004, the growth of extractive industries, such as the mining, petroleum, and unconventional gas¹² industries, has increased competition for water resources with other consumptive users in many parts of Australia (box 3.5) (NWC 2014b). 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 2014b, 2014e).

¹² 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 GL per year in July 2013 to 59 GL per year in July 2015, while water use for conventional gas production decreased from 1.8 GL per year in 2012 to about 1 GL per year in late 2014 (DNRM (Qld) 2016h, pp. 61–62). Some of the extracted water is treated and reused. Water use for CSG production is expected to increase further — there were 4600 production wells in the Surat Basin in January 2015 and about 13 500 are expected by 2030 (DNRM (Qld) 2016h, p. 14).

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

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. (2014e, 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 (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 entitlements 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).

Box 3.6 Jurisdictional 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 entitlements 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 (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 (2014b, 2014e); Queensland DNRM (2016a), Responses to State and Territory information requests.

Participants to this inquiry raised concerns about the use of alternative water management arrangements for extractive industries, particularly in light of the potential cumulative effects of water extractions (EDOs of Australia, sub. DR133; Nelson, sub. DR109). For example, the Wentworth Group 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. (sub. 40, p. 4)

The Department of Agriculture and Water Resources 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. (sub. 73, pp. 2–3)

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

The Minerals Council of Australia (sub. DR141) suggested that paragraph (or clause) 34 of the NWI should be retained because it meets an ongoing need for planning, entitlement and access arrangements that accommodate the atypical characteristics of the minerals industry (box 3.7). They also suggested that the minerals industry faces potential barriers to accessing water under current water planning arrangements, including in relation to:

- incorporation of new information into water resource plans (for example, they noted there have been cases where a mining company has 'proven up' a new groundwater resource, but access to the resource has been restricted because it was not considered in the water plan for the area in which the mine was proposed)
- access to low quality water resources (for example, poor quality but usable water supplies are often excluded from water resource plans) (discussed further in section 3.6).

Similar issues were raised about water access by the petroleum and gas industry.

Box 3.7 Characteristics of water use by the minerals industry

The Minerals Council of Australia outlined that:

Water used by the industry is primarily self-sourced and operations frequently supply and operate their own water infrastructure and may supply water to a range of third parties either voluntarily or as required by regulation. Many mining operations are located in remote locations with hydrological characteristics not suited to water resource planning and entitlement regimes common in hydrologically well connected regions. (sub. DR141, p. 2)

They suggested that examples of more unusual characteristics of mining water use include:

a) The use of saline or hypersaline water: The industry uses a wide variety of water sources of varying quality, including saline water that is not fit for any purpose other than industrial applications. In some cases, such as the gold fields in Western Australia, deep hypersaline aquifers (which can be five or even ten times saltier than seawater) are pumped at significant cost to supply water for critical mine processing. Accordingly, this water is not a catchment flow, nor is it transferrable to other users after consumption. In many cases, operations treat this unusable water to make it suitable for site processes.

b) Water accessed for safe operation but not consumed: As a result of dewatering activities to make mines safe for operation, much of the mining industry's water take can be 'incidental'. This water, extracted from the ore body and surrounding groundwater, is normally managed on site or discharged into the environment in line with an operation's licence conditions. In some cases, this water is treated to make it suitable for the environment or other uses, including agriculture, before it is released.

Incidental water is not used or consumed by the mining industry. Instead, this water can be made available for downstream agricultural activities. In some cases, mining companies provide water to local communities and townships.

c) Contingency licencing: Dewatering volumes can vary from year to year depending on local geology and groundwater characteristics, rainfall patterns and other climatic factors. State authorisations generally require mining companies to hold water licences set at the maximum predicted water take for any given year over the anticipated life of an operation. This often includes a large contingency volume to enable companies to manage these variations.

It is important to note that many mines are located in areas prone to extreme variability, driven by tropical weather patterns and cyclonic activity. Accordingly, the contingency built into a water licence can be many times that of the actual annual water take by an operation. For example, there are mining operations in the Pilbara where the average annual take for dewatering (safety purposes) is only 30 per cent of licenced water take.

d) Multiple licences for the same water: In some regions where the minerals industry is the dominant industry, water that is 'dewatered' from an operation in upper catchment areas is often captured by downstream operations, only to be again removed and discharged downstream. The net result is that several mines may hold licences for access to what is materially the same water. (sub. DR141, p. 2)

Jurisdictions have acknowledged the importance of ongoing work to ensure robust water management arrangements for water use by extractive industries, including through the 2017 *National Groundwater Strategic Framework*.

There is a need for sound and robust information relating to key national issues, such as the long-term impact of coal seam and tight gas and other extractive industries. Human induced impacts on groundwater can be significant well before becoming apparent, and may be irreversible in terms of aquifer depletion, water quality degradation or pollution. There is a need for detailed understanding, analysis and management of groundwater systems to minimise the risk of irreversible damage. Where relevant national water planning or management frameworks

are in place these should be actively applied to all groundwater management processes. (Australian, State and Territory Governments 2017c, p. 6)

Actions under the *National Groundwater Strategic Framework* include to ‘develop risk-based approaches to assess and manage cumulative effects associated with multiple stressors and water extractions’ (Australian, State and Territory Governments 2017c, p. 10).

Jurisdictions should reassess 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 value uses 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 reassess 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 (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 3.8).

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.

Box 3.8 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 2014c, p. 512). The Northern Territory Department of Environment and Natural Resources (DENR (NT) 2017d, 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 2014e).

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* (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.

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 3.9). 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.

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.

Box 3.9 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 entitlements 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:

... 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. (2014e, 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 2014b, 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’ (MJA 2014, p. 16).

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 2014e). 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.

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 influences the benefits that the community derives 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 — they think it is important that these ecosystems continue to exist, they enjoy spending time in natural environments and 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.¹³ Under current arrangements water use is capped and the security of both environmental and consumptive use water is explicitly considered and legally protected.

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 the 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. Key questions that have arisen are 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's 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)

¹³ 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.

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)

A 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. In Queensland, draft amendments to the *Water Act 2000* (Qld) are currently before the Queensland Parliament. The proposed changes make an explicit requirement for the Minister ‘to consider the water-related effects of climate change on water availability when preparing a water plan and ... on water use practices and the risk to land or water resources arising from the use of water on land when preparing a water use plan’ (Queensland Parliament 2017, pp. 5–6).¹⁴

However, reviews 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 a separate process that assesses water resources on a regular basis and identifies when predefined triggers for reconsidering the balance have been reached. The advantage of this approach is 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 broadly of this type. There would be merit in other jurisdictions considering introducing processes that provide a holistic and consistent provision of climate information for water planning at a jurisdiction level.

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 (section 3.7) and thorough and effective community and stakeholder engagement (chapter 9). Reviews should also consider the requirements and impacts of mining to the extent relevant (section 3.3). 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, 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,

¹⁴ See *Mineral, Water and Other Legislation Amendment Bill 2017* (Qld), s. 240-241.

section B.1. 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 are focused predominately on surface water and groundwater. Property right arrangements for wastewater and stormwater have had 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.

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 users¹⁵ (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.

Several participants considered that entitlement frameworks (including to storage) were a potentially important impediment to investment. For example, the International Association of Hydrogeologists (sub. DR91) considered there was a need for clearer legislation across the nation with regard to ensuring that those who inject water into an aquifer have a right to recover it, and consistent approaches to determine loss factors, particularly temporal extraction rights (for example, storage periods and associated losses). 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)

Others questioned the extent to which entitlement frameworks are a major impediment to investment in alternative water resources. For example, the South Australian Government noted that:

...entitlement frameworks are unlikely to be the key to securing further investment in alternative water resources.

Surface and groundwater resources that are prescribed already allow for entitlement arrangements for alternative water sources and managed aquifer recharge. Mechanisms are in

¹⁵ The International Association of Hydrogeologists (sub. DR91. p. 4) highlighted that Western Australia's framework whereby managed aquifer recharge 'credits' are received, supports 'this important water management tool'.

place to ensure that the right to extract is linked to the volumes recharged. Outside of prescribed areas, it is not currently necessary for there to be a blanket requirement for alternative resources to utilise entitlement arrangements. (sub. DR143, p. 5)

Under the *National Groundwater Strategic Framework*, jurisdictions have recognised potential regulatory and legal barriers to alternative water sources and agreed to:

... address regulatory frameworks and legal uncertainty which inhibits the update of innovative groundwater solutions (such as Managed Aquifer Recharge, groundwater trading and use of recycled water), with appropriate safeguards and where these solutions provide additional options to complement traditional water infrastructure approaches. (Australian, State and Territory Governments 2017c, p. 11)

State and Territory Governments should periodically review their entitlement frameworks to ensure they can incorporate alternative water sources, such as stormwater, wastewater, and managed aquifer recharge (where doing so would be beneficial) and do not present a barrier to efficient investment in these supply options.

3.6 Better incorporating water quality issues into water planning

In addition to establishing the entitlement and planning frameworks that govern how available water resources are shared between competing uses (water quantity management), governments also play a role in protecting and maintaining the quality of water resources (water quality management). For example, they do this by setting or administering environmental protection and land-use regulations or funding on-ground works to maintain or improve water quality through their natural resource management frameworks.

Water quantity management and water quality management are both critical for maximising the economic, environmental and social benefits the community derives from Australia's water resources. In 2014, the NWC argued 'contemporary water management requires a recognition of the interactions between water quality and quantity and the range of uses of water to achieve economic, social and environmental outcomes, and ensure cost-effective solutions' (NWC 2014b, p. 8). In the case of environmental watering, for example, Sinclair Knight Merz noted:

If the timing, magnitude, and duration of inflows are managed to optimise environmental outcomes, but the quality of the environmental water is poor, then the intended outcomes may not be realised and other impacts may occur. It is therefore important for water managers to understand the quantity and timing of water needed by environmental assets, the source of environmental water and the quality of that water in conjunction with watering requirements. (2013, p. 18)

Many participants contended that water planning and management is too heavily focused on water quantity and that more should be done to integrate water quality issues into water planning (Moles, sub. DR103). These views echo the findings of previous assessments that

water quality is often managed separately from water quantity (Sinclair Knight Merz 2013) and that this ‘risked disconnection between the water quantity and quality agendas’ (NWC 2014b, p. 7).

Since 2014, the Australian, State and Territory Governments have progressed several measures to better integrate water quality into planning.

- The *National Water Quality Management Strategy* (NWQMS) is the principal COAG mechanism for the management of water quality. A recent update of the NWQMS, due for release in early 2018, brings a greater focus on integration of water quality and quantity in water planning and management.
- In the MDB, jurisdictions are developing water resource plans under the Basin Plan, which include a water quality management plan. In developing the plans water planners are encouraged to consider the impacts that wider natural resource management and land management activities may have on water quality within their water resource plan area (MDBA 2017j).
- In 2017, the Department of Agriculture and Water Resources released *Characterising the Relationship between Water Quality and Water Quantity*, which aims to help water managers gain a greater insight into some of the key water quality issues that are experienced across Australia (Sinclair Knight Merz 2013).
- The *National Groundwater Strategic Framework 2016–2026* includes actions to ‘embed water quality into planning, management and regulation frameworks utilising the *National Water Quality Management Strategy: Guidelines for Groundwater Quality Protection in Australia ...* to support national water management processes’ (Australian, State and Territory Governments 2017c, p. 8).

In addition to the actions above, several participants suggested that the Australian, State and Territory Governments should amend the NWI to address the interactions between water quality and quantity in more detail. For example, Moles argued for:

Water quality to be included in the ‘public benefit outcomes’ described in clause [paragraph] 35 of the NWI ... a process and timeline for all jurisdictions to include statutory water quality requirements and targets in all water plans; and for it to be very clear that such requirements will apply to all users. (sub. DR103, pp. 3, 8)

The Commission agrees there is scope to revise the NWI to better reflect interactions between water quality and quantity in water planning — the limited mention of water quality in sections of the NWI relating to water planning has become increasingly conspicuous and out of step with contemporary water management issues. For example, water quality is an important consideration for several aspects of water planning and management — including identifying risks to water resources, optimising environmental watering, and identifying and developing alternative water supplies (such as hypersaline water that is not suitable quality for agricultural production but has other applications, such as in mining) (section 3.3).

Including water quality in sections of the NWI relating to water planning would provide water planners with a stronger incentive (and imprimatur) to consider water quality issues

as water plans are reviewed and renewed. It would also provide an impetus for improved practices that would ultimately improve the cost-effectiveness of water resource management in the long run. For example, greater consideration of water quality in planning may:

- assist in meeting water demands for consumptive use at lower cost (for example, by reducing water treatment costs for towns if source water quality can be improved, or by facilitating the development of new fit-for-purpose water supplies in sectors such as mining)
- help prioritise government resources to the water management activities (quantity or quality) that are likely to be most effective in managing risks to the availability and safety of urban and rural water supplies or in meeting environmental objectives
- assist in setting environmental regulations that protect environmental outcomes but enable more cost-effective and innovative solutions.

Any changes to the NWI that impose additional requirements on water planners to consider water quality would need to be flexible enough to account for different circumstances, within and across jurisdictions. For example, key water quality issues in coastal planning areas (such as seawater intrusion) will often be different to water quality issues in inland water planning areas. Similarly, water quality will be a more prominent risk to shared resources in some water planning areas than others. As such, the level of detail in specific water plans on water quality issues will vary according to the level of risk. Hence, principles or guidance requiring consideration of quality in water planning may need to be relatively general (similar to the components for water plans set out in Schedule E of the current NWI, Guidelines For Water Plans And Planning Processes¹⁶).

The key outcome sought is that water planners think about water quality and the risk it could pose during the process of water planning and make any necessary linkages with plans, actions and regulatory requirements undertaken through natural resource management and environmental protection frameworks. Where plans, actions and regulatory requirements are synergistic, no further action would be required. Where there are opportunities to more closely align these to give a more cost-effective solution or improved environmental outcomes, changes to those plans should be encouraged.

¹⁶ Some existing components for water plans in NWI Schedule E (such as considering relevant regional natural resource management plans and cross jurisdictional plans, where applicable) may indirectly involve consideration of water quality issues.

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, including ensuring that 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, 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 explore opportunities to better incorporate water quality issues in water planning, particularly as water plans come up for review and renewal
- f. 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 (f).

3.7 Recognising the needs of Indigenous Australians in water planning and management

The water needs of Indigenous Australians includes those for cultural, social, spiritual and customary (collectively referred to as ‘cultural’ in this report) values and those for economic purposes (box 3.10).

Accommodating the cultural water needs of Indigenous Australians is a key feature of the NWI. Under the NWI, jurisdictions agreed that water access entitlements and planning frameworks would recognise the needs of Indigenous Australians 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
- providing for the possible existence of native title rights to water in water planning processes
- accounting for water allocated to native title holders for traditional cultural purposes.

In addition, parties agreed to monitor and report on outcomes identified in water plans.

Box 3.10 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 significance to Indigenous Australians. 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 Australians also value the economic benefits of water

Indigenous Australians access water for a wide range of economic purposes, from maintaining culturally significant species at a rate that allows for a viable subsistence economy, to developing commercially viable agriculture, aquaculture and tourism enterprises.

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

Most jurisdictions have established specific processes for engaging with Indigenous communities on water planning and management issues — the exception is Western Australia where there does not appear to be any dedicated mechanisms for engaging Indigenous communities in water planning (appendix B, section B.1).

Despite improved mechanisms for engagement, most jurisdictions have routinely failed to identify and provide for Indigenous cultural values and objectives in water plans. However, there have been some positive developments in this area, as outlined below.

Ensuring that cultural values are recognised and provided for in water plans has been an ongoing aspiration for Indigenous communities, leading to the inclusion of provisions in the NWI to meet that goal. However, many Indigenous communities also want access to water for commercial purposes to promote economic development within communities and generate employment and income. Although water for economic purposes can be sourced through standard entitlement frameworks, Indigenous Australians may face barriers to access without support. This issue is not addressed explicitly by the actions within the NWI.

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

States and Territories have been slow to act on their commitment to identify Indigenous cultural objectives in water plans and make provision for those objectives (through water allocations or cultural flows, for example). In 2014, the NWC found that most jurisdictions had:

... 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. (2014b, p. 31)

A number of participants have expressed frustration with the lack of progress in making provisions for cultural values in water plans.

... 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. (Federation of Victorian Traditional Owner Corporations, sub. 37, p. 15)

... the current frameworks for recognition of Indigenous cultural flows under the *Water Act 2007* (Cth) and most State water rights systems remain inadequate. Indigenous peoples often have the right to ‘consultation’, but generally no substantive rights or cultural entitlements. (Law Council of Australia, sub. DR119, p. 6)

Progress in this area may have been impeded by the complex, time-consuming and contentious nature of the tasks involved. As the Cairns Regional Council observed, water-dependent values:

... can be story places and mythical beings that may not necessarily be tied to measurable or quantifiable indicators that “fits” in the traditional management framework concept. (sub. 52, p. 2)

Likewise, the Murray Lower Darling Rivers Indigenous Nations (MLDRIN) considered that:

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. (sub. 60, p. 5)

Although these challenges are real, progress can be made where there is sufficient will and commitment. Hartwig and Jackson (sub. DR92) provided examples from within the MDB of methods that have been developed and used to determine Indigenous cultural water objectives.¹⁷ The recently released COAG guidance, *Engaging Indigenous Peoples in Water Planning and Management* (box 3.11), also provides States and Territories with practical advice and strategies for assessing Indigenous cultural values and setting associated objectives and water needs.

Box 3.11 COAG guidance: Engaging Indigenous Peoples in Water Planning and Management

A module, *Engaging Indigenous Peoples in Water Planning and Management*, was developed by all Australian Governments through COAG in 2017. The module is a supporting document to the 2010 *NWI Policy Guidelines for Water Planning and Management*. 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 Australians in water planning
- provides examples of the incorporation of Indigenous cultural values, objectives and needs in water planning and management activities.

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).

Since 2014, there have been positive developments in some States and Territories in making provisions for cultural values in water plans (appendix B, section B.1). 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 3.12). These efforts have been reinforced in MDB jurisdictions by the Basin Plan requirement (chapter 10, part 14) that water resource plans have regard to cultural values, and identify Indigenous objectives and outcomes.

¹⁷ In Mooney and Tan (2012) cultural values and water requirements were identified using guided visits, photo documentation and a focus group meeting. Jackson et al. (2015) engaged two Indigenous communities to elicit their cultural water values and objectives and used an adapted environmental flow assessment framework to assess the effect of alternative water planning scenarios on those cultural objectives and identify specific water requirements.

Box 3.12 **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. For example, the Victorian Government has committed \$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 (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 (DEWNR (SA) 2017).

The Ngarrindjeri Partnerships Project (based in the Coorong / Lower Lakes / Murray Mouth area) seeks to protect and manage the cultural values of sites (DEWNR (SA) 2015c).

National Cultural Flows Research Project

The National Cultural Flows Research Project (2017), 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 Murray-Darling Basin, 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).

In its 2014 assessment, the NWC held New South Wales up as the ‘benchmark in good engagement’ for its approach to incorporating Indigenous cultural objectives in water plans (MLDRIN, sub. 60, p. 6). This approach was undertaken through the then NSW Office of Water’s Aboriginal Water Initiative (AWI). The work of the AWI included collecting and maintaining a database of Indigenous water values in a culturally appropriate manner and helping to build the capacity of the staff and communities to recognise Indigenous cultural values, and develop and input appropriate rules in water sharing plans. Moggridge (Canberra trans., pp. 23–24, 26) noted that the AWI also supported Aboriginal water needs by developing governance arrangements for water knowledge collection and security, and cultural awareness training for the department. However, in 2016 the New South Wales Government ceased the AWI.

The NSW Department of Industry (sub. DR116) advised that it has maintained formal and informal engagement with Indigenous Australians, which is contributing to the development

of the water resource plans required under the Basin Plan. For example, it noted Aboriginal stakeholders are represented on Stakeholder Advisory Panels for each water resource plan, and a process has been initiated to ‘co-design the engagement model for more direct, detailed consultation’ (sub. DR116, p. 2). It also noted peak representative Nation groups have been consulted on ways to incorporate the objectives of Aboriginal people in the development of water resource plans and the Long Term Environmental Watering Plans.

However, some participants argued that New South Wales’ current model of engagement is less effective in identifying Indigenous cultural values than under the previous AWI. Moggridge (sub. DR117, Canberra trans., p. 26) noted that Aboriginal Elders are now expected to sit on Stakeholder Advisory Panels with limited capacity and understanding of water management and suggested that this type of approach was ineffective in the past and unlikely to work in the future. Moggridge stated that engagement with Aboriginal people was strengthened by the use of Aboriginal staff and facilitators through the AWI. MLDRIN also expressed concern about the future of the AWI:

... 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)

In response to some of these concerns, the New South Wales Government noted that it held a training day specifically for Aboriginal Stakeholder Advisory Panel members to provide capability support. Moreover, the database of Indigenous water values developed under the AWI program has been secured and protocols for access have been established to prevent unauthorised use of the information and to protect intellectual property (NSW Department of Industry, pers. comm., 28 November 2017).

In several cases, including the new arrangements in New South Wales, it is too early to judge the effectiveness of jurisdictions’ Indigenous engagement initiatives, as they have only recently been (or are yet to be) implemented. Similarly, it is too early to observe the usefulness of the COAG guidelines (box 3.11).

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, section B.1). 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. Jurisdictions could report on indicators such as the proportion of water plans which incorporate specific cultural objectives. Consultation is likely to support the development of measurable and meaningful indicators of progress.

Environmental water can support Indigenous cultural objectives, but not always

In many cases, planned and held environmental water¹⁸ 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 environmental water in a way that supports environmental *and* Indigenous objectives, where possible (chapter 5).

There have been some positive developments in this area. For example, the Victorian Government has committed to amending the legislated objectives of the Victorian Environmental Water Holder (VEWH), such that it is required to consider Aboriginal water-related environmental outcomes. A Victorian Aboriginal Commissioner was also appointed to the VEWH in 2017. In addition, 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 3.13).

Box 3.13 Maximising the benefits of environmental water

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 Ngiyampaa-Wayilwan elders and community members and representatives of the CEWH and New South Wales 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 [Indigenous Protected Area]; 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 effective[ness] of environmental watering’ (sub. 63, p. 5). Evidence of this is apparent in some of the more

¹⁸ Planned environmental water refers to rules contained in water plans that constrain the volume and timing of extractions, in order to ‘leave water behind’ for the environment. Held environmental water refers to water access entitlements held and used (usually by governments) for the purpose of achieving environmental outcomes.

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) 2016e, p. 22).

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 Victorian Government announced an environmental flow release from Rocklands Reservoir into the Glenelg River that supported both environmental outcomes (improved river health and reduced salinity) and Aboriginal cultural values (by sustaining the health of country for Traditional Owners) (Neville 2017).

Although 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 (discussed in the previous section).

Despite the potential for environmental and Indigenous benefits to coincide, it is important that water planners do not assume this to be the case. The NWC highlighted this as an issue:

... 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. (2014b, p. 422)

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 water 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

Providing water for economic purposes for Indigenous communities can have material benefits. Most notably, these arrangements can facilitate commercial pursuits in Indigenous communities, thereby supporting employment, income and economic development. Ultimately, economic development can improve the financial security and living standards (including health outcomes) of beneficiaries (Australian, State and Territory Governments 2017b).

Although participants noted that paragraph 25(ix) of the NWI can be interpreted to include the economic needs of Indigenous Australians as well as cultural needs (Hartwig and Jackson, sub. DR92), the NWI does not explicitly cover the provision of water to Indigenous communities for economic needs. However, the *NWI Policy Guidelines for Water Planning and Management* provide some guidance:

Although the range of Indigenous values in water may be difficult to quantify, they are likely to cover both cultural and economic uses of water, and these uses may overlap. (COAG 2010b, p. 32)

Although the boundaries between water for cultural and economic purposes can sometimes be blurred¹⁹, it is nonetheless useful to consider water for economic purposes as a distinct issue (National Irrigators' Council, sub. DR85). There are also some unique issues to consider when providing water for economic purposes. For example, governance arrangements may be required to define who has the right to access and make decisions about water held and how the benefits from the use of the water held should be distributed between groups and individuals (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 Australians 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 economic purposes and exploiting the opportunities it provides.

A number of States and Territories have established or are consulting on the development of specific provisions for Indigenous communities wishing to access water for economic purposes. For example:

- in New South Wales, Indigenous Australians 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

¹⁹ When the MDBA (sub. DR120, pp. 7-8) consulted with Traditional Owners regarding water values in 2012, the range of water dependent economic opportunities that were identified demonstrate the potential crossover between cultural, environmental and economic outcomes. Examples included 'creating businesses from bush tucker' and 'the use of feral plant and animal material for fertilizer production'.

example, permanently to other Aboriginal groups or individuals, or temporarily without this restriction) (Australian, State and Territory Governments 2017b)

- 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 Queensland, unallocated water reserves for the purposes of supporting economic opportunities for Aboriginal communities are included in the water plans for the Burnett, Fitzroy and Wet Tropics
- the South Australian Government (sub. DR143) is exploring broad capacity building and information provision processes on water rights and water markets, which will include mechanisms to build the capacity of Indigenous stakeholders to participate in the water market
- the Northern Territory Government released a policy framework for the reintroduction of Strategic Aboriginal Water Reserves (previously called Strategic Indigenous Reserves). A Strategic Aboriginal Water Reserve is a reserved percentage of water from the consumptive pool within a water allocation plan area, which is set aside for exclusive access by eligible Aboriginal communities to use or trade for their economic benefit. Licences granted from a water reserve ‘will be subject to the same standard conditions and licence security protocols that apply to all other water extraction licences in that water allocation plan area’ (Northern Territory Government 2017, p. 5). For example, licences would only be granted for 10 years at a time.

The MLDRIN argued that special water access arrangements for Indigenous Australians 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. (sub. 60, p. 6)

... and provided examples of practical steps required to ensure that Aboriginal needs and interests are better accommodated and represented, including:

- Providing special dispensation for Aboriginal access to unallocated water in relevant systems (including creation of Strategic Indigenous Reserves to support future access and use) ...
- Providing adequate funding for Aboriginal people and organisations to acquire water for economic development purposes, in fully allocated systems ... (sub. 60, pp. 9-10)

The NWI policy guidelines note a typical rationale for water reserve policies is that Indigenous Australians 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).

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 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 Australians, but should do so transparently.

There may be hidden costs if governments provide access to water outside of existing frameworks. A lack of transparency may conceal the highest value alternative use of that water (that is, the opportunity cost of the water provided to Indigenous users). 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 any particular group.

The National Irrigators' Council said that by working within existing water entitlement frameworks, governments can 'explicitly work to meet development objectives with Indigenous communities but without devaluing or diminishing the property right held by the owners of water' (sub. DR85, p. 7).

Access to water is far from the only barrier Indigenous Australians face in taking advantage of economic development opportunities, and access to water does not guarantee commercial success. 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. Therefore, water access arrangements for Indigenous Australians are likely to produce the greatest value for their communities when they are part of a broader strategy, which may include investment in education, training and business development.

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. Program design and implementation should be informed by direct consultation with the community and carefully consider governance arrangements, accountabilities and conditions for use.

State and Territory Governments should monitor and evaluate activity related to Indigenous access to water for economic purposes. Public reporting of provisions and outcomes for Indigenous water would also improve transparency and inform the Commission's future triennial assessments of progress in this area. Reporting would ideally occur at least every three years, with the first reporting period to occur before the next triennial assessment.

FINDING 3.2

Access to water resources to achieve cultural values is increasingly being addressed by using specific mechanisms for engaging with Indigenous communities in the development of water plans — the exception is Western Australia.

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

There is evidence that environmental water managers have used held environmental water to achieve Indigenous cultural objectives, without forgoing environmental benefits.

RECOMMENDATION 3.2

State and Territory Governments should ensure that:

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

RECOMMENDATION 3.3

Where State and Territory Governments provide access to water for Indigenous communities for 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. specify and implement future governance arrangements
- e. regularly monitor and publicly report on these provisions (such as the volume of entitlements sourced, water used and supporting arrangements) and their outcomes.

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

Accounting for native title rights and interests

Several commentators have previously expressed concerns about implementation of the NWI provision that native title rights in water should be accounted for (Tan and Jackson 2013). While the NWC's 2014 assessment did make reference to native title, it did not assess the extent to which individual water plans take account of the possible existence of native title rights in water.

Participants to this inquiry have highlighted examples of water planning processes that do not appear to adequately account for native title rights in water, particularly in New South Wales (Hartwig and Jackson, sub. DR92; Moggridge, sub. DR117).

Hartwig and Jackson (sub. DR92) submitted that native title determinations are not necessarily accounted for in water plans in New South Wales. All water plans in New South Wales include a clause to account for native title rights to access water, which have equal priority to stock and domestic rights.²⁰ Hartwig and Jackson (sub. DR92) observed that native title was recognised for the Barkandji people over a large stretch of the Darling River and some adjacent land in June 2015, but the subsequent 2016 *Murray and Lower Darling Regulated Rivers Water Sources* plan (which covers both land and waters where the Barkandji people hold native title) makes no mention of that determination, and (in their view) does not adequately protect the native title rights of the Barkandji people.

The New South Wales Government has indicated that the native title rights of the Barkandji people were recognised too late in the planning process to be included in the 2016 *Murray and Lower Darling Regulated Rivers Water Sources* plan. The New South Wales Government intends to account for the Barkandji determination when the water plan is updated as part of the MDB Water Resource Planning project (NSW Department of Industry, pers. comm., 28 November 2017).

In addition to the right to use water, native title holders may have other rights, such as the right to protect significant sites along waterways (Duff 2017). It is unclear that water plans account for these non-use rights, where recognised by determinations.

²⁰ As of November 2017, one plan (*Greater Metropolitan Region Unregulated River Water Sources 2011*) provides a non-zero allocation, while three plans (*Clarence River Unregulated and Alluvial Water Sources 2016*, *North Coast Coastal Sands Groundwater Sources 2016* and *Nambucca Unregulated and Alluvial Water Sources 2016*) refer to relevant native title determinations and account for associated rights, without providing a volumetric allocation.

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 the irrigation sector more prosperous and resilient. While water trading can have mixed effects on regional economies as production moves to different locations, this has to be considered against the counterfactual of no water trading and the effects of other influences, such as depressed prices for a particular commodity.
- 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 focus on improving the quality and accessibility of basic trade data, and allow the private sector to provide more tailored information services. Governments should also look to improve information about water resources and market rules.
- 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 in some places, 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. There are adequate arrangements in place to guard against negative consequences for water markets as the CEWH becomes a more active trader.

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 other entitlement holders) 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 unduly 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 access to 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 chapter 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

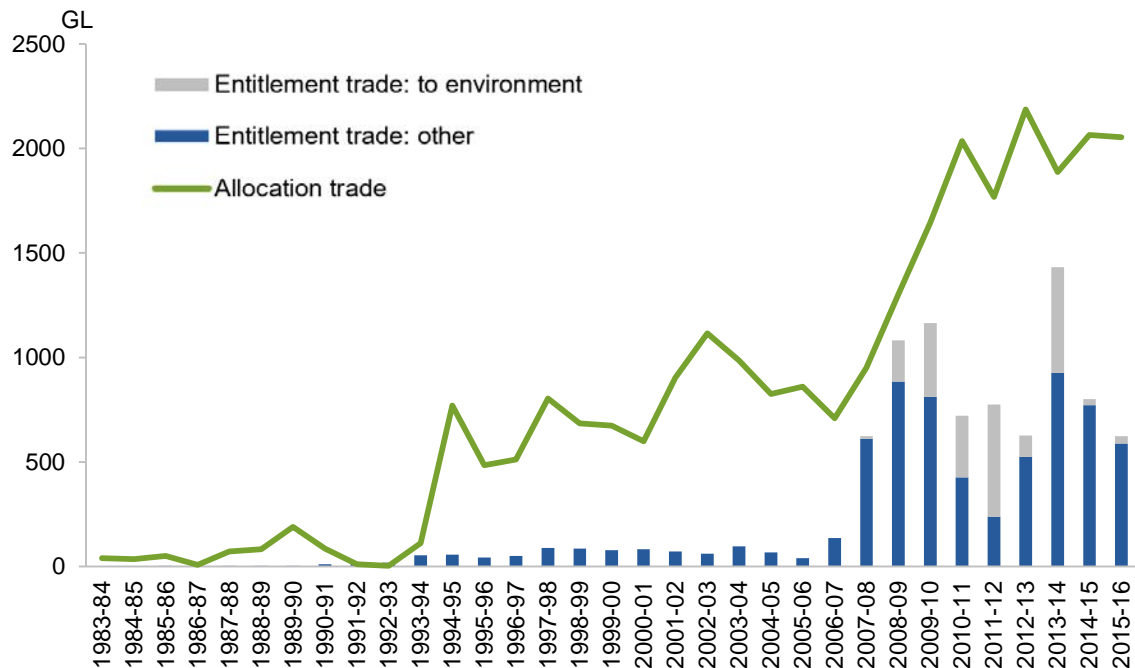
Australia is widely regarded as a world leader in the establishment and management of water markets (Hughes, Gupta and Rathakumar 2016). This section briefly considers the rise of water markets and the geographic extent of their development across the country.

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 first developed 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 (which, while recorded in registry trade data, involve no commercial transaction) and trades made by irrigation infrastructure operators (which are legitimate trades, but are excluded because reliable data on them are only available for recent years). Irrigation infrastructure operator 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)

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- 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.

Water markets are now sizable in dollar terms. In 2015-16, the value of entitlements on issue in the southern MDB was over \$13 billion, and turnover value for entitlement trade was \$985 million (or 7.6 per cent of the total value of entitlements) (ABARES 2017). 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 megalitre 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, 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.

There has also been an increase in trade of groundwater over recent years, both within the MDB and elsewhere. Overall, groundwater accounted for 7 per cent of allocation trade and 19 per cent of entitlement trade in 2015-16 (table 4.1).

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.

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

<i>Region</i>	<i>Resource type</i>	<i>Allocation trade^a (GL)</i>	<i>% overall total</i>	<i>Entitlement trade^b (GL)</i>	<i>% overall 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).

Progress

Under the NWI, reforms to water entitlements 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, within regulated systems in the MDB water rights have typically been separated into water access rights (water access entitlements and allocations), water

delivery rights (for delivery through off-river networks), water use approvals (to use water on land) and works approvals (such as for water offtakes and pumps) (ACCC, sub. 28). While there are recent examples of States pursuing further unbundling in other systems, including 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 the 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 Murray-Darling Basin, suggesting that this market is maturing over time).

Unbundling can also involve the creation of potentially 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 of tradeable products 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.

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.²¹

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’ (2014b, p. 41).

Table 4.2 summarises progress against the NWI commitments — further detail is included in appendix B (section B.2) 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.

²¹ As discussed in appendix B, arrangements are yet to be put in place to allow water trading between the ACT and New South Wales.

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 are available from water registers, including on internal trades within irrigation districts.

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 unwarranted 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 (including the Australian Government's cap on purchases of water for the environment). 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 complex trading environment. 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 by 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 by Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES) found that over 90 per cent of irrigators in the southern MDB agreed that both allocation and entitlement trading were beneficial to their farm businesses (NWC 2012e, pp. 23–28). 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 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 2012e, 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 tend 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 billion 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, 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 ‘it 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, 2012e).

Trade has been used to source water for the environment under the Basin Plan, which can have socioeconomic effects. The impacts vary by region, for example, analysis conducted for the Northern MDB Review estimated that past and proposed future water recovery would reduce total employment by 3 per cent in Narromine, 9 per cent in St George and 18 per cent in Dirranbandi (MDBA 2016c, p. 4).²² The impacts are greater in smaller regions with a high dependency on irrigated agriculture.

It is important to appreciate that 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 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.

²² In part due to the findings of this study it was decided to reduce the quantity of water to be recovered for the environment in the northern MDB.

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.

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 are 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 Murray-Darling Basin Authority (MDBA) (sub. DR120, p. 9) considered that there was ‘potential to further improve the transparency and efficiency of trade restrictions throughout the whole MDB’
- the CEWH (sub. 63, p. 3) argued that ‘trade restrictions, put in place to address environmental and socioeconomic 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

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- in reviewing water trading in the southern MDB, 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 trade limits (box 4.2), the Goulburn inter-valley transfer trade limits, limits on trade through the Barmah Choke and limits on trade from New South Wales Murray to Victorian Murray. All of these are in the southern MDB and have at times been binding restrictions on trade in recent years.

Trade restrictions that are used to manage hydrological constraints and environmental impacts have both costs and benefits. The costs arise because they prevent trades that would benefit buyers and sellers. 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 or more equitable measure. The latter could involve creating tradeable rights to the capacity of a congestion point on a river, applying a loss factor on trades to account for conveyance losses, or a range of other approaches (Hughes, Gupta and Rathakumar 2016).

There are processes in place that could lead to some improvements being made to current trade restrictions. The first of these involves the Basin Plan water trading rules, which were introduced in July 2014. The rules, developed and enforced by the 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. The MDBA (sub. DR120) reported that states will need to address a number of inconsistent trade restrictions before 2019 (in conjunction with developing the water resource plans required under the Basin Plan).

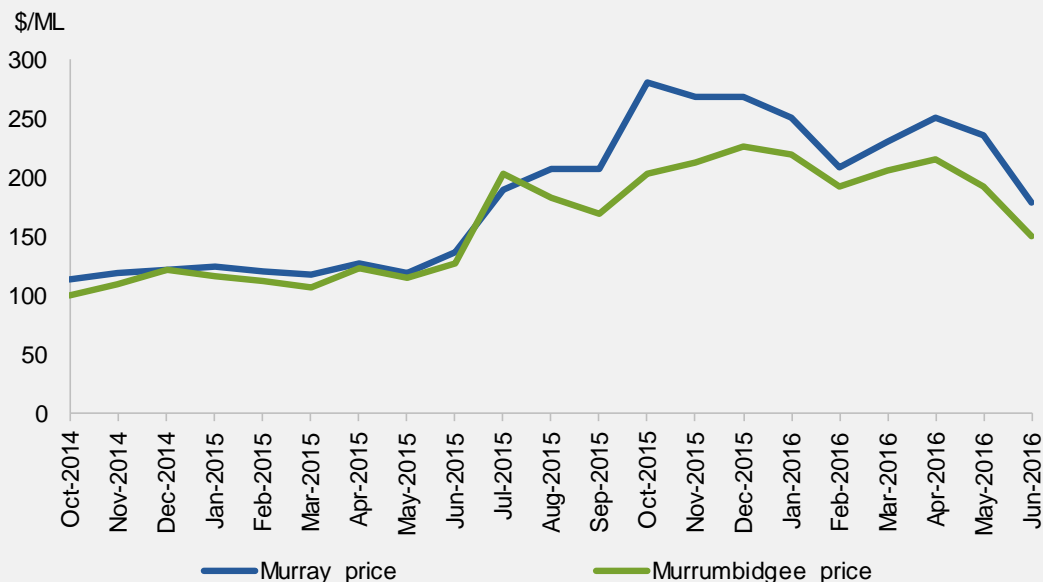
Box 4.2 Murrumbidgee inter-valley transfer trade limits

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 Murrumbidgee and resulting in a divergence in allocation prices between the Murrumbidgee and Murray trading zones, as shown in the figure below. When trading was briefly reopened in November 2015 there was substantial trade out of the Murrumbidgee, and the price differential reduced. More recently the pattern of trade has reversed, with considerable trade into the Murrumbidgee resulting in the limit on further inward trade being reached.

Monthly allocation prices, Murrumbidgee and Murray



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

The second of these processes is that Basin jurisdictions and the MDBA have commenced a trade adjustments project to examine ways to improve interstate water trade in the MDBA (ACCC, sub. DR124; MDBA, sub. DR120). Trade adjustments, in this context, refers to the arrangements for allowing interstate trade, while ensuring States' shares of water under the MDB Agreement are maintained. The project will explore whether there are opportunities to improve the way that trade adjustments are made, which could result in improving the transparency and efficiency of trade restrictions. An update on the trade adjustments project will be provided to the Basin Officials Committee in mid-2018 (MDBA, sub. DR120).

The Commission will examine the progress of these processes during the 2018 inquiry into the implementation of the Basin Plan.

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 systems 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 less restrictive 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 2014b). 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).²³

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.

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).

The cost to the Australian community from unwarranted 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 additional savings in operating costs (PC 2011, p. 92).

The South Australian Government (sub. DR143) argued that purchasing water was not a viable alternative to desalination, pointing to short term risks of relying on River Murray supplies. During a previous inquiry into urban water the Commission considered the short term risks and concluded that they were manageable, especially given the availability of various types of high reliability entitlements and the large investment being made in improving the health of the Murray-Darling system (PC 2011). This analysis also found that the doubling of the plant's capacity, which occurred through the Australian Government's involvement, was particularly inefficient. The South Australian Government also referred to modelling that estimated that without desalination and other measures, Adelaide would face a shortfall of over 160 GL per annum by 2050 in extreme dry years (sub. DR143). The Commission's view is that projected long-term shortfalls did not warrant the immediate

²³ On the basis that urban users frequently pay over \$3000 per megalitre for water and the price for water allocations is often between \$30 and \$300 per megalitre.

investment in water supply augmentation. A projected long-term problem should be addressed through a strategic assessment of all options to address the issue which could include the role of purchasing water, water efficiency measures, reuse and the optimal time and scale of investment in options such as manufactured water.

While most jurisdictions (with the exception of Perth) are not considering major supply augmentations at present, wasteful expenditure could occur in the future if water trading and other transfers are not fully explored as urban supply options. The more immediate concern is that water could be supplied from existing desalination plants when lower cost water is available.

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 still likely to be cheaper in most cases to purchase water from the MDB than to run the 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.
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 entitlements 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 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 modest as:

- 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 2016a, 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.

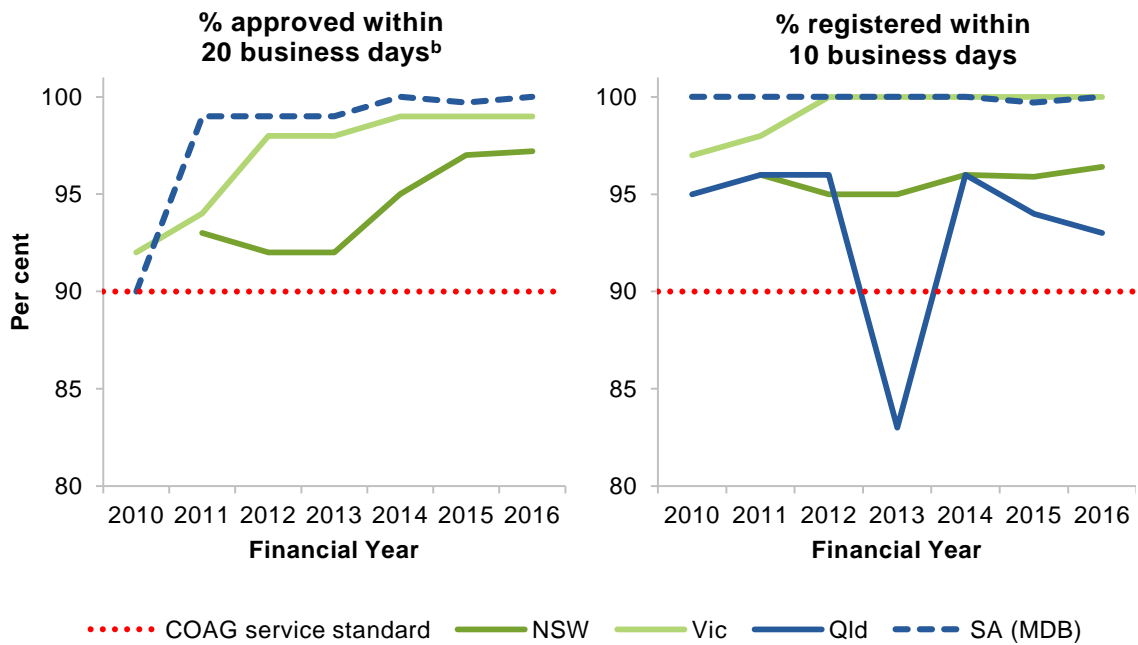
Trade approval processes

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, section B.2). 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 2014b). 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.

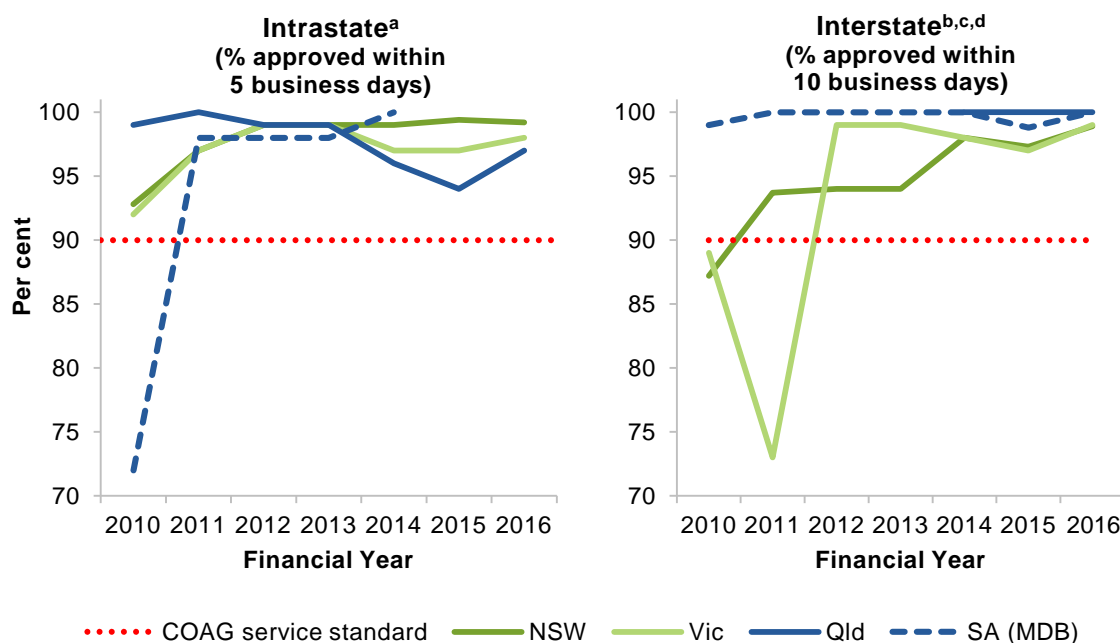
Figure 4.2 Processing entitlement trades^a
 Performance of jurisdictions against COAG standards, 2009-10 to 2015-16



^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 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:

- water prices
- trade rules and limits
- water allocations
- long-range weather forecasts
- characteristics of water products (for example, carryover rules).

Information 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 price 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)

The Department of Agriculture and Water Resources (sub. DR113) also pointed out that accurate price and other trade information can be important for ensuring that obligations to pay taxes and report information to governments are met.

Appendix B (section B.2) 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 transfers²⁴ 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

²⁴ 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.

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- 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 trade-related information. For example, the New South Wales Government has 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 awarded grants of up to \$100 000 each to four 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). In September 2017 one of these firms, Marsden Jacob Associates, was awarded a further grant of \$1 million to develop a proof of concept for their proposed solution (Australian Government 2017b). The aim of providing grants under the initiative is 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 trade 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. (2016b, 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 Cooperative Limited 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 overreliance 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.²⁵ (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 NFF also expressed the view that confidence and predictability in allocation decisions is a core foundation of an effective water market and that:

... there is an opportunity to improve the transparency of the water allocation decisions of resource managers. Currently, decisions are announced, but there is no opportunity to interrogate those decisions and for stakeholders to better understand them. While we appreciate that full

²⁵ The National Irrigators' Council also nominated the length of the process as a barrier to trade.

codification of resource allocation decisions may not be desirable, there is an opportunity for resource managers to provide access to additional information to build confidence in the decisions made. (sub. DR131, pp. 2–3)

The Commission's view is that the 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, and summarised data showing median prices) and information about water resources and market rules 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 water registers where necessary, such as in Queensland (as discussed in appendix B (section B.2), in seeking to improve water registers, jurisdictions should take account of approaches used in other states and explicitly consider synergies and cost savings of coordinated approaches)
- ensuring that clear information is readily available on how water allocation decisions are made and on the characteristics of water products (for example, on rules for carrying over water allocated to a water entitlement).

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 water market information, in the Commission's view, go beyond the role that governments should be playing.

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 water resource, market rules and basic trade 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 (2010a) study 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 (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). The Australian Government is currently working with the Australian Water Brokers Association in its efforts to develop and improve participation in a self-regulation initiative (DAWR, sub. DR113).

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.

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 2638 GL of entitlements with a long-term average annual yield of 1811 GL (as at 30 September 2017) (DEE 2017a). These entitlements, which represent 15 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 (2016) 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.²⁶

²⁶ 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 inter-valley transfer limits, being triggered. This adds to the importance of reviewing trade restrictions, as discussed earlier in the chapter.

The Water Act (Cwlth) provides authority for the trade of Commonwealth environmental water and imposes requirements on such trade. 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 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 Murray-Darling Basin Plan (2016, p. 94) ‘heard concerns from witnesses regarding the potential for foreign ownership of water and the implications this may have for the water market’.

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, floodplains and aquifers.
- 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 have recognised the environment's share of water and provisions of water for the environment are made through water planning arrangements (although Western Australia's water plans and extraction limits are non-statutory).
 - In many areas, particularly in the highly-regulated parts of the Murray-Darling Basin, governments also provide environmental water by way of entitlements with the same rights and conditions as those of consumptive users. This is often done to address overallocation and overuse. A substantial volume of entitlements is now actively managed for environmental benefit.
 - All governments have agencies responsible for managing environmental water, whether provided for through water plans or entitlements. Some arrangements are in place to coordinate the use of environmental water across jurisdictions, and entitlement-based environmental water has been traded.
- Although 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 best practice governance arrangements for entitlement-based environmental water, particularly where managers are responsible for 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, robust and efficient, 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 community concern about the environmental degradation caused by the development of the nation's land and water resources increased (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). It also threatened the sustainability of some of Australia's key groundwater-dependent ecosystems (NWC 2012c).

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 2017a).

In light of the poor health of many rivers, wetlands and other aquatic ecosystems, 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 2016c; MDBC 1999).

Addressing the reduction in water availability for the environment was more challenging due to the potential impact on consumptive users. Early efforts, in the 1980s, included the delivery of a flow allocation of 18 500 ML to support the ecological health of the Macquarie Marshes in New South Wales, and an allocation of 25 000 ML from Dartmouth Dam to provide for the environment in northern Victoria (Garry Smith, pers. comm., 11 September 2017; NWC 2012a). In 1988, Western Australia set minimum water levels for nine Gngangara Mound wetlands to protect them from the impacts of groundwater extraction (Minister for Environment (WA) 1988).

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, make legally-recognised provisions of water for the environment and achieve a better balance between consumptive and environmental needs in overallocated systems.

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 planning
- return overallocated and overused surface water 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.²⁷

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

²⁷ 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’.

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 (section B.4) and summarised in table 5.1 (environmental water provided through water plans is also discussed in chapter 3).

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 (with scope to improve the specification of outcomes for some types of groundwater-dependent ecosystems in particular). 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 Murray-Darling Basin (MDB), Great Artesian Basin and Lake Eyre Basin.
Common arrangements for connected surface water 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 National Water Commission).
Environmental water holders able to trade	Achieved	All governments with held environmental water (Australian, New South Wales, Victorian and South Australian) are legally able to trade water allocations and entitlements.
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 commitment 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.

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 provision of water for the environment through statutory water plans or equivalent instruments. Western Australia does provide water for the environment through its water allocation plans and extraction limits, but the lack of statutory backing makes these arrangements less secure.

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.

The mechanisms to provide water for the environment through water planning vary by jurisdiction. However, water plans usually provide ‘planned environmental water’, which is where constraints or obligations are placed on consumptive users to leave a residual flow in a river or stream, or to limit water extraction from groundwater systems. These can include cease-to-pump rules, flow sharing arrangements, passing-flow releases from water storages, environmental water allowances and groundwater access rules (New South Wales Government nd; NWC 2014b).

Planned environmental water constitutes the majority of water dedicated to environmental outcomes and, in many water sources, it is possible to achieve these outcomes using only planned environmental water (provided the plan provisions are appropriately designed and implemented). However, in a number of systems (particularly in the regulated parts of the 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. To achieve the desired environmental outcomes, the entitlements need to be actively managed. Environmental water managers have considerable discretion in how, where and when they can use this water.

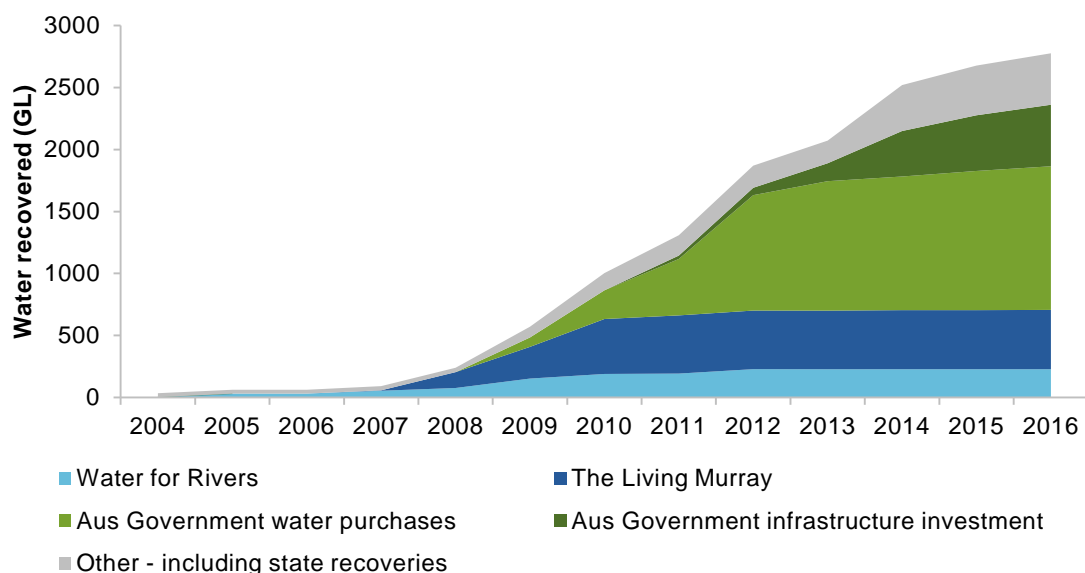
As outlined in appendix B, there has been considerable progress in addressing overallocated or overused systems, although there is still further work to be done in a number of jurisdictions. It should be acknowledged that progress requires difficult trade-offs to be made between environmental and consumptive uses of water. 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 Gnamptuwa groundwater system and Lower Gascoyne) (NWC 2014b)
- the ongoing Great Artesian Basin Sustainability Initiative (begun in 1999) to repair uncontrolled bores that had reduced water pressure and volume (DAWR 2017a)

- 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, achieved through the Water for Rivers joint enterprise (DPI (NSW) 2017e)
- the 2003 agreement between southern MDB jurisdictions to acquire 500 GL of entitlements as a ‘first step’ to restoring the River Murray as part of The Living Murray 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 Basin Plan and the target to recover a long-term annual average of 2750 GL of water for the environment by 2024 (MDBA 2016a). Programs are in place in all MDB jurisdictions, mostly funded by the Australian Government, to recover water to achieve this target and address overallocation and overuse in major river systems and aquifers across the Basin.

With the recovery of water in overallocated and overused systems (figure 5.1), substantial entitlements are now held for environmental use in the MDB. As of 2015-16, governments in the MDB held a total of 4315 GL of entitlements (of varying reliabilities), or 24 per cent of all entitlements on issue (ABARES 2017; MDBA 2017h). The Commonwealth Environmental Water Holder (CEWH) held 56 per cent of this water (2432 GL) on behalf of the Australian Government, making it the largest environmental water holder by far. The CEWH’s holdings have since grown to 2638 GL, with a long-term average annual yield of 1811 GL (as of 30 September 2017) (DEE 2017a).

Figure 5.1 Held environmental water recovery in the MDB^{a,b}



^a Volumes recovered to 30 June 2016 in terms of long-term average annual yield. ^b State recoveries include programs such as New South Wales Riverbank and other small recoveries.

Data source: MDBA (2017h).

The New South Wales and Victorian Governments also hold significant environmental water, while the South Australian Government has a relatively small amount (Victoria and South Australia also hold some entitlements outside the MDB). In addition, New South Wales actively manages environmental contingency allowances defined in some water plans to achieve environmental outcomes.

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 across jurisdictions, and held environmental water has been traded on the temporary market. Box 5.1 describes the usual process for coordinating held environmental water use in the MDB, which will continue to evolve.

The benefits of water reform are starting to be realised

Although ecological restoration is a long-term process, the benefits of having more water available for the environment are being realised. Environmental water provision has contributed to better outcomes for native fish, frogs and waterbirds, while also improving native vegetation condition and helping to maintain water quality (Argent 2017; MDBA 2017d, 2017k; Watts et al. 2016). Without the increased 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).

Box 5.1 Held environmental water use in practice

Providing water for the environment through the use of held entitlements usually 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), based on the short- and longer-term environmental needs of rivers, wetlands and floodplains. These proposals are identified in consultation with local communities, informed by available science, and build on the planned environmental 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 their 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 environmental water reaches its destination and determine whether any risks have materialised. They also monitor ecological responses to environmental water provision to evaluate whether it 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.

Sources: CEWO, pers. comm., 28 August 2017; MDBA (2014a).

Where to next?

In assessing the progress of reform in 2014, the National Water Commission (NWC) highlighted the need to improve monitoring and reporting on environmental outcomes and noted inadequacies in the standard of environmental water accounting²⁸, particularly in

²⁸ 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.

relation to planned environmental water. The NWC (2014b, 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 2014a).

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 water, 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.

Jurisdictions have planned environmental water 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 should 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.

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 an assessment of the areas of unfinished business, and issues identified through consultation 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 best practice 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 necessarily enough to secure environmental outcomes. Environmental water provisions can help achieve flow regimes and extraction rates that better reflect ecological need. However, waterways — such as rivers, wetlands, floodplains and estuaries — also face threats like nutrient pollution, salinity, increased sedimentation, habitat degradation and invasive species. The Commission considers that there is significant scope to improve environmental outcomes through a focus on integrating the management of environmental water and waterways (whether fed through surface water or groundwater).

For example, providing environmental water to a particular wetland may be more effective in increasing native fish populations if waterway managers can maintain wetland vegetation, reduce weeds and install screens to exclude carp. Similarly, the benefits of providing water to stimulate regeneration of red gum forests can be totally eroded if grazing then eliminates the resultant seedlings. Waterway managers are generally responsible for such activities (referred to in this report as ‘complementary waterway management’) under State and Territory natural resource management (NRM) frameworks.

‘Integration’ can mean many things, but the Commission’s expectation is that the managers of environmental water (planned and held), at a minimum, align and coordinate their objectives and activities with those of waterway managers. In 2014, the NWC (2014b) 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 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 (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.²⁹ 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 (the LLS replaced catchment management authorities in 2014). As a result of both of these issues, the water-related NRM goals for LLS are not as strong as they could be 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 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) 2017c, 2017a). 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.³⁰

Victoria, South Australia and the ACT appear to have the most robust arrangements for integrating water and waterway management. In each case, legislation provides a clear

²⁹ *Water Management Act 2000* (NSW) s. 18(1A) and *Local Land Services Act 2013* (NSW) s. 47(3)(d).

³⁰ *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)).

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 are responsible for developing regional strategies to improve waterway health, as well as planning for environmental water use and delivering that water on behalf of the Victorian Environmental Water Holder (VEWH) (*Water Act 1989* (Vic), ss. 189-190). South Australia's *Natural Resources Management Act 2004* (s. 76(2)) requires water plans to form part of regional NRM plans, and both are prepared by the same regional NRM board. 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.

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. However, 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 state and 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* (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 public land 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 waterways 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 (OEH (NSW) 2014). However, the move away from catchments and the impact of the LLS boundaries led some advisory group members to question, as early as 2014, whether the role of the LLS as Chair might impact the groups' 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; VEW 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.

Moreover, if all jurisdictions had coherent legislative, institutional and policy frameworks that ensured the integrated management of environmental water and waterways, there would be no need for the CEWH to invest in waterway management. This is a state-level responsibility that should be addressed by State and Territory Governments, with involvement from the Australian Government where coordination is required.

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 Murray-Darling Basin Authority (MDBA) (sub. 81) also stressed the importance of local and regional knowledge.

The Commission's view is that local, preferably catchment-based 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-level 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 and facilitate community participation and support.

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 river and wetland planning, delivering environmental water, and 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 are working towards a consistent long-term vision for each environmental asset that the community values.

To facilitate this, State and Territory Governments should review their legislative, policy and planning frameworks to ensure they explicitly require consistent objectives for water-dependent ecosystems that will govern 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.

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 environmental watering proposals (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 guide the CMAs' 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 lack of an overarching strategy for statewide catchment management, an inability to hold regional partners accountable and that funding arrangements are short-term. 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).

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).³¹

³¹ 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.

RECOMMENDATION 5.2

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

To achieve this:

- a. State and Territory Governments should ensure that consistent management objectives 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 best practice

Governments hold entitlements worth billions of dollars which are actively managed to achieve environmental outcomes — the Commonwealth holdings alone may be valued at up to \$5 billion once water acquisition in the MDB 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 through carryover arrangements. 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 decision-making processes 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 recognises 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 policy makers because they lack political accountability. However, once a strong policy framework is in place, it is important that such bodies have the independence they need to achieve their objectives without fear or favour. Reflecting this, the six jurisdictions³² that signed on to the *Agreement on Murray-Darling Basin Reform* in 2008 agreed that environmental water management should be underpinned by ‘independence from the influence of competing uses’ (COAG 2008a, p. 36).

By its nature, influence can be hard to detect. Good governance arrangements are designed to avert the risk of undue influence occurring, and to provide reassurance to the community that decisions are made objectively. 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 its environmental water entitlements to support crops rather than protect a fish species from extinction. Ultimately, the Victorian Government maintained that the entitlements were to be used for their intended purpose. However, the situation highlighted the threat to the integrity of the entitlement framework (and to environmental outcomes) where decisions on the use of environmental water holdings may be subject to political pressures. Such issues contributed to the decision by the Victorian Government to establish the independent VEWH in 2011 (O’Donnell 2010).

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. In addition, governments should ensure that the logic and rationale for decisions are easily accessible to the public.

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 VEWH is a separate body and the CEWH is a statutory office holder, albeit one within a government department.

³² 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 is in the process of divesting its share of The Living Murray entitlements, as mentioned below, and so has not been included in this table (or discussed in this section).

The Commission has focused its analysis on the governance arrangements that support the CEWH and the VEWH as both models seek to provide for independence to differing degrees. 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 extent 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 with respect to some of its functions (any directions must be published), section 33DS of the Water Act (Vic) explicitly disallows directions concerning particular uses or trades of water. The VEWH's independence is further increased by its constitution as a separate entity, with at least three (currently four) statutorily independent commissioners responsible for its decisions. Having multiple commissioners has an advantage over vesting independence in just one person 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 it from 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 water entitlements or allocations (ss. 105 and 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 (Cwlth) still permits the Minister or departmental secretary to direct the CEWH in relation to a critical part of its functions — 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 (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. As is the case for the VEWH, the CEWH is required to publish any directives (s. 114). The fact that the department’s annual report has so far disclosed that there have been no directions does not eliminate the possibility that directions could be given in the future.

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.³³ 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. While there is nothing to suggest that those who have filled the position of CEWH have ever acted inappropriately, combining the roles of policy making 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 is independent.

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.³⁴

³³ 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 (CEWO, pers. comm., 28 August 2017; DSEWPC 2012).

³⁴ 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 consultants (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 multiple 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 (Vic) (s. 33DF) specifies that any person appointed as a VEWH commissioner must have knowledge of, or experience in, one or more of environmental management, sustainable water management, economics, and public administration. The VEWH has also appointed an Aboriginal Commissioner to provide an understanding of Indigenous traditional ecological knowledge and values associated with environmental water.

While there is no requirement that the VEWH's commissioners must have different skills from each other, in practice this appears to be the case. 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.

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.

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 (no additional policy responsibilities). 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 (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 government department. This would be more consistent with the COAG (1994, p. 5) principle that 'as far as possible, the roles of water resource management, standard setting

and regulatory enforcement and service provision be separated institutionally'. Establishing a new body is not costless, but there are ways to reduce those costs by outsourcing corporate functions (such as personnel) to a department.

This body could be established as a corporate or non-corporate entity (the VEWH is a body corporate). A corporate entity may facilitate increased trade by the CEWH. Compared with the OEH and the VEWH, the CEWH has sold larger volumes of water allocations, but less frequently, and has only sold a small proportion of its allocations to date (with no purchases).³⁵ The CEWH's capacity for trade is an important consideration in reviewing its governance arrangements — trade can help maximise environmental and community benefits by putting environmental water to better use in different locations or at a later time, or by using sale proceeds to fund complementary waterway management activities.

Despite the benefits of a corporate model in facilitating greater trade by the CEWH, the Commission considers that a non-corporate model is preferable. The CEWH's activities are primarily non-commercial in focus, and Commonwealth bodies with a primarily non-commercial function are usually established as non-corporate entities (Department of Finance, pers. comm., 30 October 2017). There is precedent for the establishment of an independent, statutory, non-corporate Commonwealth agency with multiple accountable decision makers (the Organ and Tissue Authority, for example). Provided either its board members or chief executive have expertise relevant to trade, a non-corporate model should be sufficient for the CEWH.

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 new entity should also be responsible for managing the environmental contingency allowances provided for in some New South Wales water plans, as these represent significant volumes of water that require a decision for release.

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

³⁵ For example, the CEWH's largest sale of 22 864 ML in the Goulburn catchment was only about 2 per cent of the CEWH's total allocations in 2015-16 (DEE 2014, 2017a).

relatively small at under 100 GL.³⁶ 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.

RECOMMENDATION 5.3

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

The Australian and New South Wales Governments should review current governance arrangements to ensure that held environmental water and environmental contingency allowances 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 of environmental water requires streamlined planning and decision making, with no duplication. 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) — which involves 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, New South Wales, Victorian, South Australian and ACT Governments 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 'icon' sites along the river. In addition to acquiring the environmental water, the program built a suite of environmental works — water management structures such as regulators and levees — to help deliver the water more efficiently to these sites.

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

³⁶ South Australia held 77 GL (long-term average annual yield) in the MDB as of 30 June 2016 and in addition manages 16 GL of entitlements in the Adelaide and Mt Lofty Ranges NRM region (DEWNR (SA), pers. comm., 30 November 2017; MDBA 2017d).

to the States of issue, as agreed by the Murray-Darling Ministerial Council in 2015 (MDBA, pers. comm., 8 August 2017). While decisions are made by consensus, the MDBA is required to manage all TLM entitlements (Water Act (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 and in using environmental works to enhance watering outcomes. However, with the Basin Plan now seeking to benefit the entire system (including through the Sustainable Diversion Limit adjustment mechanism, which aims to build new environmental works at a range of locations), a separate program focused solely on six sites no longer makes sense. As Murray Irrigation (sub. 16, p. 9) pointed out, there are multiple agencies ‘managing 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 2014 review of the Water Act (Cwlth) 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 wound down. 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 environmental 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. The MDBA, New South Wales and Victoria have raised concerns about the financial and operational implications of the proposed change. The Commission’s view is that the relevant governments will need to resolve these issues (for both the entitlements and the environmental works) as part of the process to wind down TLM, and should do so transparently. It will also be important that the jurisdictions maintain their current commitment to coordinating watering actions through the Southern Connected Basin Environmental Watering Committee to achieve the outcomes of the Basin-wide environmental watering strategy.

RECOMMENDATION 5.4

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

Consistent with this principle, The Living Murray program should be wound down as there is no clear rationale for its continued existence in the context of the 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.

Some environmental water management should be devolved over time

The principle of subsidiarity holds that a central authority should only undertake activities that cannot be done as effectively at a more local level. Over time, the management of some held environmental water could be devolved to further streamline arrangements and better integrate the planning and management of water with other river, wetland and floodplain management activities. This would also give local people an opportunity for more involvement in delivering local environmental priorities (and active local engagement may facilitate adaptive management, as discussed below). Potential partners could include river operators, local waterway managers, non-government organisations or other suitable local groups, including Indigenous groups.

That said, in the MDB there is a clear need for a national entity such as the CEWH to manage environmental water to achieve whole-of-basin outcomes, particularly in the hydrologically connected — and historically contested — southern Basin. Most importantly, an entity at this level can make decisions to use, transfer and trade water that address the necessary trade-offs between competing catchment and jurisdictional priorities (the CEWH also benefits from economies of scale in implementing those decisions).

For these reasons, the Commission considers that the majority of the Commonwealth's environmental water holdings are appropriately managed at the national level. However, while the Australian Government should retain ownership of its asset, the CEWH should aim to devolve decisions on the management of some Commonwealth water to local or state bodies as environmental watering evolves over time.

The CEWH has already made progress in this area. First, it has developed a number of decision support tools that could facilitate the management of environmental water by local and state-based partners 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 that is needed to achieve environmental objectives in the Lachlan catchment (Campbell et al. 2016).

Second, between 2012 and 2016, the CEWH established three- to five-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). These agreements give local entities more opportunity for active involvement in planning and delivery, but fall short of devolved management as the CEWH still makes the decisions on the use of the Commonwealth holdings.

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's experience highlights that opportunities for devolved management should be considered on a case-by-case basis. The CEWH is ultimately responsible for ensuring that the Australian Government's assets are managed appropriately and devolution involves risks that must be carefully examined. 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). Managing such risks will require robust governance and management arrangements, with clear objectives and strong monitoring and reporting frameworks to facilitate accountability.

Despite the challenges, the CEWH should continue to move towards devolving the management of its environmental water where accountable partners are capable of achieving the outcomes sought. Initially, the CEWH should trial arrangements for devolved management in cases where an environmental asset has clearly specified needs and relatively routine water requirements, or where the CEWH holds water in unregulated catchments with limited scope for active management. In the longer-term, and subject to the availability of appropriate partners, the CEWH might enter into agreements for more complex management needs.

The Commission has focused here on the CEWH on the basis that state and territory environmental water managers have greater interaction with (and sometimes are) the on-ground managers. However, the objective to devolve management to the lowest practicable level is also relevant to State and Territory Governments to the extent that they have or acquire significant held environmental water portfolios.

RECOMMENDATION 5.5

Over time, the Australian Government should devolve the management of Commonwealth environmental water to the lowest practicable level in situations where:

- the environmental water could be effectively managed by an accountable local or state and territory partner
- the involvement of the Commonwealth Environmental Water Holder is not required to achieve whole-of-basin outcomes, including by managing trade-offs between catchments and jurisdictions.

Management should initially be devolved where an environmental asset has well-specified, relatively routine water requirements, but arrangements could evolve to encompass more complex management needs.

The New South Wales, Victorian and South Australian Governments should also devolve the management of held environmental water where equivalent conditions apply.

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 elements to ensure accountability and help 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.

Participants in 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 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’ (NWC 2014b, p. 52). 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 governments commonly promote monitoring, evaluation and reporting as being important for adaptive management, there is sometimes a gap between their rhetoric and implementation.

Guidance is available

In 2009, the Australian Government published a national monitoring, evaluation, reporting and improvement (MERI) framework for NRM programs (Australian Government 2009). This informed the development of a water-specific MERI framework by the CEWH in 2012 (CEWO 2013b), as well as the principles for monitoring and evaluation outlined in sections 13.03 and 13.04 of the Basin Plan. Together these frameworks establish some guiding principles for best practice MERI in the context of environmental water.

- Consistent approaches to MERI 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 water provision

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 water provision, but also at the intermediate and longer-term ecological responses, at both local and basin scales.

Ecological complexity makes monitoring environmental outcomes inherently difficult. For example, responses take time to become evident and it can be difficult to distinguish the contribution of environmental water from other factors. 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 environmental water provision than jurisdictions with water resources that are under stress. However, even in locations where the risk is relatively low, some monitoring of outcomes is needed to ensure planning arrangements remain sufficient to maintain the desired benefits over time.

In higher-risk areas — particularly those 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 water. 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 (including through the TLM monitoring program), 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) 2016b; 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 (2014c, 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. However, 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 approaches that enable the synthesis of outcomes across time and space.

A consistent and coordinated approach to monitoring and evaluation is particularly important for water resources that are shared across jurisdictions. 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 by all environmental water managers.

This strategy 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 be consistent with the national MERI framework and the guidance on monitoring and evaluation provided by the Basin Plan (including the principle expressed in section 13.04 that monitoring and evaluation should be informed, where practicable, by the best available scientific, local and cultural knowledge). It should also consider opportunities to monitor and evaluate other public benefit outcomes, where practicable.

Transparent reporting and independent auditing is critical for accountability and learning

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 *Reflections* booklet (2016b) on the outcomes of its activities in 2015-16 outlined the benefits of watering but generally lacked information about objectives that were not met or areas for improvement. The VEWH's annual report (2016a) was more forthcoming, noting that 40 per cent of priority watering actions were either not achieved or only partially achieved in 2015-16. That these statistics were reported at all is commendable, but it is not enough to report that things did not go as planned. The VEWH and other 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 explained the reasons (Watts et al. 2016). The report included a table outlining whether each 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 of progress is also needed. The NWI (paragraph 79(i)(d)) recognises the need for 'periodic independent audit ... of the achievement of environmental and other public benefit outcomes and the adequacy of the water provision and management arrangements in achieving those outcomes'. Yet reviews at the state and territory level are usually undertaken by the same government agencies responsible for implementation.

Some independent scrutiny is occurring. For example, the Commission is now responsible for reviewing the NWI and the Basin Plan. However, the functions transferred from the NWC to the Commission did not explicitly include the audit of environmental water management. The Commission's work is not a substitute for the in-depth consideration given

to environmental management arrangements through the NWC's biennial Australian Environmental Water Management reviews (in 2010, 2012 and 2014). And while the implementation of the Basin Plan has been subject to a range of reviews by different entities, these are limited to the MDB.

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 (at least triennially) of environmental water 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 environmental water provision 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. The Commission will consider these audit reports as part of its periodic inquiries into the NWI and Basin Plan.

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 to continuously improve management decisions. The need to adapt environmental management over time is missing from the NWI and it warrants greater focus in future reforms.

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. 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 water 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 water provision 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.

It will also become increasingly important for environmental water holders to understand the possible interactions between held environmental water, 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. Adaptive management can help in developing this body of knowledge.

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) 2017d; 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 would be 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 to capable staff, 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 water 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 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 to 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).

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 water provision — 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 approaches 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 water provision, both planned and held
- c. all managers of environmental water should publicly report on outcomes that are not achieved, in addition to those that are, and the reasons why
- d. to improve transparency, Australian, State and Territory Governments should establish arrangements for independent auditing (at least triennially) of environmental water outcomes and supporting management arrangements
- 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, responsibility for adaptive management should be clearly allocated and adequately resourced.

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 have resulted in significant benefits. However, many of these benefits were achieved through reforms instituted in the 1990s, while there has been less focus on urban water in recent years under the NWI. Given the challenges of population growth and the impact of climate change there is a need to ramp up reform in urban water management to ensure the demands of Australia's growing cities can be met efficiently and that water services remain affordable over the long term.
- Maintaining water security in major cities requires more robust and transparent centralised supply augmentation planning processes, and ensuring that policy barriers 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.
- Environmental regulations should protect urban waterway health as cost-effectively as possible and should not prevent innovative decentralised approaches such as integrated water cycle management. 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 of urban water service provision can be further improved through:
 - extending independent economic regulation to utilities of a sufficient scale where it is not presently in place
 - enhancing existing regulatory processes in Western Australia and south-east Queensland
 - improving the quality and consistency of economic regulation across Australia through the adoption of a set of national regulatory principles for the water sector.
- Providing water services in regional areas faces specific challenges due to the high cost of serving small and dispersed populations. In regional New South Wales and Queensland these challenges can be addressed 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, particularly among smaller providers
 - increasing the transparency of performance reporting.

Urban water services range from the provision of potable (drinking quality) water and wastewater services to stormwater management and water recycling. They are provided to households and businesses in settlements of all sizes, ranging from large metropolitan centres to small towns and remote communities. However, they do not include irrigation infrastructure services that deliver water for agriculture, which are discussed in chapter 7.

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. A key challenge for urban water management in the future is to provide efficient and affordable water services for rapidly growing cities and towns, while also contributing to their liveability in a potentially drier climate. There are further challenges in providing urban water services in regional and remote areas, such as the high cost of serving small and dispersed population centres, and the difficulty of attracting staff.

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

About 196 businesses and local governments deliver water and wastewater services to households and businesses in locations ranging from large metropolitan centres to small towns. In addition, there are a range of small private and local government owned licensees that provide localised and/or specialised water services, including in some remote communities. Further, most local governments throughout Australia, and some water and wastewater utilities³⁷, provide drainage services to manage stormwater and mitigate flooding. The Commission estimates that the urban water sector provided water and wastewater services valued at about \$16 billion in 2015-16 (based on BOM (2017i) and New South Wales Government (2017d)). As an essential service and input for most households and businesses, the quality and efficiency of urban water services directly affects the quality of people's lives and the broader efficiency of the economy.

Water and wastewater 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

³⁷ For example Melbourne Water, Sydney Water and the Water Corporation (WA).

heavily on capital equipment such as pipes, treatment plants and dams. The value of the sector's water and wastewater infrastructure was about \$160 billion in 2015-16 and it invests an average of about \$5 billion a year on new water and wastewater infrastructure (BITRE 2016).

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 per cent and 7 per cent% 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-integrated 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 a few 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 (table 6.2). 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.

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	3					
	Local government			2	63		1
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 licensees 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 seeks to transfer TasWater to State ownership. While legislation implementing this policy has been rejected by the Tasmanian Legislative Council, the Tasmanian Government will take the policy to the next State election. ^f 72 remote communities are served by a subsidiary of the Power and Water Corporation called Indigenous Essential Services.

Sources: BOM (2017i); Department of Primary Industries, Parks, Water and Environment (Tas), sub. 57; NSW Government (2017d); Parliament of Tasmania (2017a); qldwater (2017) and sub. DR105; Shine (2017).

While government-owned entities dominate the urban water sector, corporatisation has meant that these entities outsource a high proportion of their expenditure to the private sector. In 2009-10 major utilities typically outsourced over 90 per cent of their capital expenditure and over 50 per cent of their operating expenditure, and the level of contracting has generally increased since that time (Water Services Association of Australia, pers. comm., 1 December 2017). In addition, some facilities (such as the Sydney and Victorian desalination plants) are privately-owned and niche providers of wastewater treatment and water recycling services have begun to emerge.

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 household 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 of New South Wales, Melbourne and Sydney during the 1970s and 1980s (Salisbury, Head and Groom 2017). 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). The aim of corporatisation was to achieve a stronger focus on commercial performance in order to benefit water users and taxpayers. The reform agenda also incorporated improvement of health outcomes through provision of high quality drinking water achieved through the development of the Australian Drinking Water Guidelines.

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.
- 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 separation of service delivery from policy making and regulation through the corporatisation of water utilities, and the introduction of independent economic regulation in many major urban areas, has improved efficiency, increased the transparency of investment decisions and promoted more efficient pricing. The Commission has previously estimated that Australia's GDP was about 0.35 per cent higher over the 1990s due largely to institutional and pricing reforms in the urban water sector (PC 2005). If gains of this magnitude have been maintained through to today, this would represent an annual economic gain of over \$5 billion (in today's dollars). 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 kL per property (BOM 2015, 2017d).

Many of the benefits of reform came from the pricing and institutional reforms begun in the 1990s. While the NWI reinforced these reforms, it focused more on managing water

resources through planning and entitlements, trading and environmental water; its requirements for the urban water sector were comparatively minor.

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 sector³⁸, 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 (sections B.3 and B.6).

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 three areas.

- 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 6.5).
- Not all jurisdictions have achieved the pricing requirements of the NWI and improvements to pricing practices are required (section 6.6).
- Governments should provide for economically unviable services in small communities through Community Service Obligation (CSO) payments rather than grants for specific projects as currently occurs in some jurisdictions (section 6.7).

Further, the Commission is concerned about emerging evidence of backsliding against some earlier reforms. For example, the Tasmanian Government proposes to constrain the role of the independent economic regulator in that State. While legislation implementing this policy has been rejected by the Tasmanian Legislative Council (Parliament of Tasmania 2017a), the Tasmanian Government will take the policy to the next State election (Shine 2017). This change, if implemented, would make it more difficult to achieve cost-reflective pricing. Similarly, the South Australian Government has made an election commitment to incorporate SA Water within a government department covering both energy and water supply. This would risk politicising water investments and operations in South Australia.

³⁸ 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.

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 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 persistent 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 CSO payments 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	Independent 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 will take to the next election a policy 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. The South Australian Government's election commitment to decorporatise SA Water risks politicising investments in that state. Further, 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	Largely achieved	Drinking water quality generally meets existing guidelines. New South Wales, Victoria, South Australia and the ACT all achieve good water quality results, with New South Wales in particular having made significant progress in improving regional drinking water quality over several decades. Some issues remain in Queensland, Western Australia, Tasmania and the Northern Territory, particularly in remote areas, but these jurisdictions are all taking steps to address remaining concerns.
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.

Future 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. Some of these decisions were costly and highly contentious, and substantially increased costs to water customers. 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. The experience of this period can inform future policy and support cost-effective investment in the future.

There are significant challenges facing the urban water sector that have emerged or intensified over recent years. These include growing populations in major cities, declining populations in some regional and remote areas, and increasing pressures on water supplies from climate change. We need to ensure that this growing demand can be met efficiently and that water services remain affordable over the long term. More broadly, urban water customers are demanding more from the water services they receive, including improved urban amenity and liveability, requiring a more integrated approach to managing all elements of the water cycle than has been common in the past.

Where to next?

These challenges, unfinished business from the NWI, and the emerging risks of backsliding on past reforms highlight the need for further action on urban water reform. The need to ramp up urban water reform is strengthened by the importance of getting urban water management right to support productivity of Australia's cities, which in turn are key drivers of economic activity. For example, 80 per cent of Australia's GDP is produced in cities, while 80 per cent of Australia's population growth to 2050 is expected to occur in capital cities (PC 2017a, pp. 123–124). Further, given the size of the urban water sector, even small improvements in the efficiency of the sector will provide substantial gains.

The Commission has identified the key elements of a new urban water reform agenda:

- planning for growth in major cities (section 6.3) by:
 - improving major supply augmentation planning through clarifying roles and responsibilities, and following good planning principles
 - 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 and do not constrain innovative decentralised approaches such as integrated water cycle management (section 6.4)

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- improving the efficiency of utilities and pricing through national principles that enhance the quality and consistency of independent economic regulation (section 6.5)
 - enhanced performance monitoring for regional utilities to improve transparency and improve efficiency (section 6.5)
 - improving service provision in regional and remote areas through increased collaboration (section 6.7).

It is also important that unfinished business from the NWI outlined above is completed, and that governments avoid backsliding on past reforms.

6.3 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). The drying impacts and increased rainfall variability of climate change expected in many areas 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 (sub. 50, p. 4) presents data indicating that capital expenditure in the water sector between 2008-09 and 2012-13 'far exceeded the long-term average', largely reflecting significant investments in desalination plants to address drought conditions. Past Commission analysis indicates that decisions to invest in expensive desalination plants to supply Sydney, Adelaide, Perth³⁹ and Melbourne were potentially unnecessary or ill-timed (PC 2011). Given the plants in question cost over \$9 billion to construct (in today's dollars), alternatives to some of these investments could have reduced the cost of water services in some cities significantly.

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. Improvements in planning and decision-making processes are necessary to ensure that future investment decisions are prudent, cost-effective and supported by the community. They will also ensure that all options for expanding water supply are considered fully and transparently, including emerging decentralised options.

³⁹ The Commission's criticism of the Perth desalination investment was based on analysis that indicated that the Yarragadee aquifer was a lower-cost alternative, not on the basis that no investment was required.

Unless we make these improvements there is a risk of imposing excessive water bills on customers and missing opportunities to improve liveability when planning our urban environments.

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 centralised system to end users. It also involves considering opportunities to implement decentralised options for water supply and management such as onsite wastewater treatment and reuse, stormwater harvesting, and managing stormwater locally through water sensitive urban design (WSUD) measures such as rehabilitating wetlands and natural waterways and increased use of permeable surfaces. 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. Capturing the benefits of decentralised options may rely on close collaboration between entities across different parts of the water supply chain, and with relevant land-use planning bodies. This means that it is important that the potential benefits of decentralised options are considered early in the planning of major growth corridors and development locations, as discussed further below (recommendation 6.2). It is also important that decentralised options do not face barriers and distortions from the general policy framework (finding 6.2).

The emergence of decentralised options means that good planning involves more than just comparing the costs and benefits of various options to augment 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 6.1). City-scale planning should recognise the potential contribution of decentralised supply options to supporting water security, and take these into account when determining the size, timing and nature of new major augmentations through cost-benefit analysis. In some cases, decentralised options may make centralised augmentation unnecessary.

Box 6.1 Different but related planning processes

City-scale (or 'centralised system') water planning

Optimising the use of and investment in 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 integrated water cycle management 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
- 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* (COAG 2010a) 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.

Planning for growth in major cities requires reform in two main areas.

- Making centralised system planning more robust through adopting good principles, including recognising the linkages between centralised and decentralised supply options, and by making roles and responsibilities clear.

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- Ensuring that decentralised IWCM approaches are considered on an equal footing through establishing place-based IWCM plans.

These issues are discussed in turn below.

Strengthening centralised system planning processes

Principles for good centralised system planning

Principles for good planning at the city-scale are reinforced by the COAG National Urban Water Planning Principles (DAWR 2016b). Five important principles are listed below.

- 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 direct potable reuse (chapter 4 and box 6.2, 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 be transparent and consultative — good planning involves balancing consumers’ desire for water services of a given quality and reliability with the cost of providing them. These trade-offs should be informed by meaningful customer engagement. Further, transparent planning processes should support the identification of a broad range of options and subject them to necessary scrutiny.
- Planning should consider the interaction of centralised and decentralised supply options — this includes full consideration of the costs and benefits of both centralised and decentralised 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 centralised system planning. It also recognises the potentially large value of deferring a decision to undertake an irreversible supply augmentation until a drought breaks and it is not required. One way to achieve this is through pre-planning major investments so that the time between ‘triggering’ the investment and it delivering water is shorter, and the trigger can be delayed without threatening water security. Similar benefits can be achieved through demand management approaches, such as scarcity pricing and temporary water restrictions.
- 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.

Box 6.2 Policy bans on water supply options

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.
- 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 the 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 (DPR) under the *Public Health Regulation 2005* (Qld). While the social and political aspects of planned potable reuse — particularly 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 by Khan (sub. 7, pp. 5–6, quoting ATSE (2013)):

... 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.

While the cheapest water supply option is case-specific, 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 the National Urban Water Planning Principles provide a strong basis for centralised system 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.

Roles and responsibilities in centralised system planning

Clear roles for governments and utilities in centralised system planning are critical to ensuring that major supply augmentation 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)

Water Services Association of Australia (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 those of the National Water Commission (NWC), which found that '[w]ater utilities operate without clear mandates, often-opaque governance arrangements and unclear authority regarding their ability to make planning and investment decisions' (2014d, p. 28).

The relationship between governments and utilities is crucial

A range of planning approaches are evident in practice around Australia. Table 6.4 summarises the key planning documents published in various metropolitan regions.

As the elected representatives of a community, governments determine the policy framework within which planning decisions are made. This means they are ultimately accountable for ensuring that these frameworks are sufficiently robust to deliver on desired policy objectives, such as the desired level of reliability, and for ensuring that roles and responsibilities are clear. In turn this means that governments must determine whether or not to delegate various planning 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.

Table 6.4 Key supply augmentation planning documents

<i>Metropolitan region</i>	<i>Document(s)</i>	<i>Date</i>	<i>Author(s)</i>
Sydney	Metropolitan Water Plan	2017	NSW Government
Hunter region	Lower Hunter Water Plan	2014	NSW Government
Melbourne	Melbourne Water System Strategy	2017	Melbourne Water
	Various 'urban water strategies'	2017	City West Water; South East Water; Yarra Valley Water; Barwon Water; Western Water; South Gippsland Water; Westernport Water
	Central Region Sustainable Water Strategy	2006 ^a	Victorian Government
South-east Queensland	Water for Life: South East Queensland's Water Security Program	2015	Seqwater
Perth	Water Forever: Towards Climate Resilience	2009	Water Corporation
	Water Forever: Drought-Proofing Perth	2011	Water Corporation
Adelaide	Water for Good	2009	SA Government
Hobart	None published
Darwin	Darwin Regional Water Supply strategy	2013	Power and Water Corporation
Canberra	Water Security for the ACT and Region: Progress Report and Recommendations to ACT Government	2008	ACTEW (now Icon Water)

^a A review of this document was commenced in late 2016 but is not yet complete (DELWP (Vic) nd).
 .. Not applicable

Sources: ACTEW (2008); Barwon Water (2017); City West Water (2017); DSE (Vic) (2006); Melbourne Water (2017); NSW Government (2014, 2017a); Power and Water Corporation (2013); SA Government (2009); South East Water (2017); South Gippsland Water (2017); Water Corporation (2009, 2011); Western Water (2017); Westernport Water (2017); Yarra Valley Water (2017).

Where multiple entities are involved in bulk water supply it is more likely that government will need to coordinate the planning process and the contributions of these entities. An example of this 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 case for government coordination is strong due to the division of bulk water supply responsibilities between WaterNSW and the Sydney Desalination Plant, and the important role of Sydney Water as the primary purchaser of bulk water.

In cases where a single utility has responsibility for all the key elements of bulk water supply in a region, it will be more feasible for governments to delegate planning to this utility. An example of this case is in south-east Queensland where there is a single utility, Seqwater, with control of all the major bulk water assets within the region. Seqwater is required by

legislation to develop and regularly update a ‘water security program’, and runs this process independently of government. While the Queensland 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.

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.

Some planning processes should be clarified and made more transparent

While roles and responsibilities are clear in the case of New South Wales (discussed above), the transparency of this process can be improved. The 2017 *Metropolitan Water Plan* for the Greater Sydney region (New South Wales Government 2017a) should have disclosed more information on the basis on which planning decisions are made. This document sets out a series of technical judgements, such as that there is sufficient supply to meet demand for more than 10 years, but the basis on which these judgements are made is unclear. Further, the New South Wales 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. Release of supplementary reports detailing the underlying technical analysis would improve transparency.

South Australia’s supply augmentation processes lack clear roles and responsibilities, as well as transparency. 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. The South Australian Government (sub. DR143) outlined that SA Water develops ‘long term plans’ (which do not appear to be published), but does not explain how these relate to the South Australian Government’s demand and supply statements, nor to its forthcoming water security plan (DEWNR (SA), pers. comm., 2 August 2017). Further, while legislation requires statewide 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)); complying with this requirement would aid transparency. Similarly, while the South Australian Government reviewed its statewide water policy in 2014-15 (DEWNR (SA) 2015b) this review was not published.

In Western Australia, the Northern Territory and the ACT, planning occurs on an informal and occasional basis and, while 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, or that planning is occurring but is not transparent.

Tasmania’s key urban water service provider, TasWater, has not previously published comprehensive planning documents. However, the Tasmanian Government will take a

policy to the next State election that would require TasWater to publish a 10-year infrastructure investment plan (sub. DR132). If implemented, these plans would significantly increase the level of transparency in investment planning in that State.

RECOMMENDATION 6.1

State and Territory Governments should:

- a. ensure that roles and responsibilities for system and major supply augmentation planning are clearly allocated between governments and utilities, recognising that ultimate accountability rests with government
- 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 6.1 (b).

Supporting decentralised integrated water cycle management approaches

Traditional centralised system approaches to urban water have tended to focus separately on water supply, wastewater and stormwater services. However, better outcomes for water consumers may be achieved if the interrelationships between these different functions (and between the water sector and land-use planning) are properly considered. This is the essential idea behind IWCM. For example, a more integrated approach would see stormwater not just as a flood risk to be managed, but also as a potential source of water and contributor towards improving the amenity (or ‘liveability’) of cities and towns. Similarly, a more integrated approach would recognise that recycling wastewater for reuse locally can avoid costs for both the supply of potable water and for the transport of wastewater to centralised treatment plants. IWCM approaches offer a range of benefits; they can:

- provide new fit-for-purpose water sources to complement rainfall-dependent potable water supplies
- improve urban amenity (or liveability) through supporting the maintenance of green space, providing communities with wetlands and waterways and improving urban cooling
- improve the ecological health of urban waterways by reducing the level of, or pollution in, urban stormwater runoff, or the level of wastewater discharge
- augment natural flows to support waterway health, which may be particularly important as climate change is projected to contribute to reduced natural streamflow

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- mitigate flooding risk through reducing and managing stormwater runoff through WSUD measures.

The aim should be to take these benefits into account, while also recognising that particular approaches, such as recycling wastewater, have costs. This means not assuming at the outset that supplying water through decentralised approaches is either better or worse than using centralised approaches.

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, 2017b). 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)

Emerging challenges increase the imperative to get IWCM right. Population growth and the effects of climate change increase the importance of ensuring that all potential water supply options are on the table and considered in a timely manner. Further, growing city populations increase the value of properly maintaining green space. Increased population density also tends to reduce the extent of permeable surfaces in cities, and therefore the rate of stormwater runoff, potentially increasing flood risk.

Successful integrated water cycle management is hard

IWCM (and similar concepts such as WSUD) have been advocated for many years, but there seems to be general agreement that no jurisdiction has fully succeeded with its implementation. This reflects the fact that implementing IWCM is hard; some of the key difficulties are as follows.

- There are often many different organisations, each with their own priorities, that need to be involved. This includes water and wastewater service providers, stormwater managers (in some cases multiple stormwater managers) and land-use planning authorities. Achieving effective collaboration between these different organisations 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.
- There are different sets of beneficiaries of IWCM projects, which can make it hard to identify who should pay for them and which organisation is ultimately accountable for delivering them. For example, a stormwater reuse project could benefit: water users, by reducing the need to augment centralised supplies; stormwater managers, by reducing

the need to upgrade drainage infrastructure; and the broader community, by reducing nutrient runoff that would otherwise have had a detrimental effect on the ecological health of waterways or marine environments. In such circumstances, devising equitable and workable funding arrangements can be difficult (noting that there will be some instances where a single beneficiary will be willing to pay for an entire project because the benefits they would receive exceed the costs).

- Compounding the point above, some of the benefits are hard to quantify, making it difficult to establish whether the benefits of particular IWCM projects outweigh the costs. For example, it can be challenging to quantify improved urban amenity or ecological outcomes.

Institutional changes may assist, but collaboration is key

One possible response to the difficulties created by there being many organisations involved in IWCM is to reduce the number. Some participants have argued in favour of institutional change, suggesting that there is scope for water service provision to be more integrated with stormwater management, and with land-use planning:

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)

Roles of master water planning in cities are very muddled, too many players leading to an absence of real implementation of IWCM approach. Integration is required both across the water cycle and across sectors (e.g. with local councils and planning sectors). (Australian Water Association, sub. 66, p. 23)

While there may be some advantages to giving water service providers greater responsibilities in relation to stormwater management, significantly changing arrangements might also have disadvantages. In particular, it is likely to be necessary for local governments to remain closely involved in stormwater management, given their involvement in planning and zoning, and their role as providers of local infrastructure. Further, in regional New South Wales and Queensland, local governments are already responsible for stormwater, potable water and wastewater, potentially supporting integration of these functions (although in practice different local governments adopt different degrees of integration). Similarly, in Melbourne, Sydney and Perth, water service providers already share responsibility for stormwater management with local governments. Given the potential complexity of institutional changes, and the fact that arrangements vary greatly across Australia, changes to stormwater management to facilitate IWCM would need to be considered on a case-by-case basis.

Changes to roles and responsibilities for land-use planning would involve particularly significant risks. 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).

These issues suggest that changing institutional arrangements is unlikely to be the answer to unlocking the potential of IWCM approaches. Clear roles and responsibilities for, and collaboration between, relevant entities is likely to be a more important factor in facilitating change. Participants to this inquiry recognise this. For example, the Australian Water Association (AWA) stated that ‘... collaboration and planning processes [are] likely to be the key rather than institutional changes’ (sub. 66, p. 23). WSAA also argued:

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. (2014, p. 9)

The Commission’s research indicates collaboration has improved in some respects. For example, to varying degrees land-use planning processes now 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 Victorian Government has implemented a policy to establish integrated water management forums that promote collaboration between relevant entities, including local governments and water corporations (DELWP (Vic) 2017a).

However, further progress is needed, particularly in collaboration between the water sector and land-use planning authorities. This view was supported by Sydney Water:

... 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. (sub. 36, p. 4)

FINDING 6.1

In some cases integrated water cycle management 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.

The role of governments

In the Commission’s view, governments should promote collaboration by ensuring that place-based IWCM plans are developed for major growth corridors and significant infill development locations (recommendation 6.2). This process would be broadly similar to the integrated water management forums recently established by the Victorian Government and would enable governments to play a constructive leadership role that would enable

decentralised IWCM approaches to be properly considered. 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 Monash Water Sensitive Cities, who 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 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. (sub. 74, p. 3)

The best way to develop 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, while in other cases it may be easier for local governments to lead and consult with utilities.

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 and can be extremely costly. In more developed areas project-specific approaches are likely to be more appropriate than large-scale IWCM plans.

By publicly canvassing IWCM opportunities, these plans can also support the involvement of emerging private service providers. The process by which these plans are developed will give those service providers an opportunity to propose innovative servicing options, or to propose that they deliver or operate options identified on behalf of other entities (such as incumbent monopolies). This can promote efficiency through increased innovation and competition.

Some inquiry participants advocated that governments intervene in other ways, such as by providing funding for IWCM projects or mandating particular IWCM approaches. While these options may have some legitimate role, they also carry significant risks.

A number of inquiry participants were in favour of government funding for IWCM projects, including the City of Newcastle:

... 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)

In the Commission's view, governments should generally not play the major role in funding IWCM projects, or step in to fill funding gaps without proper justification. To do so can be problematic for both efficiency and equity reasons. While some government funding may be justified where there are material environmental or amenity benefits that accrue to a community, it is essential to undertake robust cost-benefit analysis to ensure that any government funding is justified.

In terms of equity, government subsidies should not be provided for projects where the beneficiary is a private entity. The Commission is aware of a range of IWCM projects that received government funding despite the fact that the benefits accrued primarily to a private entity. For example, the New South Wales Government's (now closed) Climate Change Fund subsidised a range of private entities, such as golf clubs and manufacturers, to undertake alternative water supply projects that would benefit those entities through reduced potable water costs (box 6.3). Subsidies of this kind represent an inequitable transfer from government to private interests, and create a risk that funding will be motivated by political objectives rather than genuine community-wide benefits.

Box 6.3 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 also 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 bill 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).

Another approach advocated by some inquiry participants was that governments mandate the uptake of particular types of IWCM projects. For example, Flow suggested 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).

Mandating the uptake of IWCM approaches, such as recycled water or stormwater harvesting, is a blunt, risky and potentially costly policy option. Only a subset of projects are likely to deliver a net benefit from a community-wide perspective and a mandate would promote projects that are not cost-effective as well as ones that are.

Some other barriers should also be addressed

In addition to introducing place-based IWCM plans, it is important that governments ensure that material barriers to the adoption of IWCM approaches are removed from the general policy framework. Several potential barriers were raised by participants, as discussed below.

Making developer charges more cost reflective

Developer charges play an important role in shaping the overall planning approach to new developments (particularly in major greenfields development corridors). 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.

The way in which developer charges are levied can affect the choice between centralised and decentralised approaches, and therefore the uptake of IWCM approaches. For example onsite water recycling will reduce both the need to transport potable water to that site, and the need to transport wastewater to a centralised treatment plant. If developers are not rewarded for these avoided costs through appropriately reduced developer charges, their incentive to invest in onsite options may be reduced.

There is some evidence that policy settings can move developer charges away from cost-reflective levels. For example, the New South Wales Government has 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 both the incentive for developers to invest in decentralised IWCM approaches and the broader efficiency of servicing new areas. Sydney Water expressed some concern about the effects of this policy:

... Sydney Water’s entire customer base pays for growth related infrastructure, so a home-owner pays only a portion of their property’s servicing costs, through their water bills. This does not send a price signal to the market on the differential costs of servicing new growth areas. (sub. DR86, p. 15)

Setting developer charges at cost-reflective levels requires detailed technical assessments of future demands on, and costs of, infrastructure and so it is difficult to assess whether current policies in different jurisdictions distribute these costs equitably and efficiently. Further,

while some jurisdictions, such as New South Wales⁴⁰, provide quite detailed guidance for how developer charges should be set, many do not.

Given the importance of developer charges in determining whether IWCM approaches are considered on an equal footing alongside centralised approaches, State and Territory Governments should review how they can be set in a cost-reflective way (recommendation 6.2).

Such a review should also examine the broader role developer charges play in shaping new development. The effect of developer charges is significant; they affect equity by determining who pays for growth infrastructure, and efficiency by changing the relative cost of developing different areas (box 6.4).

Box 6.4 Developer charges and the growth of cities

Developer charges determine who pays for infrastructure in growing cities, and shapes where this growth occurs. In terms of who pays for growth, high levels of developer charges mean that residents of new development areas primarily pay for growth. Conversely, lower developer charges mean that these costs are spread broadly across all water and wastewater customers by increasing tariffs. Low developer charges could also affect the financial position of utilities; in this case costs would be recovered from customers over an extended timeframe, requiring the utility to finance the upfront cost of new infrastructure.

Developer charges also shape where growth occurs as they affect the relative cost of developing different areas. If developer charges are set to closely reflect the cost of serving a particular area, it will encourage developers to develop areas that can be serviced at a lower cost. Conversely, if developer charges are set less precisely, developers will not face the full cost of developing higher cost areas, increasing the likelihood that these areas will be developed when it is not cost-effective to do so. Less precise developer charges can also affect infrastructure choices, such as between local and centralised wastewater treatment.

Ensuring that economic regulation is sufficiently flexible

WSAA argued 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 the 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

⁴⁰ These assessments do not apply in the Sydney Water and Hunter Water services areas, where State Government policy sets developer charges to zero.

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. (2016c, p. 34)

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. (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 benefit all customers of a water service provider by lowering the cost of water services it is entirely appropriate for such costs to be recovered by the utility.

Addressing other policy and regulatory barriers

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 6.4, 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.

FINDING 6.2

Governments should ensure that any significant barriers to the adoption of integrated water cycle management approaches are removed from the general policy framework.

RECOMMENDATION 6.2

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 urban 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 6.2 (a) to 6.2 (d).

6.4 Making environmental regulations 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 (particularly environmental) regulations could be improved to allow innovation in the sector and lower the costs of achieving the desired outcomes.⁴¹ This could be done by making regulations more focused on the desired outcomes (such as environmental improvement), and providing flexibility to the regulated party to achieve

⁴¹ WSAA (sub. 35); Sydney Water (sub. 36 and sub. DR86); qldwater (sub. 41 and sub. DR105); VicWater (sub. 47); AWA (sub. 66); Local Government Association of Queensland (sub. 71).

those outcomes at the lowest cost. For example, WSAA argued that a more ‘outcomes-based approach’ would be ‘more cost effective and beneficial to the environment’ (sub. 35, p. 18).

Growth is an important motivator for outcomes focused regulations — growing populations increase pressure on urban waterways, and managing these effects could require significant expenditure. In turn, addressing these potentially large effects in a more flexible and efficient way could have particularly large benefits compared to less flexible approaches. In particular, more flexible regulations will allow innovative decentralised approaches such as IWCM (section 6.3) to improve environmental outcomes, rather than relying solely on traditional centralised approaches.

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 Territories applied various pollution controls on discharges from point source pollution, including wastewater treatment plants 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). Poorly managed urban stormwater is also an important diffuse source of pollution that can affect waterway health (WSAA, sub. DR136).

However, in many cases, environmental regulators still primarily regulate identifiable point sources of pollution rather than diffuse pollution. This is understandable — 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 origins of diffuse source pollution may be beyond their mandate.⁴²

However, maintaining focus only on point source pollution does not constitute an outcomes-focused approach to environmental regulation, and is not sufficiently flexible to allow innovation and ensure that the costs of achieving environmental outcomes are minimised.

⁴² 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).

Could regulations be improved?

Participants have raised specific concerns with inflexible approaches to establishing and enforcing effluent discharge standards for wastewater treatment plants (VicWater, sub. 47; Local Government Association of Queensland, sub. 71), standards for sewer overflows (IPA, sub. 19, attachment 1) and to providing environmental flows with treated wastewater (Flow, sub. 44; Sydney Water, sub. DR86).

Wastewater discharge standards

Current wastewater discharge regulations in many jurisdictions are based on enforcing prescribed standards, rather than meeting environmental outcomes in waterways. 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). In New South Wales, a load-based licensing system requires wastewater treatment plants to pay licence fees based on the quantity of pollutants discharged to the waterway (EPA (NSW) 2014).

Under these types of approaches, achieving desired water quality outcomes can require investment in increasingly expensive treatment processes. As pointed out by the Local Government Association of Queensland (LGAQ) (sub. 71), treatment costs can increase quite rapidly when moving from basic treatment to more advanced forms. There is potential to reduce costs through approaches that consider alternative options for achieving water quality outcomes. This could involve, for example, cost-effective interventions to reduce diffuse source pollution instead of expensive upgrades to water treatment plants.

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 reusing wastewater (or evaporating it from ponds) is better for the environment than returning it 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 licencing wastewater treatment plants. 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; Sydney Water, sub. DR86). With climate change projected to contribute to reduced streamflow in southern Australia (chapter 2), alternative water sources may become more valuable in augmenting natural flows to support waterway health. 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 governments being more accommodating 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 is occurring under stage one 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. The two main approaches are:

- containing rainfall events of a certain size (for example, Victoria’s standard focuses on a one-in-five-year rainfall event (EPA (Vic) 1995))
- requiring 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). As with wastewater discharge standards, there are likely to be more cost-effective ways to achieve equivalent water quality outcomes by addressing diffuse source pollution rather than by significant expenditure on upgrading sewers to meet prescriptive standards.

Innovative environmental regulation is needed to manage growth affordably

The above suggests that some regulatory regimes for wastewater discharge standards and sewer overflows are not sufficiently outcomes-focused and may not meet the standards of good regulatory practice. The emphasis on minimising discharge to waterways from wastewater treatment plants similarly imposes unnecessary costs and precludes possible in-stream benefits from treated wastewater, such as for environmental flows.

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).

Where utilities need to invest in infrastructure to meet tighter standards, inflexible regulations bring a significant risk of precluding innovative projects that may achieve the desired outcome at lower cost. This risk is exacerbated by growing urban populations (increasing the demand for wastewater treatment and sewerage services) and the drying impacts of climate change (increasing the potential value of treated wastewater for environmental or other uses).

FINDING 6.3

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

Some progress is already being made by utilities and regulators

A number of water service providers have developed alternative projects that meet the underlying water quality objectives of environmental regulation, but 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 an outcomes-focused approach allows utilities to achieve (or exceed) pollution reduction objectives at a lower total cost than complying with increasingly stringent effluent discharge standards, while sometimes producing further benefits such as improved amenity (section 6.3).

These alternative approaches generally involve offsetting the environmental impact of effluent discharge by financing lower-cost activities to reduce diffuse pollution, with approval from the environmental regulator. 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.

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 runoff 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 pers. comm., 9 August 2017 and (2016); Melbourne Water, pers. comm., 18 May 2017.

The way forward for governments

While industry-led projects (box 6.5) can offer substantial benefits, they also create risks for utilities. As highlighted by Sydney Water:

There is a risk, however, that ... due to the newness of the approach [outcomes-focused regulation], inherent regulatory conservatism, limited scientific understanding of complex river processes, and the environmental regulator's legislated ability to regulate based on the

‘precautionary principle’, the requirements for new approaches will be set too high for the innovation to be viable. (sub. DR86, p. 13)

In pursuing alternative approaches to addressing pollution, utilities 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 — this means that, in theory, utilities risk being found to be non-compliant with existing prescriptive regulations, although in practice regulators have generally accommodated these approaches. 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 governments could more explicitly support these approaches by implementing more outcomes-focused regulations.

Such regulation is already emerging in some areas, leading to the initiation of pilot projects. The Queensland Government has a draft offset policy that creates a voluntary framework for point source polluters to undertake certain prescribed nutrient reduction activities to offset waterway discharge pollution and improve water quality (DEHP (Qld) 2017b). This has facilitated a pilot project at the Beaudesert wastewater treatment plant, 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). Similarly, the New South Wales Environmental Protection Authority is currently developing a Hawkesbury-Nepean Nutrient Regulatory Framework, which includes an offsets framework that should allow Sydney Water to undertake projects that flexibly target river health outcomes (Sydney Water, sub. DR86).

While these are positive steps, there is likely to be scope to do more. Governments should proactively assess whether existing environmental regulations permit alternative approaches, and where they do not, explore the possibility of applying more outcomes-focused regulations 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 innovative 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).

RECOMMENDATION 6.3

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.

6.5 Improving the efficiency and pricing of utilities

The urban water sector is dominated by government-owned monopoly service providers (section 6.1). This means that governments must simultaneously fulfil a range of roles in the sector; they are the shareholders of major service delivery entities and so are interested in their efficiency and financial returns, but they also regulate these entities in a range of ways, including through oversight of prices, the access to infrastructure they provide to potential competitors, 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 sector. Governments may pursue policy objectives through intervening in the operations of utilities, blurring the distinction between service provision and policy-making. One particularly important area of potential tension is in planning major supply augmentations. Governments may prescribe directions that will impose higher costs on customers by ruling out lower cost alternatives. Clarity in the respective roles and responsibilities of governments and utilities in planning and decision making can assist in resolving some of this tension (recommendation 6.1).

Another issue is that governments may politicise water pricing. This could be overpricing to extract dividends from utilities to improve budgetary outcomes or, alternatively, underpricing to improve affordability for customers.

Despite reform efforts some deficiencies remain

Reform efforts over several decades have sought to resolve the tensions created by multiple government roles by clearly separating policy-making from service delivery and the policy interests of governments from their financial interests. This has usually been through establishing distinct portfolio (ministerial) responsibilities and arms-length monitoring of pricing and performance. This was a key focus of the 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, further effort is required 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. (2014b, 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. (2014b, p. 7)

One particular example of interference in price-setting mentioned by the NWC (2014b) 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 policy to greatly restrict the role of the economic regulator in that State and limit the rate of price increases to address concerns about affordability. Further, this proposal would remove the requirement to pay 'tax equivalents' to the Tasmanian Government in lieu of company income tax, further entrenching underpricing. The Tasmanian Government (sub. DR132) argues that these changes are consistent with the NWI as the economic regulator retains a review and advisory role. However, the Commission considers that, as the policy applies firm (albeit temporary) caps to TasWater's prices, it effectively ceases independent price regulation in that State for the period the price caps apply and is a clear case of political interference in price-setting.

There is also evidence that governments have intervened in specific investment decisions, when these should ordinarily be determined 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 6.6).

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 suggest

that there is further scope to separate service provision and policy-making and embed the reforms begun in the 1990s.

Box 6.6 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 ML of water per day (or about 90 GL 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 GL 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. While the Victorian Government has noted that this provision no longer applies, in practice the 2012 provision meant that the desalination plant investment was not subjected to regulatory scrutiny at the time the associated costs first affected consumer bills.

Sources: Aquasure (nd); ESC (2016b); IPART (2008); SDP (nd); Victorian Government (2012) and sub. DR137.

Urban water institutional and regulatory frameworks

Good institutional arrangements and regulatory frameworks can minimise tensions between service provision and policy-making and so support efficient outcomes. The following three areas are particularly important.

- 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.
- 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 WSAA (2015). IPART also considered 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

Corporatising government businesses through the separation of service delivery from policy-making has given service providers a clear commercial focus. 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 6.5.

The South Australian Government has made an election commitment to incorporate SA Water within a government department covering both energy and water supply (Weatherill 2017a). This proposal, if implemented, would represent significant backsliding from the core urban water reforms of the 1990s and present a substantial risk to the transparent and efficient delivery of SA Water's services.

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 that demonstrate that operational expenditure is efficient and investments maximise net benefits. 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 keep prices low for consumers.

Table 6.5 Elements of good governance of state-owned corporations

	<i>Productivity 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 *Independent Pricing and Regulatory Tribunal Act 1992* (NSW) 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.

There is potential to increase efficiency by reforming arrangements for economic regulation in some jurisdictions, as 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. It also supports the consideration of all potential options to deliver services, including IWCM, by allowing emerging private providers to propose innovative service options (section 6.3). 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. A number have sought clarification on the role of competition in the sector (IPART, sub. 18; WSAA, sub. 35; 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 has legislated the *Water Industry Competition Act 2006* (NSW) (WICA), which has underpinned licencing, access and wholesale pricing arrangements to support competitive entry in a range of areas, such as greenfields service provision and sewer mining. It also allows for wholesale competition through access to pipeline infrastructure at regulated prices, although this 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 these licensees supplied over 3000 customers with water and sewerage services, and supplied 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 jurisdiction, 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.

Improving 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, Tasmania⁴³ 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 6.6).

Table 6.6 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 (67)	

^a The Tasmanian Government has made an election commitment to transfer TasWater to State ownership. ^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 (2017a); ESC (2017); ESCOSA (2016); ICRC (2013); IPART (nd); OTTER (2015); QCA (2015, 2017a); Utilities Commission (NT) (2017).

⁴³ The Tasmanian Government will take to the next election a policy that would greatly constrain the role of the independent economic regulator in that State.

Expanding coverage and increasing the independence of regulation

While there would be benefits in subjecting all water businesses to economic regulation, regulatory costs are likely to exceed the benefits for many smaller providers. Reflecting this, the Commission considers that independent economic regulation should be applied to all urban water service providers of a sufficient scale. As such, independent oversight should be extended to unregulated retailer-distributors in south-east Queensland and the Northern Territory's Power and Water Corporation. Most small urban water service providers, such as those in regional New South Wales and Queensland, should remain unregulated due to their relatively small scale but, as discussed later, they should be subject to improved performance reporting processes.

Through the course of this inquiry, a number of participants (IPA, sub. DR127; WSAA, sub. DR136; IPART, sub. 18; the Business Council of Australia, sub. 65; AWA, sub. 66) have argued in favour of expanding the coverage of independent economic regulation, including expressing support for the Commission's draft recommendation on this issue. On the other hand, Unitywater (sub. DR104, p. 1), a south-east Queensland retailer-distributor, disagreed with the need to apply independent economic regulation to its business in response to the Commission's draft recommendation to do so:

Unitywater's view is that economic regulation is not necessarily the only mechanism to hold water utilities to account as SEQ's [south-east Queensland's] current ownership model for water utilities has been effective in ensuring the retailer-distributors manage price.

In a similar vein, qldwater (sub. DR105) argued that the cost of past economic regulation regimes in south-east Queensland were not proportionate to the risks being addressed.

The Commission emphasises that economic regulation is not solely about constraining prices to avoid excessive pricing. It is also about improving the long-run efficiency of regulated businesses through enhanced scrutiny of operational and investment decisions. While noting the views of Queensland participants, the Commission considers that the advantages of economic regulation justify its introduction in south-east Queensland. A similar case for change applies in the Northern Territory. The Commission notes that the previous regulatory model applying to south-east Queensland retailer-distributors was limited to only monitoring prices, and did not involve a detailed review of investment and operating decisions to determine their efficient costs as proposed by the Commission (recommendation 6.4).

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 independent. 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.

Improving the quality and consistency of regulation

While expanding the coverage of economic regulation would mean that all metropolitan and jurisdiction-wide providers would be subject to independent scrutiny, it is also important to improve the quality of regulatory processes. 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 and sub. DR136; AWA, sub. 66; Living Utilities, sub. 68). The Australian Government's Competition Policy Review emphasises the importance of good regulatory processes to facilitate competition, stating 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' (Harper et al. 2015, p. 53).

Supporting frameworks are also important to facilitate competition. IPART (sub. 18, p. 3), 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'.

Recognising the importance of improving the quality and consistency of regulation, the Commission proposes that the following principles be adopted nationally to govern independent economic regulation in each jurisdiction.

- *Decisions should be guided by the objective of promoting the long-term interests of consumers.* This will help utilities and regulators make trade-offs between potentially conflicting objectives, by maintaining a focus on ensuring consumers receive services of the desired quality at the lowest sustainable cost, while encouraging innovation by utilities if consumers ultimately benefit.
- *Regulatory decisions should include transparent customer engagement.* This will allow utilities to tailor their services to what customers value. For example, this will help utilities assess whether customers are willing to pay more for improved services.
- *Prices should reflect the full efficient cost of service provision.* While prices can be temporarily kept below the full cost of service provision, this will tend to impose higher costs on society in the future through inflating demand for water, imposing fiscal costs on governments or constraining the ability of utilities to invest sustainably to maintain and replace their assets.
- *Utilities should have incentives to innovate and improve their efficiency.* Regulation should not provide perverse incentives for increasing costs and should reward utilities for reducing their costs.
- *Regulatory decisions should consider the long-term financial viability of utilities.* While regulatory decisions typically constrain prices, they should not do so in a way that compromises the financial viability of utilities, as this could distort investment and operational decisions and increase long-run costs. Financial viability should be assessed so that borrowing and dividend decisions made by shareholders are scrutinised as part of the regulatory process.

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- *Regulatory frameworks should be adaptable and flexible.* In particular, the economic regulator should incorporate feedback into its approach.
 - *Regulatory processes should be transparent to allow scrutiny.* In particular, the economic regulator should detail the rationale underlying any regulatory decisions.
 - *Regulatory processes should facilitate effective competition in potentially contestable parts of the industry.* They should not affect whether services are delivered by incumbent monopoly utilities or alternative providers. They can do this by making the costs of sub-components of the water supply chain transparent, allowing providers to compete on a level playing field to supply different components.

While some stakeholders (WSAA, sub. 35; Sydney Water, sub. 36) have argued for merits review of regulatory decisions as a core element of regulatory regimes, the Commission considers that jurisdictions should have flexibility to consider whether or not this is required in their specific circumstances. In the urban water sector, where utilities are almost entirely government-owned, merits review processes that address a utility's regulated rate of return will primarily cause distributional changes between two largely overlapping groups of society — taxpayers and water consumers — and so will impose additional regulatory cost for little economic benefit. More generally, it is not clear how merits review processes will improve the efficiency of service providers for the long-term benefit of consumers (consistent with the objective of regulation). However, the Commission recognises that jurisdictions may consider that merits review is required in their specific circumstance, particularly if they seek greater private participation in the urban water sector.

While national regulatory principles may help to ensure that all regulatory processes incorporate a range of important elements, it is also appropriate that jurisdictions retain flexibility to tailor their regulatory regime to their particular needs. The approach and form of regulation should be determined by the independent regulator in consultation with stakeholders, provided it complies with all relevant national principles. This approach balances the need for innovation to occur, as has occurred through the Essential Services Commission's new 'PREMO' regulatory approach, and for consistent compliance with core regulatory standards. For example, jurisdictions should have flexibility to choose between regulatory approaches ranging from 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. The Commission considers that, for larger providers such as those in Western Australia, south-east Queensland and the Northern Territory, either price recommendations or price (or revenue) determinations may be appropriate. The key requirements are that the processes are independent and transparent.

RECOMMENDATION 6.4

State and Territory Governments should ensure that independent economic regulation is in place for all urban water service providers of a sufficient 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
- c. establishing common national principles to raise the standard of economic regulation across all jurisdictions. These should include that:
 - ... the objective of regulation is to promote the long-term interests of customers
 - ... regulatory decisions should include transparent customer engagement
 - ... prices should reflect the full efficient cost of service provision
 - ... utilities should have incentives to innovate and improve their efficiency
 - ... regulatory decisions should consider the long-term viability of utilities
 - ... regulatory frameworks should be adaptable and flexible, and allow the economic regulator to incorporate feedback into its approach
 - ... the economic regulator should be transparent and detail the rationale underlying any regulatory decisions
 - ... regulatory decisions should facilitate effective competition in potentially contestable parts of the industry.

Australian, State and Territory Governments should revise relevant provisions in the National Water Initiative to align with recommendation 6.4 (c).

Increasing transparency and scrutiny of regional service provision

As discussed above, independent economic regulation should be extended to all water businesses of a sufficient scale, but for some smaller providers the costs associated with formal price regulation will outweigh the benefits. This is likely to be the case for regional providers in New South Wales and Queensland, which tend to be of a smaller size than metropolitan providers (table 6.7). However, even in the absence of independent economic regulation, transparency and scrutiny of the performance of these providers can be increased by improving existing performance reporting processes. This can occur in two main ways:

- increasing the scope and consistency of publicly reported information to promote 'competition by comparison'
- using independent bodies to analyse reported information so as to provide greater scrutiny of 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 (2017d) reports on a comprehensive range of performance metrics across providers of all sizes, reporting in Queensland is not consistent or comprehensive. In particular:

- larger providers (with more than 10 000 connections) report on financial performance metrics, particularly the economic real rate of return (ERRR) metric, through the Bureau of Meteorology’s National Performance Report (BOM 2017d), but smaller providers do not
- providers report for a Queensland Government benchmarking exercise (DEWS (Qld) 2017), but while many of the metrics provided to the Government in this process are the same as those used in the National Performance Report, only a small number of them are published
- 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 published 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 in relation to smaller providers. Given that providers of all sizes in Queensland already report a great number of performance metrics, including financial metrics, comprehensive publication of these results to allow competition by comparison will not impose additional administrative costs on the providers themselves.

The existence of persistent underpricing in regional New South Wales (section 6.6) demonstrates the importance of independent and rigorous scrutiny of financial performance. In particular, while the New South Wales Government reports a range of metrics, these data have 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 they can deliver this outcome. The scrutiny achieved by robust reporting frameworks will highlight cases where users are not fully funding their water services and, in these cases, the associated cost this imposes on taxpayers. 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 improving financial reporting frameworks is likely to be justified by its benefits in promoting improved compliance with the *NWI Pricing Principles*.

Scrutiny of financial performance can be further improved by refining the approach used in the National Performance Report and state-based reporting processes. This is particularly important for providers in regional New South Wales and Queensland, who are not subject

to formal economic regulation and therefore for whom performance reporting provides the primary public source of financial data. However, the Commission's analysis in appendix B (section B.3) shows that the effect of developer charges and contributed assets⁴⁴ can distort the ERRR metric used in the National Performance Report and state-based reporting, and obscure cases of underpricing. Publication of a second metric that excludes developer charges and contributed assets would more effectively highlight cases where pricing is not consistent with the NWI.

RECOMMENDATION 6.5

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

Priorities are that:

- a. the Queensland Government extend the public reporting of financial information to service providers with fewer than 10 000 connections
- b. the New South Wales and Queensland Governments require 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. State and Territory Governments, through the National Performance Report and state-based reporting processes, require providers to report a financial return metric that excludes developer charges and contributed assets alongside the economic real rate of return metric.

6.6 Pricing practices can be improved

Aside from requiring governments to use independent bodies to regulate water prices, where appropriate, the NWI also sets out requirements for the level of prices that urban water service providers can charge. Specifically, the NWI requires:

- continued movement towards upper bound pricing⁴⁵ for metropolitan providers by 2008

⁴⁴ 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').

⁴⁵ 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 pricing⁴⁶ by regional providers and continued movement towards upper bound pricing where practicable
 - the use of transparent CSO payments to fund regional services in cases where full cost recovery is unlikely to be achievable.

The *NWI Pricing Principles* clarify how parties are to achieve cost-reflective pricing by providing guidance on appropriate tariff structures and processes for recovering the cost of capital expenditure.

The NWI requirements ensure that prices reflect the long-run cost of service delivery, including both capital and operating expenditure. This is important for two reasons. First, prices that are at upper bound levels (that is, they are broadly cost reflective) send a useful signal to water consumers about how much water they should consume. Second, if prices are below lower bound levels, service providers may be forced to cut back on investment and maintenance due to a lack of revenue, reducing service quality over time; or they may become reliant on government subsidies, wasting taxpayer money and potentially distorting how services are provided.

While the NWC (2014b) found that most jurisdictions have made progress in achieving full cost recovery, it stopped short of finding that all jurisdictions have achieved this. Indeed, the NWC highlighted potential problems with pricing processes in Victoria, Western Australia and the ACT.

The Commission's analysis of pricing outcomes over the period from 1 July 2013 to 30 June 2017 also found some evidence of both underpricing and overpricing in the urban water sector (appendix B, section B.3). Large metropolitan and jurisdiction-wide providers are generally pricing at levels consistent with the requirements of the NWI, however there is some evidence of pricing below upper bound levels in Tasmania by the statewide provider, TasWater. While pricing policies applying to TasWater explicitly allow for underpricing at present, and for prices to increase towards more cost-reflective levels over time, this appears to be happening very slowly. Additionally, the Tasmanian Government will take to the next election a policy that could further slow the rate at which prices increase towards cost-reflective levels.

There is also some evidence of pricing below lower bound levels in regional New South Wales, and the New South Wales Government's provision of significant capital grants to regional service providers (section 6.7) also suggests that this is occurring. There are some instances of possible underpricing in regional Victoria, but these do not suggest material pricing problems. 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 6.5). As in New South Wales, the Queensland Government provides capital grants

⁴⁶ 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.

to many regional service providers (section 6.7), suggesting that pricing may be below lower bound levels in that State.

FINDING 6.4

The pricing practices of metropolitan and jurisdiction-wide providers are generally consistent with the requirements of the National Water Initiative. However, there is some evidence of underpricing in Tasmania.

Some providers in regional New South Wales are persistently 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.

Underpricing appears to persist in regional New South Wales in part due to an inadequate definition of ‘full cost recovery’.⁴⁷ The New South Wales Government deems a local water utility to be achieving full cost recovery if it earns a positive ERRR or if it has ‘significantly increased its charges in order to recover its costs’ (2017d, p. 99). In practice, the second part of this definition can allow providers to maintain prices below lower bound levels for an extended period. As such, while the New South Wales Government (2017d) 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 (New South Wales Government 2015b, 2016b, 2017d).

In response to the Commission’s draft report, the NSW Department of Industry stated that all regional providers that were earning negative rates of return ‘have increased prices with an aim to obtain positive ERRR next year’ (sub. DR116, p. 4). The Commission acknowledges that New South Wales is progressing towards full cost recovery, but remains of the view that providers with negative rates of return should not be defined as having achieved full cost recovery, irrespective of whether they are currently increasing their prices or expect to achieve a positive rate of return in the future.

FINDING 6.5

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

⁴⁷ The Commission has previously highlighted issues with the definition of full cost recovery used in New South Wales (PC 2011).

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 prices to move up or down based on shorter term changes in supply. Similarly, current uniform pricing policies (or ‘postage stamp pricing’) across large complex networks can also be inefficient as they result in consumers in some areas facing prices that are higher than the true cost of supply, and others facing prices that are lower. This in turn could alter how network extensions are planned and whether IWCM approaches are cost-effective (section 6.3). The *NWI Pricing Principles* discuss the potential to go beyond postage stamp pricing to differential pricing by different supply nodes (‘nodal pricing’) (COAG 2010a), but provide no guidance on how or where this should occur. The Commission considers there may be value in further investigating the use of scarcity pricing and nodal pricing.

6.7 Addressing challenges in regional service provision

Regional service providers face a range of distinct challenges. They often serve small and highly dispersed population centres, which means that a given amount of infrastructure serves fewer people, increasing costs. Further, remoteness can make it harder 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 problems with drinking water quality are more prevalent in regional and remote areas than in metropolitan areas, and particularly in some Indigenous communities. While it is important that all communities can access healthy and safe water supplies, the Commission recognises that it is not likely to be feasible or cost-effective to avoid all water quality issues. The objective should be that providers protect health through a risk-based approach that reflects local circumstances and available supply options (including self-supply from tanks), with focused action to address persistent and significant problems.

The Commission’s analysis in appendix B (section B.6) indicates that some water quality issues remain, particularly in remote communities. However, jurisdictions and providers have taken action to address this issue where required. New South Wales, Victoria, South Australia and the ACT all achieve good water quality results, with New South Wales in particular having made significant progress in improving regional drinking water quality over several decades. Some issues are very likely to exist in parts of regional Queensland, although a lack of consolidated reporting makes it difficult to assess the extent of the problem. In addition, there are water quality problems in some regional areas of Western Australia, Tasmania and the Northern Territory. Analysis by Infrastructure Australia (2017) indicates that there is scope for regulatory frameworks to better address water quality issues, for example through improving monitoring and enforcement of regulations in parts of regional Australia.

Possible policy actions to address the challenges faced by regional service providers include:

- targeting government assistance to provide disadvantaged utilities with additional resources to allow them to maintain adequate quality services
- achieving economies of scale to improve service delivery through either amalgamation or collaboration.

These issues are discussed in further detail below.

Targeting government funding to areas of greatest need

While urban water infrastructure should generally be user funded, the NWI recognises that this may not be possible in all cases. Specifically, the NWI recognises that some small regional and remote communities may not be able to pay for the full cost of urban water services that satisfy all social and public health obligations, even if they are operating as efficiently as possible. In these cases, these communities should receive some external assistance on equity grounds. The NWI provides that this funding should be via a CSO payment (paragraph 66(v)(c)).

This would suggest that non-viable services should be supported through CSO payments rather than through directly subsidising infrastructure. Capital subsidies will tend to distort investment decisions and can lead to the selection of unviable projects, while CSO payments can typically be used for operational, maintenance or capital spending as required (box 6.7), and so tend to be more cost-effective and preserve incentives for efficient service delivery.

Box 6.7 Community Service Obligation (CSO) payments

Governments provide payments to service providers to provide non-commercial services in a range of contexts, including utilities and social services. These CSO payments can be designed in a range of ways to suit the task at hand. For urban water services, CSO payments are typically:

- subject to minimal conditions and not tied to specific investments or operational decisions
- made by the relevant State or Territory Governments
- calibrated to make up the difference between the efficient cost of delivering the desired service (including compliance with relevant regulations) and the assessed ability of the community to pay for that service.

Local Government NSW and the Water Directorate argued 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 by some jurisdictions are almost certainly inconsistent with the NWI

The Australian, New South Wales and Queensland Governments have all provided capital funding for water and wastewater infrastructure in recent years. However, these subsidies generally do not conform to the NWI concept of a CSO payment as they are not provided on the basis of need and they are tied to capital expenditure. This suggests that there is scope to improve funding practices by these governments, both in terms of consistency with the NWI, and so as to promote efficient investment decision making in regional areas.

The New South Wales and Queensland Governments provide substantial funding to regional water service providers (box. 6.8). Most of this funding is provided in the form of capital subsidies. The only exception is the New South Wales Government's Aboriginal Communities Water and Sewerage Program, which effectively functions as a CSO payment. In addition to the funding sources identified in box 6.8, the Queensland Government also provides funding to general local government operations through programs structured broadly as CSO payments, 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). Some of the funding from these programs will support water services.

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 recipient service providers would have relatively high bills and still earn a relatively low rates of return on their existing assets.

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.

Box 6.8 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 State 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
- \$1 billion for regional water and wastewater projects committed in the 2017-18 State Budget through the Safe and Secure Water program, including up to \$500 million to fund a pipeline connecting Broken Hill to the River Murray.

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). Since 2009 the Queensland Government has not provided specific water infrastructure funding, but has provided a range of general purpose infrastructure funds to local government. Of these, the Commission has identified the following funding for urban water infrastructure:

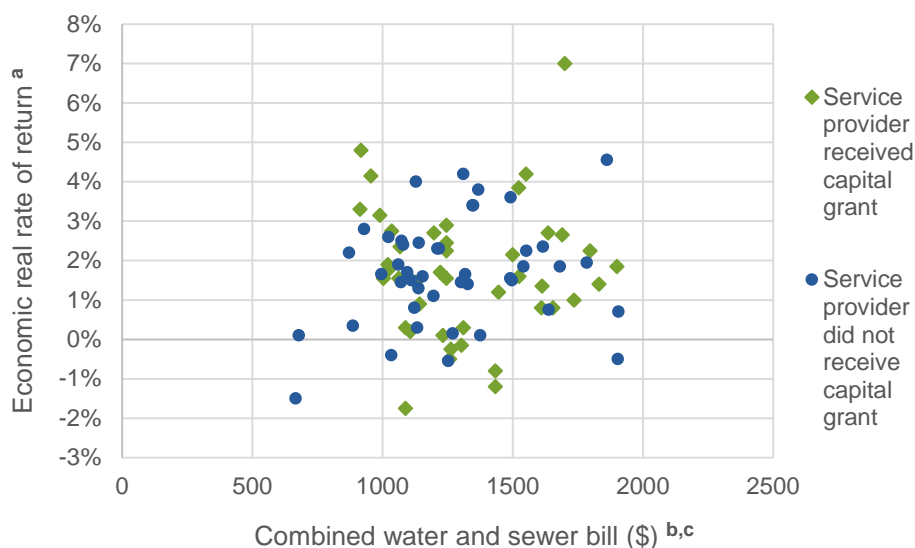
- \$67 million through the Royalties for the Regions program between 2012 and 2015 (Queensland Audit Office 2015, p. 40)
- about \$21 million through the Royalties for Resource Producing Communities Fund
- about \$44 million through the Regional Capital Fund
- about \$6 million through the Remote and Indigenous 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.

Sources: DILGP (Qld) (2017a, 2017b); DPI (NSW) (2016a, 2017c, 2017d, nd); DSD (Qld) (2017a); Queensland Government (2017b).

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 kL. 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: DPI (NSW) (2016a, nd); NSW Government (2017d).

Equivalent 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. For example, while the Remote Communities Infrastructure Fund is likely to primarily benefit communities with significant service challenges, the Royalties for Resource Producing Communities funds explicitly targets communities that host resource sector activity (DSD (Qld) 2017d); this is likely to be a poor way to assess whether a community is able to fund its own water infrastructure. 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 Bay⁴⁸ and Gladstone, and in the metropolitan area served by Queensland Urban Utilities. These communities should be able to achieve full cost recovery without imposing excessive charges on users, and so it is not clear why these projects would require State Government assistance.

In response to the Commission’s draft report, qldwater (sub. DR105) argued that subsidies to larger service providers may be needed to address the cost of serving smaller communities within their service areas while avoiding cross-subsidisation. If this is indeed the driver, a

⁴⁸ Hervey Bay is the largest centre in the Fraser Coast Regional Council area, which has a total population of about 100 000.

fairer, more transparent and less distortionary approach would be to use NWI-compliant CSO payments. Further, this does not appear to be the case for some of the projects in question, which fund upgrades to infrastructure serving the primary towns in question — examples include the Chapple Street sewer and Kirkwood reservoir upgrades in Gladstone, and a new sewerage main for the southern suburbs of Townsville.

A clear example of poorly targeted government funding for infrastructure is the Queensland Government's recent commitment of \$225 million to fund water security measures for Townsville (box 6.9). It is likely that these measures, if they are indeed necessary, could have been fully funded by water users without an unreasonable impact on water bills. Even with a cost increase of the magnitude calculated in box 6.9 passed through to consumers, water charges for Townsville households would remain well below those in Brisbane for a comparable volume. Townsville households can use up to 772 kL a year for a fixed price of \$755 (City of Townsville 2017). This large water allowance has contributed to Townsville's high average water consumption of 369 kL per household in 2015-16 (BOM 2017i). If a household in Brisbane were to consume 369 kL in a year it would pay about \$1577, or more than twice what an equivalent Townsville household would pay.⁴⁹

Box 6.9 Water security measures for Townsville

The 2017-18 Queensland budget committed \$225 million to implement water security measures for Townsville recommended in the interim report of the Townsville Water Security Taskforce. These measures were considered to be sufficient to address the city's water security problems for at least the next 15 years, though longer term measures were also canvassed. The key components of the water security measures are new channels, pipelines and pumping stations to expand the existing connection between the Burdekin River and Townsville's Ross River Dam.

As the capital cost of these investments are being paid for by the Queensland Government, it appears that Townsville water users will pay only for any associated operational and maintenance costs. For comparison, the capital cost of this project would be about \$0.25 per kL if it were recovered equally across Townsville's current average annual consumption of just over 50 GL per year.^a In turn, this would represent an increase of about 12 per cent on average per unit water charges in Townsville.

^a Assuming a 5 per cent real rate of return over a 40 year project life.

Sources: Bailey and O'Rourke (2017); Townsville Water Security Taskforce (2017); Queensland Government (2017b).

Water security measures in Townsville do not appear to have been tested through robust cost-benefit analysis. As discussed in section 8.4, this is a crucial element of ensuring that public funding supports cost-effective investments. In general, the best approach to ensuring that the Townsville City Council employs the most cost-effective water security measures is for them to be funded by water users, rather than the State Government. In practice Townsville's water security could be protected through a combination of new infrastructure, changed operating regimes for existing infrastructure, or making water prices more cost

⁴⁹ In 2015-16, the average Brisbane household used 156 kL (BOM 2017i)

reflective. Given the lack of rigour and transparency in this process by which the Queensland Government has committed to fund these specific water security measures, the Commission considers that it is unlikely that they represent the most cost-effective way to achieve the desired outcomes.

In addition to this State Government funding, the Australian Government has recently committed capital funding to urban water projects, or projects with a significant urban water component. For example, four urban water and sewerage projects in New South Wales and South Australia have received about \$10 million through the Building Better Regions Fund (Australian Government 2017a). Further, funds from the National Water Infrastructure Development Fund are committed to several projects that involve significant urban water components. However, the National Water Infrastructure Development Fund cannot fund projects that are primarily to supply urban and potable water (DAWR 2017d). Assessing whether these projects comply with the NWI needs to consider all of their benefits and funding sources. This is considered in more detail in chapter 8.

FINDING 6.6

Many capital subsidies available for regional urban water and sewerage projects from the New South Wales, Queensland and Australian Governments 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 a number of purposes, such as funding civic infrastructure or public services. However, the case for funding water infrastructure 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
- potentially allow ongoing underpricing of water services and therefore inefficiently high water use.

Importantly, while clear objectives and robust cost-benefit analysis can help ensure that capital subsidies are directed to the most cost-effective projects, these steps cannot mitigate the other issues that capital subsidies cause such as moral hazard and capital bias.

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 cause 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 in New South Wales and the principle that CSO payments should be tightly targeted, this would be likely to reduce the overall quantum of funding that this State provides to regional providers overall. Given the lower quantum of funding provided by the Queensland Government, the overall fiscal effect of this change would depend on a range of factors, including how CSO payments are determined and the extent to which general purpose local government infrastructure subsidies are reduced to account for the exclusion of urban water projects. 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.

RECOMMENDATION 6.6

Governments should not use capital grants to address affordability concerns for urban water users. These concerns should be addressed through Community Service Obligation payments.

To give effect to this principle, the New South Wales and Queensland Governments should replace existing capital grants to regional water utilities with transparent Community Service Obligation payments that are not tied to capital expenditure, and that are targeted at unviable (high-cost) regional and remote services.

Achieving economies of scale

While improved targeting of government funding can improve regional service provision, it is also 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 the number of customer connections). If a number of small service providers serve a given area, it may be more difficult for these providers 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 because 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 6.7.

Table 6.7 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 (2017i); NSW Government (2017d); 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 6.10).

Box 6.10 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. While the State Government has made an election commitment to transfer TasWater to State ownership, it remains jointly owned by Tasmania's local governments.

Sources: Armstrong and Gellatly (2008); Department of Primary Industry, Parks, Water and Environment (Tas), sub. 57; OTTER (2011); Parliament of Tasmania (2017a, 2017b); Shine (2017); 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 or synergies that are gained when water functions are operated alongside other functions of local government. Local Government NSW 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 LGAQ and qldwater (Fearon 2015) and a review of regional water supply in New South Wales (Armstrong and Gellatly 2008) both highlighted concerns that economies of scope could be lost if local water utilities were 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.

Amalgamation of water service providers is not the only way to achieve economies of scale; collaboration between multiple providers is another potential option. Collaboration can achieve some of the same benefits as amalgamation, while avoiding some of the difficulties associated with amalgamation. Collaboration — which can range from knowledge sharing to joint planning, joint procurement and shared services — can also be designed such that it does not affect other local government functions. This means that collaboration need not affect the economies of scope that arise between water services and other local government functions as it keeps the core water service functions with the relevant local governments. The degree and formality of collaboration can be tailored to suit local requirements (an indicative typology of different collaborative approaches is summarised in table 6.8). 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.⁵⁰
- 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’).

⁵⁰ Sewerage services remain with the participating councils. Rous Water supplies bulk water only.

Table 6.8 Possible collaboration and amalgamation models

<i>Model</i>	<i>Entities</i>	<i>Governance</i>	<i>Notes</i>	<i>Examples</i>
Independent local government provision	Local government owned service provider	Control by local government	No collaboration	Most NSW and Queensland service provision
Alliance	Local government owned service providers	Services delivered independently, but with joint operations undertaken cooperatively		Lower Macquarie Water Utilities Alliance; Central Region Organisation of Councils
Bilateral collaboration	Local government owned service providers	Collaboration on a 'fee-for-service' basis	Typically services will be provided by a larger, better resourced council to smaller neighbouring councils	Cairns Regional Council agreement with Yarrabah Aboriginal Shire
Joint organisation	Local government owned service providers; common legal entity (joint organisation)	Services delivered independently, but with joint operations undertaken by the joint organisation	Joint organisation can address some legal and governance issues arising under the alliance model	May be implemented in NSW through proposed joint organisations model
Joint operations with local government ownership	Common service provision and asset ownership	Shared control of common entity by participating local governments	Amalgamation (not collaboration)	NSW county councils; TasWater ^a

^a While the Tasmanian Government has made an election commitment to transfer TasWater to State ownership, it remains jointly owned by Tasmania's local governments.

Source: Productivity Commission based on Fearon (2015) and NSW Office of Local Government (2016).

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. These collaborative arrangements allow the constituent local governments to deliver services more efficiently; for example, the Centroc alliance's regional water procurements alone have saved its members over \$700 000 since its inception in 2009 (Centroc, sub. DR110, p. 7).

There are fewer example of amalgamation or collaborative work amongst small regional water utilities in Queensland.⁵¹ 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 6.7,

⁵¹ 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.

18 participate in a QWRAP alliance. The depth of cooperation and scope of joint activities varies across the five alliances.

FINDING 6.7

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. Although these jurisdictions have made progress, there is likely to be further scope for them to capture economies of scale through collaboration.

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 over time they will become less active or even disband, for example, due to a change in political priorities among the participating local governments. Qldwater suggests 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 the experience of service providers in New South Wales who have pursued collaboration has been largely positive, about half of its smaller local water utilities continue to operate independently (finding 6.7 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 CSO payments 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.

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 for agriculture

Key points

- Reform to water arrangements during the late 1980s and 1990s saw significant changes to how agricultural water was provided and priced; improving the accountability, productivity, efficiency and responsiveness of agricultural water services.
- The National Water Initiative (NWI) — which identifies best practice pricing and institutional arrangements that extend to water for agriculture — provides a basis for further reform of agricultural water services.
 - The progress of jurisdictions in meeting their commitments under the NWI has been inconsistent.
 - Unfinished business remains, most notably with respect to the limited role of economic regulators in reviewing or setting prices in some jurisdictions.
- Through economic regulation prices for most irrigation infrastructure services across Australia are set to at least recover operating costs and an allowance for future asset replacement and refurbishment and therefore achieve lower bound pricing. This level of cost recovery has resulted in the removal of many government subsidies previously required to support the operation of irrigation infrastructure.
- To promote greater accountability and efficiency of River Murray Operations (RMO) costs, which are recovered from users, there should be five-yearly reviews of efficiency and transparency. These reviews should be conducted by an independent expert and overseen by the economic regulators from New South Wales, Victoria and South Australia.
 - There is also scope to improve the transparency of RMO cost recovery arrangements in South Australia.
- Economic regulation can drive improved operating efficiency, increased transparency and reduced political interference in pricing. As is the case in the urban water sector, independent economic regulation should be enhanced through 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.
- 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. Ensuring reliable supplies of water for 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 27 per cent of the value of Australia's total agricultural production, while only occupying 0.6 per cent of the land used for

agriculture. The total value of irrigated agricultural production in 2015-16 was \$15 billion, or approximately 1 per cent of Australia's GDP (ABS 2017b).

Under the National Water Initiative (NWI), Australian, State and Territory Governments agreed to three key actions in relation to the provision of water services to the irrigation sector. The three actions to achieve cost-reflective pricing for infrastructure service were:

- to provide an appropriate role for independent economic regulators in the review or setting of infrastructure prices
- separating the water planning and management functions from the role of service delivery
- ensuring that all new government investment in infrastructure would be economically viable and ecologically sustainable.

There has been a concerted reform effort undertaken in the provision of services for irrigation. This has been part of wider reforms which have also opened up water trade within joint irrigation distribution systems. Further, a number of irrigation infrastructure providers have been privatised or corporatised, with this being driven in part by reduced subsidies for irrigation infrastructure. Such reforms have delivered much improved levels of cost recovery for irrigation infrastructure over the past decade.

The *White Paper on Developing Northern Australia* (Australian Government 2015b) sets an 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. Those involved in this proposed investment should draw on the experience of previous government investments in irrigation infrastructure to ensure past mistakes are not repeated.

This chapter considers where and how the institutional and regulatory arrangements for irrigation infrastructure can be improved. How governments should approach the provision of new water infrastructure, including infrastructure for irrigation, is addressed in chapter 8.

7.1 Australia's irrigation sector

Water use for irrigated agriculture 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 2015-16 were fruit and nuts (excluding grapes), vegetables and dairy production. In contrast, by volume, the top three uses of irrigated water were for pasture (for grazing), cotton and sugar cane (table 7.1).

Table 7.1 Major irrigation uses: 2015-16

<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	%	%
Pastures ^b	1 670	20	Fruit & Nuts	3 799	25	7
Cotton	1 432	17	Vegetables	2 801	19	5
Sugar Cane	1 295	15	Dairy	2 092	14	4
Fruit trees, nuts or berry fruits	966	11	Grapes	1 259	8	2
Other cereals	686	8	Cotton	1 164	8	2
All other	2 332	28	All other	3 900	26	7
Total^c	8 381	100	Total^c	15 015	100	27

^a The total value of agricultural production — both irrigated and dryland — was \$56 billion. ^b Water used for pasture (including lucerne) and cereal crops used for grazing or fed off. ^c Total for irrigated production.

Data sources: ABS (*Gross Value of Irrigated Agricultural Production, October 2017*, Cat. no. 4610.0); ABS (*Value of Agricultural Commodities Produced, July 2016*, Cat. no. 7503.0); ABS (*Water Use on Australian Farms, April 2016*, Cat. no. 4618.0).

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 irrigated agriculture are owned by governments (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, Western Australia, South Australia and parts of Queensland, but government-owned elsewhere (although in instances of government ownership, networks are generally managed at the local level) (table 7.2).

The asset base for providing rural water supply and drainage networks was valued at almost \$11 billion in 2012-13 (BITRE 2016, p. 297). The ABS (2016) estimated the total charges paid by irrigators for distribution services in 2014-15 was \$639 million (or less than 5 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	Various such as 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 triggered 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 Waters Agreement. The River Murray Commission (RMC) was then established in 1917. 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 Government 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 co-operation 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, Western Australia and South 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. 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 COAG's 1994 Water Reform Framework. Separating service delivery from the broader role of government has allowed more focused policy making to occur. The devolution of management of irrigation networks under the Water Reform Framework has also facilitated the efficient functioning of distribution networks.

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 entitlements 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 entitlements as collateral for loans and, in doing so, provided another means through which they could manage their business risks.

The onset of the Millennium Drought in 1997 prompted 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 cooperative 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 MDB jurisdictions. The Agreement also resulted in powers being given to the Australian Consumer and Competition Commission (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, 15 per cent of the water entitlements in the MDB are now managed

by the Commonwealth Environmental Water Holder for environmental uses rather than irrigation (ABARES 2017; 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.

The response under the NWI

There has long been concerns over the viability of government built and managed irrigation areas and the capacity of irrigators to effectively pay for these services without subsidised water prices. The NWI sought to address these concerns 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 ecologically 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 been strongest within the MDB where:

- independent economic regulation of government-owned service providers is in place to promote economically efficient prices for bulk water and distribution infrastructure services
- upper bound pricing (box 7.1) for bulk water services is being achieved in New South Wales and Victoria, with the exception of River Murray Operations (RMO) where lower bound pricing is being achieved.

However, there are also shortcomings in the MDB. In particular, there is a lack of transparency about the recovery of RMO costs from South Australian irrigators and the absence of regulatory scrutiny of RMO costs (this is explored further in section 7.4).

Box 7.1 Lower and upper bound pricing for irrigation infrastructure

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.

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).

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) required under the NWI. 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.
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. All states have benefited from the institutional separation of water management functions from service delivery. Government owned distribution networks are also pricing at lower bound levels or better.

But unfinished business remains — most notably, the minor role of economic regulators in setting or reviewing prices in Western Australia and Tasmania.

As detailed in appendix B there is scope to improve cost recovery arrangements for water planning and management activities in all jurisdictions, with the exception of New South Wales. Improvements may be made through more transparent identification and reporting of costs and the basis for allocating costs between users.

Current and emerging issues for irrigation services

Key business threats identified by irrigators included falling irrigation water delivery volumes and rising energy prices. Participants also noted that regulation — such as the infrastructure pricing rules within the MDB — limits the ability of distribution networks to respond to these emerging issues. For example, the National Irrigators' Council stated:

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. (sub. 13, p. 24)

A similar concern was presented by Coleambally Irrigation Cooperative Limited (sub 46).

The Independent Pricing and Regulatory Tribunal's (IPART'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.

In addition, there was also concern from participants (for example, from the National Irrigators Council (sub. 13)) about the overlap and duplication in reporting requirements for distribution networks.

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 2014b; 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. The amendments are 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 (section 7.3)
- bulk water services, which considers the recovery of infrastructure costs from irrigators when operations span state borders, and the ongoing government subsidisation of some bulk water schemes (section 7.4)
- distribution services, including 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), and whether there may be benefit in changing the ownership of government-owned networks (section 7.5).

7.3 Pricing for government-owned infrastructure services

The role of economic regulators in the 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 for bulk water services. 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 for bulk water services and water management activities. Distribution networks are user owned with unregulated prices.
Vic	173 ^b	Maximum prices are set by the Essential Services Commission for bulk water, distribution networks and water management charges.
Qld	67 ^c	The Minister sets prices after receiving advice from the Queensland Competition Authority for bulk water and publicly owned distribution networks. 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 for bulk water services and distribution networks. Otherwise, prices are negotiated between the Water Corporation and its customers.
SA	nil	There are no charges set for bulk water services in South Australia. Distribution networks are user owned, and operators set their own prices, but are subject to regulatory rules.
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, 2016a); IPART (2017); QCA (2012a, 2013); Tasmanian Irrigation (2016a).

As outlined in chapter 6 on *urban water* (section 6.5), 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 with respect to water for irrigated agriculture is examined below.

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

The Queensland Competition Authority (QCA) has previously been limited in the advice it could provide on prices due to constraints imposed by the relevant Minister. 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. Other matters deemed out of scope included users' capacity to pay, treatment of contributed assets, and whether prices should recover recreation management costs from irrigation customers
- 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 7.2) would make clear the costs and trade-offs of any ministerial decision to apply a different pricing structure.

Box 7.2 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.

New arrangements for Western Australia and Tasmania

Chapter 6 (section 6.5) sets out the broader case for economic regulation. The same arguments apply to government-owned bulk water and distribution services but they should 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.

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. A reporting and benchmarking regime similar to that set out for smaller urban suppliers in chapter 6 (section 6.5) was considered. 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 (appendix B, section B.3).

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 the 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 independent regulator.

The pass through of review costs would serve to limit any unfounded claims and ensure reviews are only undertaken when there are significant issues to be addressed. The sharing of costs among all users also precludes free-riding and ensures that individuals are not discouraged from seeking review where individual benefits are low and would otherwise be outweighed by the costs of seeking review. This is efficient where the collective benefits of review are substantial but individual benefits may be insufficient to trigger review.

The Commission acknowledges that alternate models of economic regulation may be implemented to constrain the potential exercise of market power. However, the scale and

scope of the activities do not lend themselves to a framework of ongoing and comprehensive economic regulation.

The use of a request process for instigating reviews avoids the costs associated with ongoing economic regulation, leverages existing expertise within state regulators and provides a proportionate response to the potential risk and consequences of monopoly pricing. The Commission considers that the request process provides sufficient incentives for regulated businesses to operate efficiently, with bulk water providers facing the credible threat of review where they seek to exercise market power.

Chapter 6 (section 6.5) outlines national principles for improving the quality and consistency of economic regulation of urban water. Many of these principles also have relevance for economic regulation of water services for irrigated agriculture and there is value in jurisdictions examining how they could be applied in this sector.

Under the *Water Act 2007* (Cth) the ACCC has a role in providing the Minister with advice when the Minister is formulating water charge rules. The ACCC also has functions to enforce compliance and enforcement by monopoly service providers with these rules. These functions of the ACCC constrain the potential for distortions in the allocation of water resources arising out of abuse of market power by monopoly service providers.

RECOMMENDATION 7.1

State and Territory Governments should ensure that 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 reasons 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 independent regulator in Western Australia and Tasmania.

7.4 Bulk water services

Under the NWI, 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 a lack of transparency with respect to the recovery of RMO costs from irrigators means it is unclear the extent to which effective cost recovery is occurring.

In addition to assessing pricing, this section considers other issues currently affecting bulk water services:

- the need for some form of regulatory oversight of RMO and Dumaresq-Barwon Border Rivers Commission (BRC) 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)⁵² to deliver River Murray water shares to New South Wales, Victoria and South Australia. These activities include renewing and maintaining the suite of River Murray water storage and delivery assets, operating these 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 RMO

The MDB Agreement sets out the funding arrangements for RMO. Operating and maintenance costs are shared by the jurisdictions of the River Murray (New South Wales, Victoria and South Australia) and are calculated under cost sharing rules established in the MDB Agreement (Aither 2017a). The Australian Government generally covers 25 per cent

⁵² 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).

of both the cost to investigate the need for infrastructure works and the cost of any works, with the remaining cost shared by the states in proportion to their water entitlements and use. The RMO budget is informed by the MDBA's scrutiny of the SCAs' proposed infrastructure works, subject to recommendations from the Basin Officials Committee and requires final approval by the Ministerial Council.⁵³

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 2014b) 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 WaterNSW and included 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 to 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 2016a). 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.

In South Australia, it is not clear that there is a framework for direct recovery of RMO costs. As noted by the MDBA in its submission to the Essential Services Commission of South Australia (ESCOSA):

In South Australia, the bulk water operations of SA Water are not currently regulated by ESCOSA. As such, SA Water is not subject to the WCIR [Water Charge Infrastructure Rules] and MDBA costs are not included in SA Water charges for cost recovery purposes. South Australia does apply some of its River Murray levy income to meet some of its contributions to the MDBA, but the levy is applied to all water users and is not a cost recovery charge within the meaning of the WCIR. (MDBA 2014c, p. 18)

⁵³ 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 MDB jurisdictions and the Australian Government.

The South Australian Government abolished the Save the River Murray levy in 2015. The extent that effective recovery of RMO costs is occurring in South Australia is unclear to the Commission. The South Australian Government should improve transparency by releasing information on the process for recovering RMO costs from users, including how costs are apportioned between users and the extent to which current mechanisms are achieving cost recovery.

Concerns over RMO costs are not new

Irrigators concerns are not new and a number of reviews have been conducted since 2014 to consider the MDBA's costs, both as part of price determination in New South Wales (Aither 2017a), and self-initiated work on efficient costs and/or cost sharing arrangements (Buckley 2014; Synergies Economic Consulting 2014). These reviews have made a number of recommendations including:

- the development (and implementation) of service standards and performance metrics
- 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
- that 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 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 on to entitlement holders. Further, as economic regulators with water infrastructure pricing expertise are in place in each of the River Murray jurisdictions, 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.

Border Rivers Commission

The BRC was established by the *New South Wales-Queensland Border Rivers Agreement* in 1946. The BRC was formed to construct, control, operate and maintain bulk water infrastructure within the Border Rivers which straddle the New South Wales and Queensland border (BRC 2016).

The BRC is the authority responsible for implementing agreements between New South Wales and Queensland concerning the sharing and distribution of waters within the Border Rivers. The BRC is also responsible for:

- controlling the operation and maintenance of Glenlyon Dam and a number of weirs
- providing advice to governments in relation to water sharing and water infrastructure (including investigating the practicability of additional water storages)
- arranging for certain river flows and groundwater levels to be monitored.

Irrigators are concerned that there is insufficient transparency about BRC costs:

... the need for transparency and independent oversight to ensure that MDBA and BRC costs are prudent and efficient, is long overdue. (National Farmers' Federation, sub. 55, p. 12)

Although these concerns are valid, BRC costs are much smaller than MDBA RMO costs. The costs passed through to entitlement holders for BRC activities, though substantial as a proportion of the charges they face, are modest in absolute terms⁵⁴ (the pass through of BRC

⁵⁴ As an indicator, IPART has established that for New South Wales customers in the Border Region, BRC costs reflect 35 per cent of the proposed customer share of the notional revenue requirement (NRR) for the Border valley (IPART 2017, National Farmers' Federation, sub. 55). The NRR is IPART's view of the total efficient costs of providing water services each year, with prices generally set to recover these costs.

costs to users is estimated to be \$685 000 in New South Wales for the 2017–2018 financial year compared with about \$18 million for MDBA costs in the same year (IPART 2017)).

The funding arrangements for the BRC are set out in the *Border Rivers Agreement 1946*. The construction, maintenance and operating costs of the BRC are shared between the state Governments of New South Wales and Queensland on an equal basis.

The BRC is commencing a process of reform of its institutional and financial arrangements which may have a bearing on the transparency of costs for BRC activities. Although the outcome of these reforms cannot be prejudged, the BRC notes that there are likely to be changes to the *Border Rivers Agreement 1946* ratifying legislation and changes to the administration of finances (BRC 2016).

How BRC costs are passed on to water entitlement holders

The pass through of BRC costs varies according to jurisdiction. In New South Wales, the costs of BRC activities are paid for by the New South Wales Government in the first instance, with WaterNSW then recovering BRC costs by passing a portion of these costs through to entitlement holders, subsequently reimbursing the New South Wales Government.

WaterNSW is subject to economic regulation by IPART, which has indirect oversight of BRC costs in New South Wales. Although not in a position to directly oversee the efficiency and prudence of BRC charges, IPART does scrutinise the pass-through of BRC costs and for the 2017–2021 determination period has imposed a 1.25 per cent compounding annual downward adjustment to BRC costs (IPART 2017).

In New South Wales, BRC costs will total \$4.26 million over the period of 2017–2021 (IPART 2017). These costs are split between the New South Wales Government and entitlement holders, with entitlement holders required to pay \$2.75 million and the government share amounting to \$1.51 million over a four year period (IPART 2017).

The process for passing through BRC costs is less transparent in Queensland, with BRC costs being passed on via water charges specified under schedule 14 of the *Water Regulation 2016* (Qld). The substantive basis of these charges and the extent to which they reflect recovery of costs for BRC activities is unclear.

Room for improvement

Current arrangements fail to provide adequate levels of transparency regarding the determination of BRC costs, the prudence or efficiency of such costs and how these costs are passed through to entitlement holders. Although the oversight by IPART of WaterNSW's pass through has brought greater scrutiny to BRC costs in New South Wales, there are opportunities for improvement in both New South Wales and Queensland.

The Commission considers that the existing state based regulators are best placed to review the prudence and efficiency of BRC costs, and to ensure sufficient transparency is provided on what costs are passed onto users. There would be benefits to such a review being undertaken — if not jointly — then in a coordinated manner between IPART and the QCA within established determination timeframes. This would be aided by the development of a consistent framework to assessing the efficiency and transparency of costs, which would reduce duplication. The exact nature of this coordination is best left to IPART and QCA to determine, after considering the costs and benefits of different approaches.

RECOMMENDATION 7.2

Relevant jurisdictions should ensure that the efficient cost of joint state infrastructure, such as River Murray Operations (RMO) and the Border Rivers Commission (BRC), are recovered from water users. RMO and BRC costs should also be subject to a periodic independent review. Specifically:

- a. South Australia should improve transparency on how RMO costs are recovered in their jurisdiction by publishing information on how costs are apportioned between different users and the extent to which current mechanisms are achieving full cost recovery
- 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
- c. BRC costs should be subject to a coordinated review process conducted by economic regulators in New South Wales and Queensland to inform pricing decisions.

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 7.3).

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 (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	na		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 and current arrangements lack transparency.

^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. **na** not available.

Sources: ERA (2017b); IPART (2017); NWC (2014b); Responses to State and Territory information requests; Seqwater (2016); SunWater (2016); Tasmanian Irrigation (2016a).

Box 7.3 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 GL 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 by 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 (2016, nd).

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) considers 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 such as: 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 7.4) and evolving circumstances (such as rising energy prices and changing customer demands).

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.

Box 7.4 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 from 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, 2016a) before and after the Millennium Drought. Some distribution networks are forecasting substantial 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 within the network in 1995.

The laws, regulation and rules applying to distribution networks

Distribution network infrastructure 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 these networks to pursue efficient operations and prudent capital expenditure, and to set prices at a competitive level.⁵⁵

However 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 7.5). These Water Charge rules are a source of concern for inquiry participants such as Coleambally Irrigation Cooperative Limited (sub. 46) and the National Irrigators' Council (sub. 13).

The Water Charge 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 these laws provide protections, the cost of accessing remedies is usually prohibitive (ACCC 2016).

⁵⁵ An example of the light touch regulation is the requirement to publish a schedule of charges under the *Water Charge (Infrastructure) Rules 2010* (Cwlth).

The number of irrigators, value of infrastructure charges and scale of the water trading market 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 with other regions.

The revised rules proposed for the MDB (box 7.5) 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 that the regulation should be protecting.

Box 7.5 Regulation of distribution pricing in the 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 restrict discriminatory pricing and require transparent prices and price setting
- the WCTFR sets out the maximum termination fees that can be charged to those disconnecting from a network and require 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 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 7.5) has resulted in the removal of regulation no longer seen as necessary, such as 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 wherever 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).⁵⁶

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.

This view is reflected in comments attributed to Acting CEO of PVWater Greg Dawes in Mazzarol et al. who noted:

Through membership, local irrigators are able to participate in the management of the infrastructure through which they take their water. Distribution efficiency is improved because members and directors have intimate knowledge of the local operating environment, and share that knowledge with operators. In this way, the goals of the business and those of customers are more closely aligned. (2016, p. 38)

Local ownership encourages responsive management of assets to ensure the provision of timely and efficient water services:

An advantage of privatisation [local ownership] is greater assurance that boards are responsive to the needs of their irrigator customers. However, they may be less responsive to 'national interest' concerns than would be government-owned enterprises that can be directed by ministers. (Roper, Sayers and Smith 2006, p. 12)

The transfer of ownership and management of distribution networks to irrigators also facilitates efficiency by allocating risks to those parties best placed to manage them. Irrigators as those most directly impacted by risks such as service disruption, service quality and financial failure have the strongest incentives to manage such risks efficiently (Roper, Sayers and Smith 2006).

Irrigators accept 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 provide support to locally owned networks, nor do they have any say in the operation of those networks.⁵⁷

Where distribution networks continue to be government owned, history shows that governments face periodic calls for financial assistance to support the refurbishment, maintenance and operation of irrigation infrastructure. The Macalister Irrigation District 2030 modernisation project is an example, with the Commonwealth and Victorian

⁵⁶ 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.

⁵⁷ 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).

governments recently committing \$20 million each to assist in the upgrade of irrigation infrastructure within the district (Southern Rural Water 2017). Government ownership does not, in itself, provide a rationale for providing grant funding for strictly private benefit.

The Commission considers the use of grant funding for such projects to be inconsistent with the intent of the NWI, particularly where capital contributions are not included in the setting of prices and the true cost of modernisation is not passed through to users.

A transition to local ownership and management is underway for four networks in Queensland (box 7.6) 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 7.6 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.

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:

- 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.

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.

8 Government investment in infrastructure for water

Key points

- A significant driver of the water reform undertaken in Australia over the past 20 years was a recognition that many past investments in water infrastructure were not economically viable or that they provided financial benefits to a specific group within the community. Many of the ongoing costs associated with these investments are borne by taxpayers.
- Much of the recent direct government investment in water infrastructure has been shown to be inconsistent with jurisdictions' commitments under the National Water Initiative (NWI) to ensure all new and refurbished infrastructure is economically viable and environmentally sustainable.
- The economic viability of new and refurbished infrastructure projects should be underpinned by full cost recovery from users. Cost-reflective prices provide incentives for efficient use and supply of infrastructure services.
- With over \$4 billion of Australian Government grants and loans available for water infrastructure, it is crucial that proper decision-making processes are followed to provide confidence that these investments are economically viable and environmentally sustainable.
 - NWI-consistent water entitlements and planning frameworks should be in place before any new infrastructure that will provide irrigation services is considered (including infrastructure financed under the Northern Australian Infrastructure Facility).
 - Sufficient water entitlements should be sold to reduce a project's risks before construction starts.
 - Governments should not provide grant funding for infrastructure, or that part of infrastructure, that is for the private benefit of irrigators or other users, or for public benefits where such benefits are costless, incidental or were not sought by government.
- Where governments seek to provide public funding for new or refurbished water infrastructure, such decisions should be underpinned by a rigorous, detailed and publicly available cost-benefit analysis.
- Governments need to exercise caution in any decision to provide finance (such as loans) for new 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.

This chapter examines the role of government investment in new and refurbished water infrastructure, including whether the investment decisions of governments are consistent with the principles of the National Water Initiative (NWI).

Under the NWI, all jurisdictions have agreed that government investment in new or refurbished infrastructure would only proceed where the infrastructure has been shown to be both economically viable and ecologically sustainable (paragraph 69). The requirement to ensure economically viable and ecologically sustainable water infrastructure covers the urban and non-urban (mining and irrigation) sector.

Full cost recovery (which typically necessitates users paying the long-run cost of service delivery) is important to ensure investment in water infrastructure is economically viable. In many instances — particularly in the urban water sector, and in part due to independent economic regulation — full cost recovery for water infrastructure is being achieved. However, there remain cases where investments are not fully paid by users — for example, State Governments in New South Wales and Queensland are providing significant capital grants to support regional water infrastructure, indicating that these investments may not be viable (chapter 6).

The Commission is aware that full cost recovery for some small regional and remote communities may not be possible. In these instances, there may be a case for government assistance on equity grounds (chapter 6). The NWI indicates that these non-viable services be supported through transparent Community Service Obligation (CSO) payments (paragraph 66(v)(c)), rather than through directly subsidising infrastructure.

While there is an equity case for CSO payments for some urban water services on the basis that access to basic water and wastewater services is essential for human needs and health, this argument does not apply to irrigation services, or other non-urban uses such as for industry or mining. The subsidisation of irrigation and other non-urban services confers private benefits on a small number of users at the expense of a broad group of taxpayers.

This chapter discusses principles for government investment in new or refurbished water infrastructure that have relevance regardless of which sector uses that infrastructure. That said, many of the examples provided in this chapter relate to infrastructure that is built to service the irrigation sector. The risk of inefficient investment in irrigation and regional infrastructure is greater because:

- the provision of new or refurbished irrigation infrastructure has been done poorly in the past and has been predicated (often erroneously) on delivering economic development opportunities for regional and rural communities
- in some jurisdictions, there is a lack of independent economic regulation to scrutinise proposed new or refurbished irrigation infrastructure investment, and the subsequent pricing of this infrastructure.

There are cases where new water infrastructure is built primarily for non-urban uses other than irrigation — typically mining. This investment is often undertaken by private entities, with little or no government funding or financing.

8.1 Progress under the NWI

The Commission has assessed the progress of State and Territory Governments in meeting their commitments under the NWI with respect to new and refurbished water infrastructure. An assessment of progress with respect to new and refurbished urban water infrastructure is presented in chapter 6 (table 6.3), which notes that outcomes have been ‘partially achieved’. The rating of ‘partially achieved’ is mainly as a result of the ongoing provisions of capital subsidies to water service providers in regional New South Wales and Queensland.

Table 8.1 summarises the Commission’s assessment with respect to new and refurbished non-urban infrastructure. More detail on this assessment is set out in appendix B (section B.3).

With respect to new infrastructure, jurisdictions have made partial progress in delivering their commitments under the NWI and unfinished business remains. The fact that the NWI principles have only been partially achieved indicates a continued risk of poor project selection and ongoing liabilities for unviable infrastructure.

Table 8.1 Assessment summary: New and refurbished water infrastructure (non-urban)

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
All new and refurbished infrastructure should be environmentally sustainable and economically viable	Partially achieved	<p>NWI-consistent water entitlement and planning arrangements have been applied (or are expected to be applied) for all (of the eleven) new major projects announced from 2014 that are receiving government investment. This has supported the environmental sustainability of new projects.</p> <p>Jurisdiction and national environmental impact assessment processes have been applied for new projects to ensure environmental sustainability. Where concerns have arisen with respect to the legitimacy of environmental impact assessment processes, existing avenues of review have facilitated rigorous assessment.</p> <p>The economic viability of the eleven projects for new and refurbished infrastructure 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.

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

From 2014, a number of new infrastructure projects have been progressed with government funding in the absence of a detailed and public cost-benefit analysis to demonstrate the

economic viability of the project (table 8.2). Although these projects may be economically viable, the lack of transparency regarding the underlying assessment of costs and benefits is unacceptable and does not meet the intent of the NWI (or good governance processes more generally).

Table 8.2 Major infrastructure funding announced from 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			
Cwlth	Rookwood 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	na ^d	No (CIC)	na	na
Vic	South West Loddon Rural Water Supply	81 ^b	No (CIC)	1.4:1	Yes
	Macalister Irrigation District Modernisation (1A)	32	No (CIC)	1.4:1	Yes
	Macalister Irrigation District Modernisation (1B)	60 ^b	No (CIC)	1.5:1	Yes
	Werribee Irrigation District Modernisation	31 ^b	No (CIC)	1.6:1	Yes
SA	Northern Adelaide Irrigation District	156 ^b	No (CIC)	1.16:1	Yes
Tas	Southern Highlands Irrigation Scheme	23 ^b	No (CIC)	1.3:1	Yes
	Swan Valley Irrigation Scheme	14 ^b	No (CIC)	2.8:1	Yes
	Duck Irrigation Scheme	24 ^b	No (CIC)	1.5:1	Yes

.. not applicable **na** 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' (NSW Government 2017b) The project has been included in this analysis as one of its goals is 'to keep more water in productive use within the Murray-Darling Basin' (NSW Government 2016a, p. 4.11). A summary of the final business case has been published indicating an incremental cost-benefit ratio of 1.089 for the proposed pipeline, detailed information concerning the basis of determining the costs and benefits of the project have not been released and consequently, the veracity of the cost-benefit ratio cannot be assessed (DPI (NSW) 2017a).

Sources: Responses to Commonwealth, State and Territory information requests; Tasmanian Irrigation (2015, 2017a).

8.2 Government funding of infrastructure

There is little sign that government enthusiasm for investing in new infrastructure is waning. In more recent years there has been a resurgence of interest in undertaking further regional development, particularly in northern Australia. This interest has resulted in the creation of multiple government financing and funding facilities dedicated to promoting investment in northern Australia, with new water infrastructure nominated as one potential use of these funds.

Although these financing and funding facilities may promote investment in northern Australia, there is considerable risk of poor project selection, poor investment and the continuation of historical failures. Incorporating rigorous and transparent assessment processes into government decision making about new water infrastructure (including refurbishment of existing infrastructure) is imperative to ensure that past mistakes are not repeated.

Investment in new, expanded or refurbished water infrastructure has profound long-term economic, environmental and social impacts for communities, industries and regions. The construction of new infrastructure may provide benefits but entails committing to paying both the cost of construction and the cost of maintaining and operating infrastructure over many decades. Where there is poor project selection, the construction of economically unviable infrastructure has the potential to impose substantial legacy costs for taxpayers, industry, communities and the environment.

The National Water Commission (NWC 2009, 2011d, 2014b) 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. (2014b, p. 9)

Inquiry participants have also raised similar concerns. For example:

... 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. (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 infrastructure is potentially significant. The Australian Government currently has over \$4 billion in grant funding and loan finance available for various forms of infrastructure (table 8.3) and there is no shortage of potential projects which this money can be spent on. For example, there was over \$3.5 billion in funding for water infrastructure projects under consideration across Australia in 2014 (Australian Government 2014c).

Table 8.3 Major Australian Government 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 (2016a); *Northern Australia Infrastructure Facility Investment Mandate Direction 2016*.

How should new infrastructure be funded?

Full cost recovery from users should be the norm

The *NWI Pricing Principles* provide that for new or replacement assets, charges are to be set to achieve full cost recovery, including capital expenditure. In the past, government subsidisation of new and refurbished infrastructure has allowed pricing below cost recovery levels. Historically, the absence of cost-reflective pricing has encouraged excessive demand for infrastructure and requests for the construction of unviable water infrastructure, often resulting in an undue burden being placed on taxpayers.

Direct user charges represent an equitable way of financing new infrastructure, because those who generate the need for, or benefit from, the infrastructure are those who pay for its construction and upkeep.

Cost-sharing between different users

The cost of infrastructure may be shared among users (including potentially government on behalf of the wider community) using a range of different approaches. There are two main approaches for allocating costs between users that are based on established cost recovery principles. These are the impactor pays approach and the beneficiary pays approach (box 8.1). While the NWI specifies that a framework of user-pays cost recovery should apply for new infrastructure, it does not explicitly endorse either a beneficiary pays or impactor pays approach.

Box 8.1 Cost recovery principles

Impactor pays principle

The impactor pays principle allocates the costs of service provision to those parties that directly cause or impose the costs on others. The application of an impactor pays principle would result in the allocation of costs between those parties that directly cause costs to arise through the use of water infrastructure services.

Beneficiary pays principle

The beneficiary pays principle allocates the costs of service provision to those parties that benefit from an action or infrastructure service.

Direct beneficiaries are those parties that derive a direct private benefit from the infrastructure services provided, for example irrigators or mines being supplied with water for commercial use.

Indirect beneficiaries are those parties that derive an indirect benefit from the infrastructure services provided, for example the broader community from increased recreational opportunities or improved environmental outcomes.

Source: Frontier Economics (2016).

Any framework for allocating costs should facilitate the outcomes and objectives of the NWI. A NWI-consistent framework should:

- achieve full cost recovery of efficient costs
- provide incentives for the efficient and sustainable use of water resources
- provide transparency regarding cost allocation
- provide disincentives for cost shifting
- preclude cross-subsidies being paid between categories of users.

The adoption of NWI-consistent frameworks of cost allocation by jurisdictions will facilitate the achievement of NWI objectives and outcomes for new and refurbished water infrastructure developments. Although the NWI does not provide a prescriptive approach to the allocation of costs, some models of cost-sharing better achieve NWI objectives than others.

The cost-sharing model that is most consistent with the NWI is the impactor pays approach. An impactor pays approach allocates costs to the users most directly accountable for them, limiting the extent that any cross-subsidisation can occur between different users and thereby encouraging cost-reflective pricing and efficient use of infrastructure services.

In contrast, a beneficiary pays approach may allocate costs to indirect beneficiaries, from whom no costs actually arise. This has the potential to provide incentives for inefficient use of infrastructure, and under recovery of the full cost of services from direct users. Further, the allocation of costs to indirect beneficiaries could be viewed as a subsidy. There could also be incentives for direct users to shift costs to indirect beneficiaries in order to obtain a subsidy.

Given the above, the adoption of a beneficiary pays approach may be inconsistent with the objectives of the NWI to facilitate the efficient use of water infrastructure. Moreover such an approach would provide less transparency regarding the basis of cost allocation than could be achieved under an impactor pays approach. An impactor pays approach provides more transparency through the clear allocation of costs through the prices paid by users when they purchase services. By comparison, a beneficiary pays approach may allocate costs to users for unsought or incidental benefits or benefits of a speculative nature.

The Commission notes that the potential for cross-subsidisation has resulted in concerns being raised by multiple stakeholders (box 8.2). Although concerns have been raised, existing cost-sharing arrangements have constrained the potential for cross-subsidisation and there is no evidence of cross-subsidisation of infrastructure charges having occurred.

When should government fund infrastructure?

Public benefits

Government investment in infrastructure may be appropriate where the provision of services resulting from the construction, expansion or refurbishment of water infrastructure have public good aspects. These public good aspects occur when the services being provided benefit the entire community (in contrast to services that predominately benefit specific parties).

The benefits that accrue from infrastructure services may be varied as stated 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, pp. 4–5)

Box 8.2 Concerns over cost sharing are not new

The allocation of costs based on beneficiary pays or impactor pays approaches results in costs being allocated differently among parties. This has resulted in concerns being expressed to the Commission that current arrangements favour some users over others.

As articulated by the National Irrigators Council (NIC):

The principle behind NWIs pricing was that the beneficiary paid. NIC does not believe there is full and transparent accounting of costs passed on for storage and delivery of environmental water or water for other purposes and these costs are being subsidised by irrigators ...

In NSW, the regulator has adopted an impactor pays approach, consequently in NSW there are examples of beneficiaries (recreation, tourism) of the regulated river system which do not contribute to the cost of its operation. (NIC, sub. 13, p. 9)

The Commission acknowledges the concerns raised by the NIC but notes that the Commonwealth Environmental Water Holder (CEWH) pays the same costs for use of infrastructure as other consumptive users under existing arrangements. As noted by the CEWH:

I pay for services used on a 'user pays' basis and support non-discriminatory behaviour consistent with the principles set out in the National Water Initiative ...

Environmental water users should not be required to pay more for services compared to other water users, pay for services not used, or be required to subsidise other network customers. (Commonwealth Environmental Water Office 2017, p. 7)

In the course of its inquiry the Commission has found no evidence of cross-subsidies being paid by irrigators for environmental benefits or environmental water holders subsidising irrigators. The Commission considers that as part of their role, independent economic regulators should explicitly address the possibility of cross-subsidies being paid by irrigators for environmental benefits using an impactor pays approach.

The adoption of a beneficiary pays approach — as advocated by the NIC — is likely to result in cross-subsidies from indirect beneficiaries to direct users. A beneficiary pays approach would likely shift the burden of costs away from direct users — including irrigators and the CEWH — to indirect beneficiaries.

However, government resources are scarce and the mere existence of a public benefit is insufficient to justify government contribution to the funding of infrastructure. Government investment should not occur where:

- the provision of the public benefit is costless to the infrastructure provider. For example, the scenic benefits associated with creation of an artificial lake necessary for a storage to operate imposes no costs on an operator
- the public benefit would have arisen irrespective of government funding – that is, the benefits naturally occur as a result of the construction or modification of the infrastructure
- public benefits are a second order consideration — for example, modification for recreational purposes — as opposed to a first order consideration such as providing dam safety/flood mitigation.

Government funding provided under the above circumstances amounts to a subsidy of commercial operations.

On the other hand, where the provision of public benefits does impose costs, the community should pay for these costs (consistent with the impactor pays approach). In the first instance, governments should seek to recover such costs from the community receiving the public benefit. However, in instances where the benefits are widely shared and/or it is not cost effective to recover relevant costs from the community, there may be a role for government in funding that part of the infrastructure required to deliver the additional benefits to ensure they are not lost. This funding should take the form of a transparent payment to the infrastructure operator.

Achieving equity in urban water services

As noted above and in chapter 6, there may also be an equity case for government assistance to deliver urban water and wastewater services of an adequate quality in some small communities where users are not able to pay for the full cost of these services. The NWI supports the delivery of such assistance through ongoing CSO payments rather than through a capital grant. CSO payments can be used for operational, maintenance or capital spending as required, and therefore allow communities to choose the most cost-effective way of improving services.

Having said that, if the sustainable delivery of services to a community is only possible through significant capital investment, there may be little practical difference between a well-targeted capital grant and a CSO payment. In such cases, if investments are rigorously tested through cost-benefit analysis they can, in practice, support the NWI objective of economically sustainable investment. However, it is still important that users pay for a reasonable portion of costs to minimise government subsidies.

The New South Wales Government's recent commitment to build a pipeline to supply water to Broken Hill has some of these characteristics. The New South Wales Government has argued that major investment of some kind is necessary to supply water to Broken Hill as the existing pipeline supplying the township with water is reaching the end of its operational life. Further, as set out in box 8.3, it appears unlikely that Broken Hill customers would be able to afford the full costs of the pipeline if recovered through water charges.

However, it is not clear that the pipeline was the best option for supplying water to Broken Hill, nor that users will pay a reasonable share of its cost. In terms of assessing the best supply options, only limited details about the cost-benefit analysis have been released into the public domain (DPI (NSW) 2017a) and, from the detail available, it appears that some project options have been ruled out without being fully considered. This issue is discussed further in section 8.4.

Box 8.3 Broken Hill's River Murray pipeline

In June 2016, the New South Wales Government committed to build a 270 km pipeline to supply Broken Hill with water from the River Murray. A contract to construct the pipeline was awarded in October 2017 at a cost of \$467 million.

The capital cost of the pipeline alone implies unit costs of about \$3 per kilolitre when averaged across Broken Hill's average consumption of 10 GL per year.^a As the capital cost of the pipeline represents only a portion of the total cost of supplying water to Broken Hill (for example, this estimate does not include any operational and maintenance costs) it is unlikely that the full recovery of costs from users of water and wastewater services would be possible without charges rising to unaffordable levels.

In turn, this means that it is likely that a significant portion, if not all, of the pipeline's capital cost will be paid for by the New South Wales Government as a capital contribution.

^a Assuming a 5 per cent real rate of return over a 40 year project life.

Sources: Baird (2016); New South Wales Government (2017d); WaterNSW (2017).

It is unclear how costs will be shared between users and the New South Wales Government. The New South Wales Government (2017e, p. 3) has indicated that it will fully fund the pipeline's capital costs and 'ongoing costs' will be shared between the Government and Broken Hill water users. However, it is unclear whether these ongoing costs include depreciation and financing costs. If they do not the Government would pay for all of the capital costs for the pipeline as well as a proportion of operating costs..

In principle, users should pay for a portion of total costs (that is, both capital and operating costs) provided this is affordable. To achieve an equitable sharing of costs, a better approach would have been for WaterNSW to fully fund the pipeline and receive ongoing CSO payments from the New South Wales Government to cover the portion of total costs that users could not afford to pay. The Independent Pricing and Regulatory Tribunal is best placed to estimate the efficient cost of servicing Broken Hill and what portion Broken Hill users should pay.

8.3 Learning from past mistakes

The business cases supporting irrigation infrastructure projects have often been found to be inadequate in the past. Some of the more common shortcomings of irrigation infrastructure business cases include overly optimistic estimates of a project's viability (NWC 2014b), 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 announced.

Inadequate business cases can undermine the assessment of costs and benefits for projects and result in support for unviable projects. The use of rigorous cost-benefit analysis,

including rigorous scrutiny of business cases can reduce the prospect of selecting poor projects and facilitate efficient investment.

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 in their estimate of economic viability, and the contribution of the project to the development of a region is often cited as part of the reason to go ahead with a project. This is particularly the case for projects that supply water for irrigation.

Unfortunately, there has been a tendency for public investment in water infrastructure to deliver less than the anticipated benefits with respect to regional development (box 8.4). While jobs are invariably created during the construction phase of projects, 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 show that where ongoing jobs are created, they come at a high cost (table 8.4).⁵⁸

Further, and as discussed earlier, many past infrastructure investment decisions made by governments have not been economically viable. This has placed both immediate and ongoing costs on taxpayers. The impost on taxpayers 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 year⁵⁹
- supporting infrastructure, such as roads, may also be required — the cost of this infrastructure is typically borne by government.

A broad view of economic viability is favoured by some groups, notably the National Irrigators Council (NIC):

NIC would agree that NWI consistent water entitlements and planning should be put in place, that projects must be environmentally sustainable and economically viable and deliver public benefits commensurate with the grant funding being provided.

The proviso on the latter condition is that the public benefits considered need to be broad enough to look at a full range of regional development priorities, and benefits that regional Australia might gain from expanding food and fibre production to generate export income and supply local markets. (sub. DR85, p. 13)

⁵⁸ A lack of publicly available business cases and an absence of reporting on project outcomes means data on job creation are scarce. Hence, the limited sample in table 8.4.

⁵⁹ Based on the yield (2.62 per cent) for 10 year Australian Government bonds on 23 August 2017 (RBA 2017).

Box 8.4 **Sample of major irrigation infrastructure projects from 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, about 85–90 per cent of that water remains unsold. Given the low levels of water use, it is unlikely the benefits from irrigation underpinning the business case for the dam have been realised (NECG 2001).

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 2016a, 2016b).

Ord Stage 2, Western Australia (2008–2014)

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 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. (2011, p. 23)

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 that '[t]he 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.

The Goulburn-Murray Water Connections Project (2008 and onward)

The Goulburn-Murray Water Connections Project (Connections) — originally the Northern Victoria Irrigation Renewal Project (NVIRP) — commenced in 2008 with the intention of assisting those in the Goulburn-Murray Irrigation District adjust to reduced water availability and creating water savings for environmental use within the Murray-Darling Basin. Connections aimed to achieve these goals through a program of irrigation modernisation, renewal and reconfiguration.

(continued next page)

Box 8.4 (continued)

Cost and funding

The NVIRP project was initially funded to the value of \$1 billion through the contributions of irrigators (\$100 million), Melbourne water users (\$300 million) and the Victorian Government (\$600 million) in order to provide a total of 225 GL in water savings. These savings were to be evenly distributed for metropolitan urban water supply, environmental use and irrigation. Following the commencement of NVIRP the Australian Government formed an agreement with the Victorian Government to provide an additional \$1 billion in grant funding on the basis that half of any additional water savings be transferred to the Australian Government for environmental use within the Murray-Darling Basin, at which time the project was renamed Connections.

The changing scope and nature of Connections

The Victorian Ombudsman (2011) completed an investigation of the project in response to concerns over governance arrangements. That investigation found deficiencies in procurement processes and the management of conflicts of interest, unclear roles and responsibilities for delivering agencies, and the absence of a business case prior to the original decision to proceed with the project. As a result, the project was recast in 2012 and the functions of NVIRP integrated into Goulburn-Murray Water (GMW).

The Connections project was premised on landowners having strong financial incentives to reconfigure or terminate their connections. The breaking of the drought and the acceptance of uniform charges for the network by the Essential Services Commission has diminished the impetus to form agreements.

In November 2015, a scheduled mid-term review of the Connections project was completed. That review indicated that the project was unlikely to be completed on schedule, within budget or achieve its stated objectives, and that a key risk for the project was that:

... Landowners are not signing up [to the project] at the required rates, pointing to persistent challenges in communicating the intention of the project and the process for selection and prioritisation of landowners for involvement in the project. (GHD 2015, p. 27)

As a consequence, the project was again reset. This time the objective of achieving 204 GL in water savings was given priority over the priorities set out in previous iterations of the project (GMW 2016b). In order to ensure the project is achieved within budget, the timeframe for completion has been extended to October 2020.

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 2016–2018 (Tasmanian Irrigation 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. (IA 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.

Table 8.4 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

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); DPIPW (Tas), pers. comm. 2 June 2017; Tasmanian Irrigation (2015, 2017a); Western Australian Auditor General (2016).

This view is echoed by the National Farmers’ Federation (NFF):

NFF holds the view of the importance of considering the full range of costs and benefits associated with irrigation infrastructure development, including important flow on impacts for communities and the economy as a whole. This must include full examination of the public benefits associated with such investment, including the contribution of projects to regional development, avoided adjustment costs, the ability to mitigate environmental impact, and the local, regional and national economic benefits that flow from investment in water and irrigation infrastructure. (sub. DR131, p. 5)

Although a broader view of economic benefits may be justified where there is evidence to establish the existence of these benefits, there is little evidence to suggest it is appropriate with respect to water infrastructure. Historically the construction of water infrastructure on the basis of prospective economic and regional development benefits has led to investments in unviable projects, which have required substantial ongoing subsidies through debt write-offs or direct grants.

Where regional development is sought as a matter of public policy, the commitment of government to water infrastructure projects may preclude alternative investments in more effective projects to promote regional development. Moreover, investments in water infrastructure may imply continuing government support for economically unviable activities over the medium to long term, distorting private investment and otherwise delaying adjustment within transitioning communities.

There is little evidence to suggest that the regional development benefits claimed to accrue from the construction of water infrastructure to support irrigated agriculture are greater than those that would accrue from alternative investments.

There is a clear need for change

Unviable and unsuccessful projects (and the resultant high cost of jobs to deliver regional development) have not deterred governments from commissioning new water infrastructure. The marginal prospects for many new 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 Australia) are driven by a number of factors including the declining marginal returns from dam construction⁶⁰, 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

Chapter 6 identified the risks associated with using grants and capital subsidies to fund urban infrastructure. These risks include potentially introducing ‘capital bias’ into decision making and allowing for the ongoing underpricing of water services, leading to their suboptimal use and the imposition of a future burden on taxpayers. These risks carry over to new infrastructure for non-urban use as well.

Funding new infrastructure through grants, rather than a user pays approach, also means an important viability check on a new piece of infrastructure — users’ preparedness to pay — is circumvented.

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 that the price of water from the dam was likely to be several times what a viable irrigated agriculture business could pay (Queensland Coordinator-General 2017). The project has however progressed on the premise of servicing mining and urban requirements within the region which have demonstrated a higher willingness to pay, with the environmental impact statement for the project recently being approved and a detailed business case now being developed.

⁶⁰ 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.

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.

Delivering irrigation infrastructure without government grants

Some Australian Government programs provide finance rather than funding for new irrigation infrastructure (box 8.5). Infrastructure financing can be an effective and efficient way for governments to elicit the public benefits of infrastructure which would not be otherwise forthcoming (section 8.2). 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 public benefits and/or public service elements to be realised.

Box 8.5 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 sectors. An example of financing in the irrigation sector is the National Water Infrastructure Loan Facility (table 8.3) 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 'impactors' who create the need for 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 infrastructure should generally be viewed as a 'last resort', and 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, government 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 for which government financing has already been committed.

Ensuring that projects are supported by NWI-consistent entitlement and planning frameworks

Under the NWI, jurisdictions have agreed that all new and refurbished infrastructure should be environmentally sustainable and economically viable. Achievement of these objectives is underpinned by the adoption of NWI-consistent entitlement and planning frameworks. The absence of sound planning and entitlement frameworks has historically led to excessive and inefficient use of water resources and environmental degradation, which have undermined the development that infrastructure projects often seek to promote.

Before committing funding or financing for water related projects, compliance with the NWI, should be assured. This is the case both for current infrastructure development programs (such as the Northern Australia Infrastructure Facility (NAIF)) and funding made available as part of City Deals.⁶¹

As discussed in chapter 3, neither Western Australia nor the Northern Territory has enacted legislation to enable NWI-consistent water entitlement and planning arrangements. In the Commission's view, such arrangements need to be in place before progressing 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, 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)

⁶¹ City Deals is an initiative to bring together 'the three levels of government, the community and private enterprise to create place-based partnerships' with the goal of helping 'to secure the future prosperity and liveability of our cities' (DPMC nd).

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 Murray-Darling Basin 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 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 CSIRO in assessing water resources in northern Australia (box 8.6) has been a pragmatic approach to resolving this tension while supporting environmentally sustainable development.

Box 8.6 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. 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.

CSIRO’s preliminary appraisal was undertaken using landscape information and detailed modelling to determine the water storage potential of sites across northern Australia. Eleven 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).

Governments should review and evaluate the outcomes from 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 2015b, p. 46)

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 ...

From 2014, governments have announced eleven significant infrastructure projects that will provide water for irrigated agriculture (table 8.2).⁶² All eleven 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 8.3).

... but the Northern Australian Infrastructure Facility 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:

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 2015b, p. 47)

Projects should align with the National Water Initiative principles ... (Australian Government 2015b, p. 51)

⁶² 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).

The Department of Agriculture and Water Resources (DAWR 2016a) 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-consistent 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.

8.4 The way forward

Further reform to the institutional arrangements and processes that govern the assessment and selection of infrastructure projects is needed. Two areas particularly stand out to the Commission:

- the need for rigorous, transparent and public cost-benefit analyses
- reducing a project's risk through the pre-sale of water entitlements.

Jurisdictions are no doubt aware of the value of these processes, and for some new water infrastructure, they have been utilised. In order to improve current practices, however, these processes should become commonplace, thereby reducing the risk that governments will invest in unviable projects.

Cost-benefit analysis must be rigorous, transparent and public

Cost-benefit analysis is an important tool to assess the merits (or otherwise) of undertaking new water infrastructure projects. Robust cost-benefit analyses can inform:

- whether there is a net benefit from the infrastructure project proceeding (that is, whether the completion of the project would benefit the community)
- whether the project delivers the greatest net benefit across a range of alternatives (that is, is the proposed project the best one to proceed with, given other projects).

While generally speaking, cost-benefit analyses have been prepared for new irrigation infrastructure projects from 2014 (appendix B), they have often not been publicly released, limiting the extent to which they can build a business case for new infrastructure and hold governments to account to their NWI commitments. Chapter 6 also points to instances where significant investments in urban water projects were undertaken without a public cost-benefit analysis (such as recent investments to augment Townsville's water supply).

The Commission therefore considers that there is considerable scope for jurisdictions to improve how they undertake cost-benefit analysis. While the principles of effective cost-benefit analysis are well documented (Boardman et al. 2011; New South Wales Government 2017c; PC 2014), given the shortcomings of cost-benefit analyses for water infrastructure in the past, a number of principles warrant emphasis.

- Approval for a project *should not be given prior to a cost-benefit analysis being undertaken* which establishes the business case of the project and verifies it as a viable proposition.
- Governments *should not ‘rule out’ legitimate project options* prior to a cost-benefit analysis being completed, nor should they require a project to possess particular characteristics.
- Cost-benefit analyses *should avoid optimism bias*. Optimism bias arises when overly favourable estimates of benefits (or net benefits) are cast as being most likely, or when costs are assumed to be overoptimistically low.
 - As a means of countering optimism bias, and accounting for risk and uncertainty more generally, cost-benefit analyses *should include sensitivity analysis* with respect to key costs and benefits.
- Cost-benefit analyses *should treat secondary effects with caution*. The inappropriate inclusion of secondary effects can contribute to the double counting of benefits, and unduly inflate estimates of net benefits.
- Cost-benefit analyses *should utilise the most up-to-date available data* and should be updated as new information becomes available.
- Cost-benefit analyses *should be undertaken free of politicisation*.
- Cost-benefit analyses should be *publicly released in full* upon their completion so that interested parties — and the public more generally — have the opportunity to scrutinise the underlying assumptions, the methodology used and the outcome of the analysis.

The importance of these principles are demonstrated in the case of the New South Wales Government’s capital subsidy for a pipeline to connect Broken Hill to the River Murray (box 8.3). The New South Wales Government only released a summary of its cost-benefit analysis (DPI (NSW) 2017a), and this occurred over one year after the final investment decision was taken. This level of scrutiny is not sufficient to rigorously test this investment decision.

Further, the cost-benefit analysis for the Broken Hill Pipeline assumes that it is cost-effective, and necessary, to comply with the New South Wales Government’s guidelines on urban water security. This effectively ruled out alternative options that involved a lower level of water security, but lower levels of subsidy. Given the significant cost difference between the Menindee Lakes and River Murray supply options (over \$250 million), the failure to examine these issues cannot give confidence that the best project option was selected.

Reducing a project's financial risk to government

Government investment in water infrastructure where demand for water is uncertain poses a risk that the new infrastructure will be underutilised. However, governments have access to a variety of instruments that can be used to minimise this risk — including contracts⁶³, pre-sale of entitlements and non-refundable deposits. These instruments can, and should be, used to elicit the willingness of users to pay for the costs of a project. They establish the true scope and nature of demand and allow projects to be tailored to reflect the services required by users. They also allow the design of infrastructure to be optimised.

Governments should seek to utilise a variety of these instruments to mitigate the risks of infrastructure projects being underutilised.

Pre-selling water entitlements has many benefits ...

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 generates 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 8.4) 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 by holding 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 a NWI-consistent 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 to 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 new infrastructure
- the pre-commitment of a portion of project costs through deposits reduces the overall cost of finance
- auction processes may allow for the identification of highest value uses and allow for project design to reduce costs.

⁶³ Contracts also provide the opportunity for unique service offerings to be made that align with user demands and for which users are willing to commit to funding on an ongoing basis.

Selling entitlements before rather than after construction (as is typically done) 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.

... but is not commonly done

There are some examples of the pre-selling of water entitlements in Australia, although they are rare. One example of its use is tranches 1 and 2 of the Tasmanian Irrigation schemes, which 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 pre-sale agreements, purchasers paid a binding and non-refundable deposit upfront and the balance of the purchase price when the schemes were commissioned (Tasmanian Irrigation 2016b).⁶⁴ The deposits were usually for 10 per cent of the purchase price but differing structures could be employed depending upon the timing of 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 instance⁶⁵
- having proposed infrastructure charges reviewed and confirmed as cost reflective by an economic regulator.

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

⁶⁴ In most cases, commissioning occurred 12–18 months after the sale of the required level of water entitlements and the commencement of construction.

⁶⁵ 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.

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 at a commercial rate and cover the operating costs of the infrastructure (that is, upper bound pricing).⁶⁶ This level of cost 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.

RECOMMENDATION 8.1

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

- a. National Water Initiative-consistent water entitlements and planning frameworks are in place before any new infrastructure is considered (including infrastructure being financed under the Northern Australia Infrastructure Facility)
- b. government grant funding is limited to those projects, or parts of projects, delivering a public good. Grant funding should not be provided until after an independent analysis of the project has been completed and made available for public comment. This analysis 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 8.1 (a) to 8.1 (c).

⁶⁶ 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 based on the net investment — that is, the initial investment less any funds repaid through the sale of water entitlements.

9 Key supporting elements of the NWI

Key points

- Key supporting elements under the National Water Initiative (NWI) include actions to improve water information and knowledge, including community and stakeholder input. Governments also agreed to address adjustment issues when implementing the NWI.
- These elements need to be an area of ongoing focus for all jurisdictions.
- 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.
- Although 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.
- Evidence of poor compliance and enforcement arrangements in some Basin jurisdictions has come to light, and warrants close examination by governments.
- An independent investigation into New South Wales' compliance regime recommended a package of structural reforms (such as changes to governance arrangements) and operational improvements (such as capacity building, documenting processes and increased public reporting).
- The Murray-Darling Basin Authority also found scope for improved compliance arrangements in New South Wales, Queensland and (to a lesser extent) in Victoria.
- It is important that the reforms to metering and compliance arrangements are commensurate with the risks to the integrity of the water entitlements and planning frameworks they seek to address, and that they are subject to scrutiny through standard regulatory and economic review processes.
- Ongoing research and capacity building will 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 (for example, about liveability and amenity). Areas requiring particular focus include developing new knowledge and/or capacity to assist with:
 - adjusting water resource management to respond to climate change; developing an adaptive approach to managing environmental water; understanding the cultural value of water systems to Indigenous communities; the adoption of outcomes-based environmental regulation for the urban water sector; and understanding the costs and benefits of integrated water cycle management approaches.
- Governments, water utilities and research institutions should collaborate 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 should be on developing the capacity of communities to deal with the impact of structural adjustment.

Water reforms have sought to transform water allocation (chapters 3 and 4), improve environmental management (chapter 5), and reform pricing and institutional arrangements for water infrastructure services (chapters 6 to 8). To enable these changes, Australian, State and Territory Governments have embedded supporting elements in the reform process. Key supporting elements under the National Water Initiative (NWI) included actions to improve water information and knowledge, including community and stakeholder input. Governments also agreed to address adjustment issues arising from the implementation of the NWI (through, for example, the gradual phasing in of policy changes that result in reduced water for consumptive use in some systems, to allow businesses to adapt their operations).

This chapter examines jurisdictions' progress in implementing the supporting elements of the NWI and considers whether further action is needed to support future reform efforts. It covers water accounting (section 9.1), knowledge and capacity (section 9.2), engagement with communities and stakeholders (section 9.3), and adjustment assistance (section 9.4).

9.1 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 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.

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 are used 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) has 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 and measurement

In 2009, COAG (2012) 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 Framework has a 10-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 Framework.

Implementation of the Non-Urban Metering Framework has been subject to delays (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 Framework. Sinclair and Holley (2015) argued 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 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. The National Irrigators' Council echoed the need to review the standards:

Australian manufacturers are undertaking their own extensive testing, often in their own facilities and are achieving extremely good results, but unfortunately these are not recognised under the National Metering Standard. (sub. DR85, p. 14)

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).

Several participants to this inquiry highlighted opportunities to further extend effective metering and measurement of water use (Carmody et al., sub. 6; Queensland Farmers' Federation, sub. 61 and DR101; Department of Water (WA), sub. 80). For example, the Department of Water (WA) (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 the further work required to implement metering and measurement for non-stock and domestic licences in the Great Artesian Basin.

In 2017, Australian and State Governments initiated a number of reviews on compliance and enforcement (discussed further below) within the Murray-Darling Basin (MDB). Two of these reviews — one by Ken Matthews AO (mainly pertaining to New South Wales) and the

other by the Murray-Darling Basin Authority (MDBA) (covering the entire MDB) — have recommended that jurisdictions adopt more comprehensive metering and non-metered measurement of water take to encourage greater compliance and public confidence in accounting and compliance processes (appendix B, section B.5). Both reviews proposed jurisdictions adopt a ‘no meter, no pump’ policy for water take, with Matthews acknowledging that ‘judgments will need to be made about the cost-and-risk-effectiveness of water metering of small volume or very occasional extractions’ (2017a, p. 2). The MDBA suggested that setting ‘a metering target of 95% per water resource area for meterable take would meet a “no meter, no pump” principle, while avoiding undue cost burdens on small entitlement holders’ (2017g, p. 17). The New South Wales Government has accepted the principles set out in Matthews’ reform package, which included the ‘no meter, no pump’ policy, and announced that meters would be installed for large water users within 12 months (Blair 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).

It is important that reforms to metering arrangements are subject to scrutiny through standard regulatory and economic review processes. In addition, cost-benefit analyses of proposals for more comprehensive metering, such as setting targets to meter 95 per cent of water take, should be made available to the public.

Moreover, to the extent there are concerns that the original timeframes and/or approach to implementing the Non-Urban Metering Framework are no longer consistent with a risk-based principle, it is important that the Australian, State and Territory Governments agree on a way forward with the Framework that maximises the net benefits of rolling out new meters and clearly communicates this to affected water users.

In the MDB, further work is required to clarify how jurisdictions would implement the proposed ‘no meter, no pump’ policy and the implications of this policy for metering coverage, benefits, and costs, above and beyond what is already outlined in state metering policies.

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 jurisdiction-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’

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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 resource management to the environment and other water users’
 5. *monitoring* — more compliance officers in the field to ‘carry out annual monitoring events equal to ten per cent of the total number of water entitlement/licence holders of a water resource’
 6. *reporting* — water agencies publish annual reporting and compliance strategies and statistics. (COAG 2012, p. 1,7,8)

The Australian Government’s funding for implementation of the National Compliance Framework ended, as planned, on 30 June 2016 (appendix B, section B.5).⁶⁷ Most of the funding under the 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).

Compliance is a significant issue and is of direct interest to all entitlement holders and those interested in environmental sustainability. Public confidence in accounting and compliance processes is critical to maintaining the integrity of the entitlement system and the water market. The National Farmers’ Federation noted:

Unresolved allegations of illegal water take and lax compliance systems ... have the potential to damage the public’s confidence that water management approaches are robust and fair. (sub. DR131, p. 6)

The broadcast of an ABC Four Corners program in July 2017 — which raised issues about water management (including compliance) in the Barwon-Darling river system in New South Wales — generated considerable public interest. The program described cases of alleged non-compliance with water laws and regulations in New South Wales, and raised broader questions about the effectiveness of compliance and enforcement regimes.

⁶⁷ The National Compliance Framework was a five year program which began in 2010-11 with the signing of a National Partnership Agreement. Overarching project management of the 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 pay any financial contributions based on their performance and completion of milestones (KPMG 2016).

A number of reviews were announced in response to issues raised by the Four Corners' investigation (box 9.1). For example, the Matthews Interim Report (*Independent Investigation into NSW Water Management and Compliance: Interim Report*) found that shortcomings with New South Wales' compliance regime required a systemic fix. He recommended a package of reforms to make the system more transparent, independent and effective. The package included structural reforms (such as changes to governance arrangements) and a range of operational improvements (such as capacity building, documenting processes and increased public reporting) (Matthews 2017b).

The MDBA (2017g) also found scope for improved compliance arrangements in New South Wales, Queensland and (to a lesser extent) in Victoria. The MDBA raised concerns about a lack of transparency over compliance activity and outcomes in New South Wales, Queensland and Victoria. It found that New South Wales and Queensland both have low levels of compliance resourcing, and that the low level of compliance resourcing in New South Wales was a contributing factor to its ineffective and inconsistent compliance regime. In addition to reporting on compliance dropping off in recent years, the report found arrangements in Victoria are limited by not having an appropriate range of penalties and sanctions available for enforcement.

The investigations into the specific allegations of non-compliance by irrigators from the Four Corners program have not yet been completed, but Matthews' view was that the overwhelming majority of irrigators take compliance seriously and that non-compliance in New South Wales is not rife (Matthews 2017a).

Similar to metering, it is important that compliance and enforcement systems are fit for purpose, risk-based and, given improvements in technology, are open to innovation. The evidence of poor compliance and enforcement arrangements in some Basin jurisdictions that has come to light warrants close examination by governments. Government responses to the reviews described in box 9.1 should be proportionate, well-targeted and transparently consider both the costs and benefits of proposed measures to address concerns about non-compliance.

Water resource accounting was recognised within the NWI as an important underpinning of public support and investor confidence in water entitlements and planning frameworks and markets. However, the findings from recent reviews raise questions as to whether the guidance on compliance embodied by the National Compliance Framework is sufficient to achieve this objective. The Commission has elected to not provide specific recommendations in these areas as a full and considered response would benefit from further time to analyse the outcomes and recommendations of these reviews, and the release of other announced reviews.⁶⁸ Notably, the Commission will have the opportunity to consider compliance issues in 2018 as part of the inquiry into the implementation of the Basin Plan (which covers the jurisdictions where concerns have been raised).

⁶⁸ At the time of writing, several of these reviews have only been recently publicly released and some others are still forthcoming.

Box 9.1 **Reviews in response to the issues raised by Four Corners**

A number of reviews were announced following the ABC Four Corners program, 'Pumped', in July 2017.

On 26 July, the New South Wales Government appointed Mr Ken Matthews AO to conduct an independent investigation into the issues raised by Four Corners. The interim report (Matthews 2017b, p. 4) concluded that 'water-related compliance and enforcement arrangements in NSW have been ineffectual and require significant and urgent improvement'. Matthews' package of recommended reforms aimed to achieve a systemic fix via:

- a package of strategic structural improvements to be considered by ministers
- a wide range of administrative and operational improvements to be considered by the Secretary of the Department of Industry.

The New South Wales Government accepted the package of reforms in principle and the final report advised on implementation and assessed progress to date (Matthews 2017a).

The NSW Ombudsman's (2017) progress report summarised themes from four investigations into compliance and enforcement that it has conducted since 2009. It noted that Matthews' findings were 'largely similar' to its own findings and that the reasons for systemic failure included governance issues, under-resourcing, the number of restructures and the absence of a compliance culture. The final report for the latest investigation will be released after April 2018.

The Murray-Darling Basin Water Compliance Review, released in November, contained a report by the Murray-Darling Basin Authority (MDBA) and a report by an independent review panel (MDBA 2017g). The MDBA raised concerns about a lack of comprehensive reporting on compliance, deficiencies in the compliance efforts of some water regulators, including the commitment to accurate metering and measurement of water take, and relatively low levels of compliance resourcing in some Basin jurisdictions.

The Australian National Audit Office (ANAO 2017) released a limited assurance review of the Australian Government Department of Agriculture and Water Resources' assessment of New South Wales' protection and use of environmental water under the National Partnership Agreement on Implementing Water Reform in the Murray Darling Basin (MDB). The review found that a lack of measurable deliverables weakened the agreement's performance framework and that the Department showed 'limited effectiveness' in assessing New South Wales' performance against the agreement's milestones in 2015-16.

Other announced reviews that are yet to be publicly released include:

- the inquiry into the integrity of the water market in the MDB by the Senate Rural and Regional Affairs and Transport References Committee (2017). The Committee recommended extending the final reporting date until March 2018. The terms of reference include the allegations of theft and corruption and use of held environmental water for irrigation
- an investigation by the NSW Independent Commission Against Corruption into the allegations made by Four Corners pursuant to a referral by the Secretary of the Department of Industry
- an independent audit of the Queensland Government's regulatory frameworks for water measurement and compliance, due March 2018 (DNRM (Qld) 2017c). The Minister for Natural Resources and Mines, the Hon Dr Anthony Lynham MP, requested the review to 'ensure that Queensland has its house in order' (Lynham 2017)

On 26 November, the South Australian Premier, the Hon Jay Weatherill (2017b), stated that South Australia would establish a Royal Commission into allegations of water theft in the MDB to begin in early 2018. Weatherill proposed that the Royal Commission would investigate breaches of the MDB Agreement and the adequacy of existing legislation and practices.

Return flows

In some cases, particularly in the MDB, governments have co-invested in new or refurbished irrigation infrastructure (such as piping irrigation channels) and water efficiency measures to secure additional water for the environment (chapter 8). Some of the water savings from these investments have been transferred to the portfolios of environmental water holders. When such investments occur, it is important to consider whether the water savings affect return flows to surface water and groundwater systems that had been providing beneficial use to the environment, other entitlement holders or other landholders.⁶⁹

There are several factors to take into account when assessing the risk of projects on beneficial return flows. First, the increasingly high level of water use efficiency on farms across the MDB has been facilitated over many years as a key action to reduce river salinity and land salinisation. Second, much of the groundwater use across the MDB is sourced from deep aquifers with shallow groundwater being saline, and it is therefore unlikely to be affected by increasing irrigation efficiencies. Third, the level of irrigation applied across the landscape in off-river irrigation districts is low and is often conducted large distances from rivers (S.A. Prathapar, pers. comm., 8 December 2017).

Some participants to the inquiry raised concerns that governments do not account for return flows when assessing the net benefits of water savings projects (ACCC, sub. DR124; EDOs of Australia, sub. DR133; Grafton and Williams, sub. DR93). For example, the ACCC stated:

Given the focus on water use efficiency and the deficiencies of benefit cost analysis of business cases for improving water use efficiency on farm and delivery efficiency off farm, it is not surprising that return flows often have not been appropriately considered. ... There is a substantial future risk to water reliability by continuing to invest in technical efficiency on farm without adequately considering the impact on third parties, including the environment and other water users. (sub. DR124, p. 4)

There is evidence that governments are cognisant of the types of issues that have been raised by participants to this inquiry and have developed water accounting protocols in response to such risks. For example, in 2010 the Australian Government classified the Northern Victorian Irrigation Renewal Project as a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth), in part due to the project's potential effects on the environment from reduced return flows (Wicks 2010). As a consequence, conditions were applied to the Northern Victorian Irrigation Renewal Project, requiring that measures be put in place to mitigate the potential adverse effects of water savings projects on key environmental values. Measures included allocating water to wetlands and waterways affected by reduced return flows that supported high environmental values. The project also had to be undertaken in accordance with the Water Savings Protocol, a key principle of

⁶⁹ Return flows do not necessarily convey third party benefits and can cause environmental damage or be lost to the system. For example, 'where irrigation surface run-off contains high levels of nutrients, salt or other pollutants; or [where] seepage due to inefficient watering causes rising water tables and salinisation of our rivers and landscape' (DAWR 2017f, p. 2).

which was that ‘water savings are the total (gross) volumes saved less the volume of water required to ensure no net impacts due to the project on high environmental values’ (Wicks 2010, p. 7).

In the Commission’s view, it is important to understand the issue of return flows at a local and system scale given the highly variable and disaggregated nature of irrigation within the MDB. However, it needs to be considered in the context of the range of factors which can affect inflows in a dynamic system including private investment in on-farm water efficiency projects, land use in catchments, the impact of bushfires and natural variation.

The Commission has not undertaken a comprehensive assessment of water savings projects and protocols, and acknowledges that a more detailed examination in the future could help promote public understanding of, and confidence in, arrangements for accounting for return flows when governments co-invest in water savings projects. The need to better account for return flows and their third party effects will be considered further as part of the Commission’s inquiry into the implementation of the Basin Plan in 2018.

9.2 Knowledge and capacity building

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
- service delivery in the urban and irrigation sectors.

Building the capacity and capability of water planners and managers through education, training and collaboration supports their ability to put new knowledge to its best use and helps optimise the return on investment in knowledge building.

To support implementation of the NWI, the Australian, State and Territory Governments 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.⁷⁰

Progress under the NWI

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). Since 2014, for example:

- Victoria has developed guidelines on groundwater management and assessing the impacts of climate change
- Queensland has released a plan that aims to identify science requirements to enable and support ongoing water resource management
- South Australia has committed to fund \$8 million of water-related research (2015 to 2018), in partnership with the Goyder Institute.

That said, two mechanisms to support the coordination of knowledge and capacity building at a national level have ceased — the National Water Commission (in 2015) and the National Water Knowledge and Research Platform (in 2016).

Some inquiry participants highlighted concerns about a lack of ongoing public investment in research and development, and the need to support collaboration in the water sector.

Ongoing public investment in research and development is important

Governments commonly play a central role in the provision and funding of water-related research. This role reflects that, without government intervention, the private sector may underinvest in such activity (for example, where external benefits from research and development accrue to those other than the innovator without adequate recompense). In addition, Australian, State and Territory Governments often have a complementary role in managing water resources and may therefore 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).

As with other types of government intervention, public provision and funding of water-related research can have drawbacks if not carefully designed, such as funding activity that recipients would have undertaken anyway without public support, or crowding out private investment.

⁷⁰ NWI paragraph 98.

Further, funding has to be raised from the community through higher taxes, or diverted from other public expenditure areas. Governments therefore have to make trade-offs between such projects across the full range of spending possibilities, where governments have a significant role as a funder (PC 2007, 2010).

Several participants in this inquiry highlighted the importance of continued public investment in water-related research and innovation, and expressed concern over the reduction in public investment that has occurred in recent years (box 9.2). For example, the Australian Academy of Technology and Engineering (sub. 20, p. 3) argued ‘there needs to be considerably more investment in strategic research and science to support improved water management’.

Box 9.2 Investment in water research — participant views

A number of participants in 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)

There is a risk that the advances in water reform based on investment into water research prior to 2010 may be lost without renewed investment into water research. (Goyder Institute for Water Research, sub. DR128, p. 3)

Defining a benchmark for what constitutes an efficient level of public expenditure on water related research would be extremely challenging and contentious, as the nature of water research needs and projects will vary over time and regions. For example, in the years following the signing of the NWI, 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 9.3). So while public investment in water research was comparatively low from 2009 to 2016 (figure 9.1), investment was coming off an historic peak brought about by circumstances that were fairly atypical. Whether and how much of the reduction since 2009 is indicative of ‘underinvestment’ is open to debate. (A more detailed assessment of funding arrangements is beyond the scope of this inquiry.)

Box 9.3 A selection of major Australian Government initiatives since 2004 aimed at advancing knowledge and capacity

Since 2004, the Australian Government has committed significant funds to a number of initiatives 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.

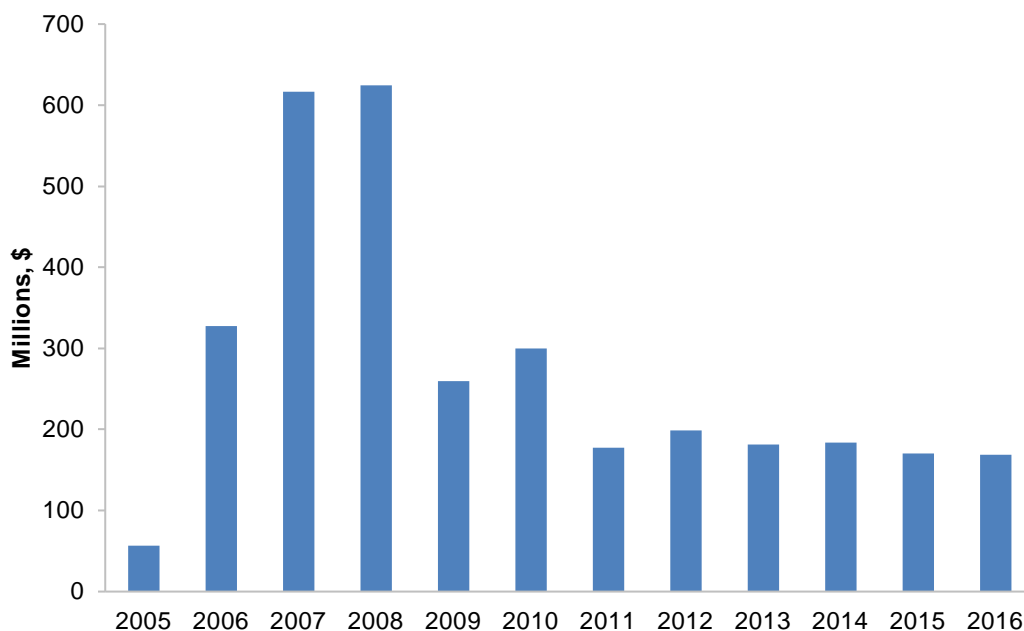
- \$1.6 billion for Water Smart Australia which focused on the development and uptake of smart technologies and good water use practices across Australia (including improving on-farm water use efficiency, irrigation infrastructure, and recycling and reuse of stormwater).
- \$200 million for Rising National 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, State and Territory Governments to deliver research on Australia's groundwater systems. The CRC also runs programs aimed at building the capacity of researchers and groundwater professionals (NCGRT nd)
- the National Centre of Excellence in Desalination Australia (NCEDA) — operated between 2009 and 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 seven Australian and international universities and research organisations (CRCWSC 2016).

Since 2012, the 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 9.1 Australian Government investment in water research^a



^a The figure does not include government funding allocated to water-related Cooperative Research Centres or Centres for Excellence. It is based on Australian Government funding provided to large research organisations for water research, including the Australian Research Council, the Bureau of Meteorology, CSIRO, and the Office of Water Science. Also included is the funding allocated under the Raising National Water Standards and Water Smart Australia programs.

Data sources: Australian Government (2005); DEH (2005); DIIS (2016).

Nonetheless, as outlined above, the Commission recognises that there are sound reasons for government involvement in the provision and funding of water research, and value in maintaining knowledge and capacity in the public sector. As ICE WaRM stated:

Australia's success in the implementation of the 1994 CoAG Water Reform Framework and the subsequent 2004 NWI was achieved through substantial investment by the Federal, state and territory governments in policy, science, regulation, practice and capacity building. ... Future reform will require a similar coordinated investment in research, knowledge brokering and capacity development. (sub. DR135, p. 4)

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. The importance of water to the Australian economy is outlined under the Australian Government's *Science and Research Priorities* (ARC 2017; Australian Government 2015c).

To get the most from available public funding for water research, it is important that research is responsive to emerging needs and challenges (some of which may have changed since the NWI was signed in 2004). Participants to this inquiry have highlighted a number of areas where knowledge and capacity could be improved to better meet future challenges (box 9.4).

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:

- adjusting water resource management to respond to climate change (chapter 3)
- understanding the cultural value of water systems to Indigenous communities (chapter 3)
- developing an adaptive approach to managing environmental water (chapter 5)
- the adoption of outcomes-based environmental regulation for the urban water sector (chapter 6)
- understanding the costs and benefits of integrated water cycle management approaches (chapter 6).

The identified priority areas for improving knowledge and capacity encompass both groundwater and surface water resources.

In addition to knowledge and capacity in the areas identified above, 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 9.4) 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. Governments' extensive involvement in water resources planning and management and environmental regulation means they have a major stake and role to play in identifying and funding some of the current and future knowledge and capacity needs to better discharge their functions.

Box 9.4 Knowledge and capacity needs — participant views

Participants to this inquiry raised concerns about 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)

... discussions with partners of the Goyder Institute have identified the following broad priority areas for future water research: climate change adaptation; alternative water (and energy) supplies to support environmentally sustainable agricultural development; and the water-energy-food nexus. (Goyder Institute for Water Research, sub DR128, p. 3)

... greater focus on water quality is needed encompassing emerging contaminants, climate change impacts on source water, public health aspects of water management and their integration with frameworks designed primarily for water allocation, and customer's water quality expectations that especially in regional and remote areas can outstrip a service provider's ability to deliver. (Water Research Australia, sub. DR140, p. 3)

FINDING 9.1

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.

Collaboration in the water sector should continue to be supported

Governments, water utilities and research institutions work together in advancing knowledge, building capacity, developing technology and devising innovative solutions. A number of formal mechanisms have been established in Australia to support collaborative work. These include Centres of Excellence and Cooperative Research Centres (box 9.3), and partnerships such as the Goyder Institute, Water Research Australia (box 9.5) and Water Services Association of Australia. Collaboration also occurs through other less formal arrangements — for example, research undertaken by individuals from a number of different organisations or joint positions between different organisations.

Box 9.5 Water Research Australia

Water Research Australia (WaterRA) is a not-for-profit company funded by its members which include 20 Australian water utilities, 25 research organisations, and several government departments and private companies.

The origins of WaterRA date back 20 years to the Cooperative Research Centre for Water Quality and Treatment (CRC WQT) funded by the Australian Government and industry partners. The CRC WQT operated for 14 years over two funding terms from 1995 to 2008. As the CRC WQT approached the end of its second funding cycle, the Boards of the CRC WQT and Water Services Association of Australia worked together to establish a self-funded entity, Water Quality Research Australia. Water Quality Research Australia was established in late 2008 (as a not-for-profit, member funded company) and aimed to deliver a responsive research agenda to meet the needs of the industry. In 2013 the name changed to WaterRA.

WaterRA focuses on initiating, facilitating and managing collaborative research in important water issues for the Australian water industry and the community. The company receives research proposals (from members, non-members, researchers and industry) that could potentially benefit the industry. The proposals are then assessed (by stakeholders) to define the research problem. If the project is approved and once the scope is outlined, funding is requested from its members or other interested stakeholders (including private organisations). Once funding is secured, the work goes out to the research community.

WaterRA current research projects are spread across 10 research areas: customers and community engagement and perceptions; IT capability and data analysis; managing contamination water; managing source water; resource recovery and reuse; operational risk reduction and productivity; sustainable management of environmental impacts; Integrated Water Management and Water Sensitive Urban Design; climate change; and economic regulation, frameworks and productivity.

There are a number of benefits to this model of collaboration including targeting research resources more effectively and efficiently, facilitating engagement and knowledge exchange between a range of participants in the water sector, encouraging co-investment in research and development within the sector, and informing the development of nationally agreed guidelines. For example, the CRC WQT developed the Water Quality Management Framework which was incorporated into the Australian Drinking Water Guidelines.

Source: Water Research Australia (nd).

The need to continue to work together was identified by a number of inquiry participants (Australian Water Association, sub. 66, sub. DR138, sub. DR145; ICE WaRM, sub. DR135; Water Research Australia, sub. DR140; Water Services Association of Australia, sub. 35, sub. DR136). For example, the Australian Water Association 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. (sub. 66, p. 5)

Likewise, the importance of mechanisms that support collaborative work was also highlighted. For example, the Water Services Association of Australia noted:

... the 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. (sub. 35, p. 13)

Similarly, the Goyder Institute for Water Research stated:

There are likely to have been many different mechanisms that have been implemented to work cooperatively and share knowledge to build overall capability and capacity. ... By way of example, the Goyder Institute has fostered the sharing of information between researchers and policy-makers and researchers and other researchers that would have not otherwise occurred. Another South Australian example is the establishment of joint-positions between state government departments and research organisations. These positions have been viewed as extremely successful in facilitating the scoping of research projects and the uptake of research outputs to meet government needs. Similar joint positions between research organisations and industry or government and industry would likely provide similar benefits. (sub. DR128, p. 5)

Collaboration and the coordination of knowledge and capacity building initiatives can deliver a number of benefits. Collaboration and coordination 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, the private sector and jurisdictions to build overall capacity and capability
- inform the development of frameworks, standards and guidelines
- aid in building capacity and capability in regards to adopting new products and technologies (box 9.6).

Box 9.6 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 plays 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 (that pinpoint leak locations) and pipe rovers (to repair the leaks).

While collaboration at a national level can provide numerous benefits (for example, Water Research Australia, box 9.5), the benefits of collaborating are not dependent on the involvement of the entire industry or sector. Collaboration can be beneficial even with a few participants as it assists in building capacity and capability.

Given that ongoing research and capacity building will be central to Australia's ability to deliver the sustainable management of water resources in the face of future challenges, mechanisms should continue to be developed to enable and support the sharing of ideas and resources, and to aid in building overall capability and capacity. These mechanisms will be particularly beneficial in instances where there are common knowledge and capacity gaps, and where available resources (both financial and human) are limited.

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, governments will need to re-commit to identify, and work collaboratively to address, future knowledge and capacity needs.

RECOMMENDATION 9.1

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 revise relevant provisions in the National Water Initiative to align with recommendations 9.1 (a) and 9.1 (b).

9.3 Engagement with communities and stakeholders

Under the NWI, jurisdictions agreed to engage communities and stakeholders in achieving the objectives of the NWI. More specifically, they agreed to open and timely consultation with stakeholders in relation to pathways for returning overdrawn surface water 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 9.7) 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.

Box 9.7 **Effective stakeholder and community engagement**

For stakeholder engagement mechanisms to be effective, they should be:

- representative — all relevant stakeholders and communities have an opportunity to express their views
- informative — all relevant stakeholders and communities have an opportunity to obtain information that enables them to increase their level of knowledge on issues that are being considered
- responsive — the information and views gathered through the engagement process are taken seriously by decision makers and are used to inform decisions.

Sources: Hart and Doolan (2017); Manwaring (2010).

Stakeholder and community engagement has 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.

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 2014b). 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 2011d).

As set out in appendix B (section B.8), the MDBA has increased stakeholder consultation and engagement since 2011 on the Basin Plan.

FINDING 9.2

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

Throughout the inquiry, participants highlighted the importance of continuing to consult and engage with stakeholders and communities (Australian Academy of Technology and Engineering, sub. 20; Australian Water Association, sub. 66; ACCC, sub. DR124; Centroc, sub. DR110; Consumer Action Law Centre, sub. DR94; National Irrigators' Council, sub. DR85; Sydney Water, sub. 36; WWF-Australia, sub. 15):

- when developing and reviewing water management plans (chapter 3)
- during the implementation of the Basin Plan
- in the management of held environmental water (chapter 5)
- in water pricing decisions and when developing urban water policies (chapter 6)
- in making rural water infrastructure decisions (chapter 8)
- when considering and implementing structural assistance measures (section 9.4).

Stakeholder engagement will also 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, the Millennium Drought highlighted the social dependence of both regional and urban communities on water and water environments — local lakes and streams dried up (particularly in regional communities) and urban communities had limited water use due to restrictions. Since then, 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. Given this, strong stakeholder and community involvement will remain an imperative in understanding community expectations and in managing water resources in the future.

9.4 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.⁷¹ (emphasis added)

⁷¹ NWI paragraph 97.

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

Since 2004, concerns about significant adjustment issues associated with water reforms have mainly arisen in the MDB, where most highly developed water resources are located.⁷² In particular, there have been concerns about the adverse effects of reducing allocations for consumptive uses in stressed or overallocated water systems on irrigators and the flow on effects on regional communities. There have also been concerns about reduced economic activity in specific regions as a result of interregional water trading in connected water systems.

In recent years, adjustment issues associated with implementation of the Basin Plan (and new Sustainable Diversion Limits) has been a major source of public interest. The extended (seven year) timeframe for implementing the Basin Plan is designed to provide affected communities and entitlement holders with additional time to adjust to reductions in water availability. In addition, the Australian Government has also:

- since 2008, spent over \$8 billion on infrastructure and water efficiency measures ‘to minimise any adverse impact of water recovery as a result of the Basin Plan, as well as increasing the sustainability of irrigated agriculture across the Basin’ (DAWR 2017e, p. 6)
- recovered water for the environment through the direct purchase of water entitlements on the water market (as opposed to through the uncompensated attenuation of water rights) (chapter 4).

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.

Be conscious to the needs of communities

Structural adjustment is continually occurring and generally does not warrant specific assistance beyond what is generally available through the welfare and tax system. An advantage of relying on these generally available assistance measures is that they target individual needs, rather than particular industries, regions or groups. Conversely, special assistance provided to regions or industries by governments, often with the aim of easing

⁷² 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.

adjustment pressures, can have unintended consequences, such as creating inequitable outcomes or locking in inefficient production (which is subsidised by taxpayers and diverts resources from other uses in the region or the broader economy).

Nonetheless, in some cases, generally available assistance may not be sufficient and there will be a role for specific adjustment assistance. For example, specific adjustment assistance may improve the efficiency of the adjustment process by reducing transitional costs attributable to impediments such as lack of information about alternative employment opportunities (PC 2001). 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 governments consider that there are significant and rapid adjustment issues affecting communities, they should avoid industry assistance and subsidies (Aither 2014). Rather, they should focus on the needs of communities by:

- removing burdensome regulations that get in the way of business owners developing or adopting new products or services, accessing new markets, or working more efficiently
- removing impediments to people gaining new skills and finding employment in more profitable and viable industries or occupations (within or outside of their community) (PC 2017b).

However, the Commission's final report on *Transitioning Regional Economies* (PC 2017b) found that the circumstances under which governments would provide specific assistance to address significant and rapid adjustment issues are rare.

The Commission and others have previously highlighted that subsidies for water infrastructure (often with the dual purpose of recovering water for the environment and easing the impacts of water reforms) can impede rather than facilitate structural adjustment by distorting on-farm and off-farm investment decisions. As noted by the Commission in 2010:

... drawbacks of subsidising irrigation infrastructure investment include that it:

- is inconsistent with the cost recovery principles agreed to by governments under the NWI
- can lead to 'gold plating' assets that may subsequently become stranded
- is inequitable for those who have already made such investments privately at full cost.

If investments do not meet basic cost-benefit criteria, they will just perpetuate a dependence on external support, delaying the adjustment these communities will inevitably have to face. (PC 2010, pp. XXXIV–XXXV)

In assessing the case for, and 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 (appendix B, section B.8). 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 2017b).

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 final report on *Transitioning Regional Economies* (PC 2017b) provides some guidance for governments in this regard.

A community focused approach requires governments to have a good understanding of communities and the factors shaping them. Community consultation (section 9.3) will be a critical part of building this understanding.

Monitoring and evaluation is an essential (if often overlooked) part of the adjustment assistance process (appendix B, section B.8). 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.

RECOMMENDATION 9.2

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 affecting 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 9.2 (a) to 9.2 (d).

10 Progressing reform

Key points

- Perseverance and continuity of effort are required to ensure gains from water reform are maintained and built upon. The relatively benign conditions in most parts of Australia over the past few years are not expected to last — it is time to move into the next phase of water reform so that we are prepared for future challenges.
- 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 recommendations relate to 'unfinished business' under the National Water Initiative (NWI) and others represent new reform proposals.
- The reform proposals contained in this 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 avoid backsliding and 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.
- Were the NWI not to be renewed Australia would run the risk of creating a legacy of problems, such as excessive water bills, less liveable cities and worsening environmental outcomes.
- 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 water infrastructure investment.
- Australian, State and Territory Governments should negotiate a renewed NWI through COAG by 2020.
- Parties to the NWI should consider including a six year work program as a schedule to the renewed NWI, which could be revised and updated to cover a further 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 by 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 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.

10.1 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.

Further reform is essential to maintain these foundations (particularly given signs of backsliding in some jurisdictions) and respond to emerging challenges. Perseverance and continuity of effort are required to ensure gains from water reform are maintained and built upon. The relatively benign conditions in most parts of Australia over the past few years are not expected to last — it is time to move into the next phase of water reform so that we are prepared for future challenges.

Some of the 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 entitlement and planning arrangements that provide for water access entitlements that are long term, not tied to land, and tradeable.

Other 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 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 and extreme weather events.
- 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. It is critical that governments act now given the urgency of these challenges and the opportunities for increased productivity and efficiency.

10.2 There are advantages in taking a national approach

The recommendations on unfinished business from the NWI relate to government commitments made over a decade ago that are yet to be implemented. The governments concerned should act on these recommendations without delay.

There are a number of ways to progress the 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:

- promote an ongoing national dialogue between government leaders on issues of national importance and demonstrate commitment on such issues
- provide a clear, coherent and credible blueprint for water reform that outlines the goals and outcomes for reform in a way that is visible to all water users and stakeholders
- enable lessons learned from developing water resources to be applied to other jurisdictions, 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 develop coordinated policies
- encourage accountability, including through joint responses to independent reviews of progress.

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. Moreover, continuing with a national approach would allow governments to capitalise on the considerable goodwill and credibility associated with the NWI.

Taking all of these factors into account, it is the Commission’s view that, while independent action is important, better outcomes will be achieved by continuing with a ‘collaborative federalism’ approach and renewing the NWI. Were the NWI not to be renewed Australia would run the risk of creating a legacy of problems, such as excessive water bills, less liveable cities and worsening environmental outcomes.

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 measureable, 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. Renewing the NWI would show leadership and commitment from governments on an issue considered by their communities to be critical to Australia's future.

10.3 Maintaining, revising and enhancing the 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 to deal with contemporary issues
- include significant enhancements in the areas of urban water, environmental management and new 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 replaced.

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. This is particularly important given recent concerns about compliance with water laws and examples of jurisdictions backsliding on reform (such as the Tasmanian Government's plan to cease price regulation of Tasmania's main water utility and the South Australian Government's proposal to de-corporatise SA Water).

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 (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 (recommendation 3.1c)
 - providing guidance on water plan reviews aimed at allowing optimisation of water use and system operation across all users (recommendation 3.1d)
 - exploring opportunities to better incorporate water quality issues in water planning (recommendation 3.1e)
- ensure that entitlement frameworks can include alternative water sources, such as stormwater, wastewater, and managed aquifer recharge (recommendation 3.1f).

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 (where they decide to do this). Specifically, they should:

- source water within existing water entitlement frameworks, such as by purchasing it on the market or as part of a transparent process for releasing unallocated water (recommendation 3.3a)
- ensure adequate supporting arrangements are in place to enable Indigenous communities to maximise the value of the resource (recommendation 3.3b)
- involve Indigenous communities in program design (recommendation 3.3c)
- ensure future governance arrangements are specified and implemented (recommendation 3.3d)
- regularly monitor and report on these provisions and their outcomes (recommendation 3.3e).

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 (recommendation 4.1a).

There is also scope to improve the quality and consistency of economic regulation through the adoption of a set of national principles (recommendation 6.4c).

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 cooperatively and share knowledge to build overall capability and capacity (recommendation 9.1).

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, among other things, avoid industry assistance and subsidies, and should consider all factors impacting on the community (recommendation 9.2).

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 the sector due to population growth, increased urbanisation, climate change, and community expectations for improved amenity and liveability of cities. Having an ambitious urban water work program in the NWI is particularly important given the size of the sector and the fact that cities are the key drivers of economic activity in Australia.

A renewed NWI should reflect the need for State and Territory Governments to:

- require that decision-making processes for supply augmentation 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 (recommendation 6.1b)
- ensure that decentralised integrated water cycle management approaches are considered on an equal footing alongside other water supply and management approaches. Integrated water cycle management 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 (recommendation 6.2).

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 nationally agreed approach to improving areas such as the integration of water and waterway management, governance 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 water with complementary waterway management at the local level, including by making objectives consistent and coordinating planning processes (recommendation 5.2)
- Australian and New South Wales Governments to review governance arrangements for held environmental water (and other water that can be actively managed) with a view to ensuring it is managed independently and at arm’s length from governments (recommendation 5.3)
- Australian, New South Wales, Victorian and South Australian Governments to devolve the use of held environmental water to the lowest practicable level, where capability exists and higher-level involvement is not required to achieve the outcomes sought (recommendation 5.5)
- Australian, State and Territory Governments to ensure that better use is made of the results of monitoring, evaluation and research on environmental water as part of an adaptive management cycle. To achieve this, responsibility for adaptive management should be clearly allocated and adequately resourced (recommendation 5.6e).

New infrastructure investment

The Australian Government currently has over \$4 billion available in grants and loans for water 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. Poor project selection processes in the past have resulted in the construction of economically unviable infrastructure that has created substantial ongoing costs for taxpayers, industry, communities and the environment and these mistakes should not be repeated.

As set out in recommendation 8.1:

- 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 and any grant funding should be subject to an open and independent analysis of the project's environmental sustainability and economic viability
 - 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 the finance will be repaid.

RECOMMENDATION 10.1

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 and compliance, water pricing and institutional reform, 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
 - ... improving the quality and consistency of economic regulation
 - ... key knowledge and capacity building priorities
 - ... 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.

In addition to the areas discussed above, in developing a renewed NWI, attention should be given to updating commitments relating to ongoing audit and assessment of progress.

Some inquiry participants also suggested that the NWI should incorporate the United Nations Sustainable Development Goals (WSAA, sub. DR136). These are wide ranging and include goals relating to clean water and sanitation (the threshold for which Australia has already been assessed as meeting (WSAA 2017a)). The Commission's proposal for a renewed NWI is designed to deal with the specific water management challenges faced by Australia. If implemented, this reform agenda would broadly align with the Sustainable Development Goals and help Australia meet its obligations, while focusing specifically on nationally important issues.

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 midpoint 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 midpoint review to cover the remaining six years. This would enable the NWI to remain up-to-date throughout the period.

10.4 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 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 the most appropriate forum through which to renew the Intergovernmental Agreement for the NWI.

In developing a renewed NWI, Australian, State and Territory Governments should consult with relevant stakeholders in all jurisdictions, including by establishing an Indigenous working group to provide advice on the development of provisions for Indigenous economic development and cultural benefits. Several inquiry participants (including the Madjulla Inc, sub. DR112, and Grafton and Williams, sub. DR93) advocated the recommendation for an Indigenous working group be extended to a longer-term 'First People's Water Council'. However, the role envisaged by the Commission would be completed once a renewed NWI was agreed. Beyond this time, engagement with Indigenous Australians on water policy would continue to be important, but in

the Commission's view, would be best achieved through more flexible arrangements than would be provided by a standing national body, particularly given that much of the focus for implementation of the agreement will need to be at state and local levels.

Some inquiry participants called for the Australian Government to make incentive payments to jurisdictions to encourage reform (including the Australian Water Association, sub. DR138, and WWF-Australia, sub. DR106). 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 for this purpose. However, any Australian Government funding or financing of water-related projects should be conditional on compliance with the NWI (chapter 8).

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 building the capability of States and Territories to fulfil Indigenous water commitments through skills development and knowledge sharing. In addition, where specific issues exist with the capacity of individual jurisdictions to comply with their reform commitments, targeted funding to address the underlying resourcing or information gap may be warranted.

Some inquiry participants called for a the introduction of a new national body, akin to the previous National Water Commission, to coordinate and oversee a renewed NWI (Consumer Action Law Centre, sub. DR94; Moles, sub. DR103; WSAA, sub. DR136). The Commission's view is that it is the role of governments to coordinate reform, and that this could be done through the existing National Water Reform Committee (which includes senior officials from water-related departments in all jurisdictions). The National Water Reform Committee would also provide an appropriate forum for deciding whether things such as the development of technical standards are needed to support reform, and if so, decide on cost sharing arrangements. As discussed earlier, the Commission will report on progress under the NWI every three years.

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 this report, regardless of whether a renewed NWI is developed.

RECOMMENDATION 10.2

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 — were 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 145 public submissions during the inquiry — 83 prior to the release of the draft report and 62 in response to the draft report (table A.1). 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* (Cwlth), the Commission established a stakeholder working group. The stakeholder working group (SWG) was an important avenue for consultation. It provided a forum to exchange information and views on issues relevant to this inquiry. The SWG members are listed in table A.4. The Commission met with the SWG on 23 February, 23 May, 15 September and 11 October 2017.

Public hearings were held in Canberra, Sydney, Adelaide and Melbourne (table A.5).

The following public documents were prepared by the Commission in this inquiry:

- issues paper — released 16 March 2017
- draft report — released 15 September 2017.

The final inquiry report was provided to Government on 19 December 2017 and is to be released publicly within 25 parliamentary sitting days from that date.

Table A.1 Public submissions received

<i>Participant</i>	<i>Submission no.</i>
Energy and Water Ombudsman (SA) (EWOSA)	1
Humphries, Robert	2
Environment Victoria	3
Moles, Sarah	4, DR103
Bureau of Meteorology (BOM)	5
Carmody, Emma; Cosens, Barbara; Gardner, Alex; Godden, Lee; Gray, Janice; Holley, Cameron; Lindsay, Bruce; Macpherson, Liz; Nelson, Rebecca; O'Donnell, Erin; O'Neill, Lily; Owens, Kate; Sinclair, Darren	6
Khan, Stuart (UNSW Sydney, School of Civil and Environment Engineering)	7
CSIRO	8
Institute for Land Water and Society, Charles Sturt University	9
Walker, Bruce and Grey-Gardne, Robyn	10
Irrigation Australia Limited (IAL)	11
Sustainable Population Australia (SPA)	12
National Irrigators' Council (NIC)	13, DR85
Madjulla Inc	14, DR112
WWF-Australia	15, DR106
Murray Irrigation	16
Inland Rivers Network (IRN)	17
Independent Pricing and Regulatory Tribunal (IPART)	18, DR98
Infrastructure Partnerships Australia (IPA)	19, DR127
Australian Academy of Technology and Engineering (ATSE)	20
Triple BL Legal	21
Eastern Metropolitan Regional Council (EMRC)	22
Horne, Avril; O'Donnell, Erin; Webb, Angus; Nathan, Rory (University of Melbourne)	23
NRM Regions Australia	24
Southern Riverina Irrigators (SRI)	25
O'Bryan, Katie	26
Soils for Life (SFL)	27
Australian Competition and Consumer Commission (ACCC)	28, DR124
Stormwater Australia	29, DR122
Bycroft, Brian	30
Nature Conservation Council of NSW (NCC)	31
SunWater Limited	32, DR107
Lachlan Valley Water Inc (LVW)	33
Engineers Australia	34, DR96
Water Services Association of Australia (WSAA)	35, DR136
Sydney Water	36, DR86
Federation of Victorian Traditional Owner Corporations	37
Sustainable Business Australia (SBA)	38
Pettigrew, John	39
Wentworth Group	40
qldwater	41, DR105

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Table A.1 (continued)

<i>Participant</i>	<i>Submission no.</i>
NSW Irrigators' Council (NSWIC)	42, DR129
The City of Newcastle	43
Flow	44
Queensland Government	45
Coleambally Irrigation Cooperative Limited (CICL)	46
VicWater	47, DR118
Walpole, Alison	48, DR87
Watson, Alistair	49, DR123
Infrastructure Australia	50
Monash Water Sensitive Cities (Monash Sustainable Development Institute)	51
Cairns Regional Council	52
Ricegrowers' Association of Australia (RGA)	53
Urban Water Cycle Solutions	54
National Farmers' Federation (NFF)	55, DR131
Victorian Association of Forest Industries (VAFI)	56
Department of Primary Industries, Parks, Water and Environment (Tasmania)	57
Macquarie River Food and Fibre (MRFF)	58
ACT Government, Environment Planning and Sustainable Development Directorate	59
Murray Lower Darling Rivers Indigenous Nations (MILDRIN)	60
Queensland Farmers' Federation (QFF)	61, DR101
Northern Australian Environmental Resources Hub	62
Commonwealth Environmental Water Holder (CEWH)	63, DR115
EDOs of Australia (EDO A)	64, DR133
Business Council of Australia	65
Australian Water Association (AWA)	66, DR138, DR145
National Health and Medical Research Council (NHMRC)	67
Living Utilities	68
National Environmental Law Association (NELA)	69
Central NSW Councils (Centroc)	70, DR110
Local Government Association of Queensland (LGAQ)	71
Local Government NSW (LGNSW) and the Water Directorate	72
Department of Agriculture and Water Resources (DAWR)	73, DR113
Institute for Sustainable Futures (ISF)	74, DR125
Rainwater Harvesting Association of Australia (RHAA)	75
Australian Forest Products Association (AFPA)	76
Galletly, Jim	77, 78, 79
Department of Water, Western Australia	80
Murray-Darling Basin Authority (MDBA)	81, DR120
Joseph, Alison	82, DR99
University of Melbourne	83, DR130
Crase, Lin	DR84
Melbourne Water	DR88

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Table A.1 (continued)

<i>Participant</i>	<i>Submission no.</i>
Essential Services Commission	DR89
Langford, John	DR90
International Association of Hydrogeologists (IAH)	DR91
Hartwig, Lana and Jackson, Sue (Griffith University)	DR92
Grafton, Quentin and Williams, John (Australian National University)	DR93
Consumer Action Law Centre (Consumer Action)	DR94
Kimberley Land Council (KLC)	DR95
CANEGROWERS	DR97
South Australian Council of Social Services (SACOSS)	DR100
White, E.T; Peterson, T.J; Costelloe, J; Western, A.W; Carrara, E	DR102
Unitywater	DR104
Business Council of Co-operatives and Mutuals (BCCM)	DR108
Nelson, Rebecca	DR109
Zanker, Mark	DR111
Cooke, John	DR114
New South Wales Department of Industry	DR116
Moggridge, Bradley	DR117
Law Council of Australia	DR119
Ross, Andrew	DR121
Water Industry Alliance (WIA)	DR126
Goyder Institute for Water Research	DR128
Tasmanian Government	DR132
Dental Health Services Victoria (DHVS)	DR134
ICE WaRM	DR135
Victorian Government	DR137
Local Government of New South Wales (LGNSW)	DR139
Water Research Australia (WaterRA)	DR140
Minerals Council of Australia (MCA)	DR141
Carter, Raymond	DR142
South Australian Government	DR143
Cooperative Research Centre for Water Sensitive Cities (CRCWSC)	DR144

Table A.2 Consultations

ACT Government - Environment and Planning Directorate
AgForce
Aither
Australian Academy of Technology and Engineering (ATSE)
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 Association (AWA)
Australian Water Brokers Association
Bundaberg Regional Irrigators Group
Bureau of Meteorology (BOM)
Centre for Global Food and Resources – University of Adelaide
Coleambally Irrigation Limited
Commonwealth Environmental Water Office (CEWO)
CSIRO
Department of Agriculture and Water Resources (DAWR)
Department of Environment
Department of Environment, Water and Natural Resources (South Australia)
Department of Industry, Innovation and Science
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
Infrastructure Partnerships Australia
Inside Infrastructure
IPART
Jackson, Sue – Griffith University
Local Government Association of Queensland
Lower Murray Water
Macquarie Franklin
Marsden Jacob Associates (MJA)
Maywald, Karlene
Minerals Council of Australia (MCA)
Murray-Darling Basin Authority (MDBA)

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Table A.2 (continued)

National Farmers' Federation (NFF)
National Irrigators' Council (NIC)
Northern Australia Development Office
NRM North
NRM Regions Australia
NSW Department of Primary Industries, Water
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
SA Water
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 Department of Environment, Land, Water and Planning
Victorian Environmental Water Holder
VicWater
WA Farmers
WaterNSW

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Table A.2 (continued)

WA Water Corporation
Water Services Association of Australia
Water West
Western Australian Department of Water and Environmental Regulation

Table A.3 Workshops and Roundtables

20 June 2017 – Liveability Workshop

Cooperative Research Centre for Water Sensitive Cities	Ben Furmage
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

Bradley 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 Heatt
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

Table A.5 Public hearing participants

Canberra — 16 October 2017

National Farmers' Federation
Central NSW Councils (Centroc)
Moggridge, Bradley

Sydney — 17 October 2017

Water Services Association of Australia
Australian Water Association
Sydney Water
Woodward, Roger
Greater Sydney Commission

Adelaide — 23 October 2017

ICE WaRM
Water Industry Alliance
Goyder Institute
Water Research Australia

Melbourne — 24 November 2016

Inxure Strategy Group
University of Melbourne
Cooperative Research Centre for Water Sustainable Cities
Australian WaterSecure Innovations
Watson, Alistair

B Assessment of progress

This appendix assesses jurisdictions' progress towards achieving the outcomes and objectives 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 to which they have completed these actions
- provides the Commission's view on the extent to which 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 frameworks (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, outcomes and objectives that can be more readily assessed against the facts. For example, 'States and Territories will prepare water plans along the lines of the characteristics and components at Schedule E'.⁷³ In other areas, the assessment of progress is less straightforward, as some 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 defined what it considers to be the criteria for meeting the NWI requirements. The terminology for the Commission's assessment of progress is set out in box B.1.

⁷³ 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 are 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).
- **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 trading) 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 conducted initial consultations with NWI parties and sent the jurisdictions 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 and areas for further work

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

Despite this good progress, there are a number of areas where jurisdictions need to do further work to meet the outcomes and objectives of the NWI. In its next triennial assessment, the Commission will consider progress in these areas, as well as whether there is backsliding against other areas of the NWI. The Commission will also assess progress against recommendations made in this report that go beyond current NWI commitments.

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 Murray-Darling Basin (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 service providers in New South Wales, Victoria, South Australia, Tasmania and the ACT. Western Australia, the Northern Territory, Queensland and regional New South Wales do not have independent economic regulation.
- Cost-reflective pricing is generally being used 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 water provision, and some arrangements are in place to coordinate water use for water resources shared across jurisdictions.

5. Water resource accounting

- Water metering, accounting and compliance systems are in place in all jurisdictions.
- Evidence of poor compliance arrangements in some MDB jurisdictions has come to light.

6. Urban water reform

- Water reuse, water use efficiency, water sensitive urban design and innovation have improved since the introduction of the NWI.
- Drinking water quality generally meets existing guidelines. Issues remain, particularly in some remote communities, but action is being taken.

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 are some areas where improvements are needed by all Australian, State and Territory Governments. Priorities include:

- improving specification of environmental and other public benefit outcomes in water planning (including in relation to Indigenous cultural values)
- better monitoring and reporting arrangements to support achievement of those outcomes
- making arrangements for independent auditing of environmental water outcomes and supporting management arrangements.

A summary of recent progress and areas for further work for each jurisdiction is set out below.

New South Wales

Since 2014, there have been some important achievements in New South Wales. For example, following the commencement of 11 new coastal water sharing plans, water plans now cover almost all of the state. However, further work is needed in some areas.

- completing implementation of best practice pricing in regional areas through:
 - achieving full cost recovery for some regional urban water service providers
 - replacing capital subsidies with Community Service Obligation (CSO) payments for regional urban water service providers
- Addressing concerns about compliance and enforcement arrangements that have arisen following recent reviews in the Murray-Darling Basin (MDB)
- working with the other Basin jurisdictions and the Murray-Darling Basin Authority (MDBA) to improve the efficiency and transparency of trade rules and enable cross-border trade with the ACT.

Victoria

Victoria has made progress in areas such as further improving the functionality of its water register and access to water market information. The Victorian Government released a state water plan in 2016 that outlines a range of actions to improve water planning, management and service delivery in the state. A number of these actions (such as measures to enhance the objectives and operations of the Victorian Environmental Water Holder (VEWH)) are still being implemented or are yet to commence.

Key priorities in Victoria include:

- ensuring the efficiency and transparency of trade rules
- removing constraints to trading and transferring water between the irrigation and urban sectors
- improving funding arrangements for irrigation distribution infrastructure.

Queensland

The Queensland Government has recently implemented a number of significant water reforms, including to the state's water planning framework in late 2016. In its next assessment, the Commission will consider how these new planning arrangements are progressing. In relation to urban water, the south-east Queensland bulk water provider, Seqwater, has increased its prices towards cost-reflective levels over the past four years.

However, Queensland should also take steps to improve its water register and access to trade data. Another key priority for Queensland in coming years will be completing implementation of best practice pricing and institutional arrangements. In particular:

- introducing independent economic regulation of retailer-distributors in south-east Queensland
- replacing capital subsidies with CSO payments for regional urban water service providers
- refining arrangements for independent economic regulation of urban and irrigation water service providers.

Western Australia

The Western Australian Government is working to reform water legislation, policy and administrative processes. The Commission considers the key priorities are:

- enacting legislation required to create secure, NWI-consistent water access entitlements, and statutory water allocation plans and extraction limits
- establishing specific mechanisms for engaging Indigenous communities in water planning
- extending the role of the economic regulator in reviewing prices for irrigation water service providers.

South Australia

In South Australia, progress has been made to enhance aspects of water planning and management, such as Indigenous engagement. South Australia also plans to undertake a project to upgrade its water register and associated systems.

However, the state still lags in some areas, such as achieving lower bound pricing for bulk water. South Australia should also improve transparency on how River Murray Operations costs are recovered.

The South Australian Government's recent proposal to decorporatise SA Water raises the prospect of backsliding on an important water reform commitment.

Tasmania

Key priorities in Tasmania include:

- addressing underpricing by the statewide water service provider
- not backsliding on reforms—for example, the Tasmanian Government will take to the next election a policy that would greatly constrain the role of the independent economic regulator in that State
- improving arrangements for commissioning new irrigation infrastructure to ensure economic viability.

Northern Territory

In the Northern Territory, there have been some notable recent policy developments, including the release of a policy framework for Strategic Aboriginal Reserves. Key priorities include:

- enacting legislation required to create secure, NWI-consistent water access entitlements
- progressing the development of water plans
- introducing independent economic regulation of the Power and Water Corporation.

Australian Capital Territory

The ACT is generally progressing well. The ACT should continue to work with New South Wales to enable cross-border trade.

Australian Government

Key priorities for the Australian Government are:

- to ensure all current and future infrastructure funding and financing facilities that may be used to support new or refurbished water infrastructure are NWI-consistent
- to ensure that decisions to invest in infrastructure are underpinned by a robust and publicly available cost-benefit analysis.

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

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- 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 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.⁷⁴

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 2014b). However, the extent to which jurisdictions have implemented NWI-consistent entitlements varies across jurisdictions, regions and types of water source.

- Surface water rights in regulated surface water systems are generally separate from land. Within regulated systems in the Murray-Darling Basin (MDB) water rights have typically been further unbundled into water access rights (water access entitlements and allocations), water delivery rights (for delivery through off-river networks), water use approvals (to use water on land) and works approvals (for water offtakes, pumps etc.) (ACCC, sub. 28).
- Water rights in groundwater and some unregulated surface water systems often remain tied to land. Even where water rights have been separated from land title, the components of the water right often remain bundled (including the rights to use water at a particular site)⁷⁵. For example, apart from the Southern Basins 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).

⁷⁴ NWI paragraph 25, 28-34.

⁷⁵ NWI paragraph 30 requires that regulatory approvals enabling water use at a particular site for a particular purpose will be specified separately to the water access entitlement.

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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 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 2014b; 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 2014b).⁷⁶
- 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.

⁷⁶ 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 entitlements⁷⁷ 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.⁷⁸

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 Water Act (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 (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 (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’⁷⁹ water in a regulated area. However, mining operations do not have to obtain a water access entitlement for ‘associated water’⁸⁰ — 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).

⁷⁷ A water access entitlement is referred to as a ‘water allocation’ in Queensland.

⁷⁸ 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.

⁷⁹ Non-associated water is underground water taken to be used for tenure related purposes. For example, water taken from a water bore.

⁸⁰ 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) 2016d). 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) 2016b).
- 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 practicable).

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 jurisdiction. 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 jurisdiction) 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 water 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 jurisdiction 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 jurisdictions in preparing water plans.⁸¹

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.⁸² Section B.8 discusses community engagement in more detail.

⁸¹ NWI paragraphs 36 to 39, Schedule E.

⁸² NWI paragraph 40.

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 the environment. In Victoria, the entitlement system is the main statutory basis for determining how water is shared (NWC 2012f, 2014c).

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 2012f, 2014b).

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 plan 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 DPIPW (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, 2014b); 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 report 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, 2012f, 2014c).

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 2014c)
- 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 2014c)

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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 Ooloo and Tindall (Mataranka) aquifers in the Northern Territory, where plans had remained in draft form since 2011-12 (NWC 2014b).

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 2014b)(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 2016.⁸³
- 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 the River Clyde water management plan in Tasmania was completed in September 2017 (the plan review was originally due in 2009) (NWC 2014b).

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.⁸⁴

⁸³ 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.

⁸⁴ 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.

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- The New South Wales Government is also undertaking regional water security assessments, as part of the Regional Water Strategies it is developing across the State. It described the Regional Water Strategies as follows:

The strategies will identify the highest regional needs, address issues that cannot be solved within individual water sharing plans, establish how a region's short and long term water needs will be secured for industry and community needs, and will facilitate consistent and coordinated water planning. They are non-statutory, risk and evidence based with regional boundaries based on one or more catchments.

The intention of the strategies is to:

- draw together analysis and advise the NSW Government on approaches, strategies and investment plans to maintain water supply security for forecast growth in the respective regions;
 - inform the statutory water sharing plans/ water resource plans that are being reviewed and prepared for water sources in NSW; and
 - address water security by assessing risk to water security from drought and identifying potential market, infrastructure, water use efficiency and statutory options. (NSW Department of Industry, sub. DR116, p. 1)
- In Tasmania, the Department of Primary Industries, Parks, Water and Environment is finalising a process and content for annual reporting on water management plans.

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 were due to occur in late 2017, as part of the consultation process on the new draft plan (DAWR 2017b).

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 <i>Paterson Regulated River Water Sharing Plan (2007 Plans)</i> . The Natural Resources Commission prepared a report recommending that all seven plans be replaced. The 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 10 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 the 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.
Tas	Review of the River Clyde water management plan	The review of the River Clyde water management plan was completed 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 (<i>The ACT Water Strategy 2014–44: Striking the Balance</i>) was released in August 2014 (following the review of the <i>Think Water Act Water 2004</i> policy).

Sources: DPI (NSW) (2016b); NWC (2014b); Responses to State and Territory information requests.

Box B.3 Queensland's new water planning framework

Under Queensland's 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 the 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 water 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 and Territories 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 chapter 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 entitlement may be traded on the temporary market (where doing so does not conflict with environmental outcomes).⁸⁵

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 water 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, environmental water allowances and groundwater access rules. Jurisdictions often set allocation limits and access rules to 'leave behind' water to meet environmental outcomes (New South Wales Government nd; NWC 2014a).

⁸⁵ 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-statutory⁸⁶) (NWC 2014a). 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 Australian Government also holds entitlements within the MDB (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 system.⁸⁷ (The Commission may examine this issue in next year’s inquiry into the Basin Plan). All governments with held environmental water (Australian, New South Wales, Victorian and South Australian) 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 2014b).

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

⁸⁶ While Western Australia does not have statutory water plans and extraction limits, the Western Australian Department of Water and Environmental Regulation administers parts of several state Acts that are relevant to environmental water (such as the *Waterways Conservation Act 1976*, *Rights in Water and Irrigation Act 1914* and *Water Agencies (Powers) Act*). In Western Australia, the Minister for the Environment also has the power under the *Environmental Protection Act 1986* to impose environmental conditions on specific projects or in specific areas. These are legal conditions which must be met. The environmental values of the Gngaranga Mound are managed in this manner.

⁸⁷ In June 2013, the Australian Government and MDB jurisdictions agreed to work to protect environmental water by implementing measures such as water shepherding (COAG 2013).

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).

The Commission's view

The intent of the NWI was that water for environmental and other public benefit 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 or 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.⁸⁸

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).

⁸⁸ NWI paragraph 41-44.

Progress to date

There are no systems in Tasmania, the Northern Territory or the ACT identified in water plans as overallocated or overused (NWC 2014c). In Victoria, planning instruments generally do not identify overuse (NWC 2014c). However, Victoria has put in place arrangements to address a long-term decline in the groundwater level in the Yarram water supply 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 2014c).

In the systems that jurisdictions have identified as overallocated or overused, jurisdictions are establishing and implementing pathways to recover water.

- In the 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.
- 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 2014b). 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 2014b). 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, were overallocated. The 2009 Gnamagara 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, overallocation 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 2014b).

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 jurisdictions 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)
- addressing the 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 2014c).

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 (DPI) 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 areas has dealt with concerns about overallocation in the Callide associated groundwater system, including addressing seawater intrusions along the Pioneer coastline.
- South Australia has completed 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 2015a, 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 that 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.⁸⁹ 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.

Progress to date

Only New South Wales and Queensland have adopted the risk sharing framework specified in the NWI.⁹⁰ 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 plan is revised and less water is available for consumptive use under this revised plan (NWC 2014b).

Under the Basin Plan arrangement, the Australian Government 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 2014b).

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 2014b).

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 Bill followed the release of the *Securing Western Australia's Water Future* 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

⁸⁹ NWI paragraph 23 vi.

⁹⁰ NWI paragraphs 46-50.

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.

In Queensland, draft amendments to the *Water Act 2000* (Qld) are currently before the Queensland Parliament. The proposed changes make an explicit requirement for the Minister ‘to consider the water-related effects of climate change on water availability when preparing a water plan and ... on water use practices and the risk to land or water resources arising from the use of water on land when preparing a water use plan’ (Queensland Parliament 2017, pp. 5–6).

The Commission’s view

To meet the outcomes and objectives of the NWI, risk assignment policies should be:

- clearly established (through statutory instruments)
- 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 needs of Indigenous Australians 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
- providing for the possible existence of native title rights to water in water planning processes
- accounting for water allocated to native title holders for traditional cultural purposes.

Progress to date and developments since 2014

Indigenous representation in water planning

In 2014, the NWC (2014b, p. 31) found that ‘most jurisdictions have improved the amount and quality of consultations with Indigenous communities in water planning and management’. Regarding individual jurisdictions, the NWC (2014b) made a range of observations.

- Indigenous representation on water advisory committees in New South Wales is mandatory under the *Water Management Act 2000* (NSW). The Aboriginal Water Initiative (AWI) program was noted as an important partnership between the New South Wales Government and Aboriginal communities — ‘a key objective of the AWI is to ensure ongoing and effective statewide and regional engagement with Aboriginal communities in the development and implementation of water sharing plans’ (NWC 2014b, p. 32).
- In Victoria, the Department of Environment and Primary Industries, Parks Victoria and several catchment management authorities had Indigenous reference groups to provide input and advice into their decision-making processes.
- 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.
- In Tasmania, there were no specific requirements for Indigenous engagement in the development of water management plans, beyond general stakeholder engagement.
- The ACT had statutory requirements to consult all stakeholders, including Indigenous groups, in the development of water plans.
- In the Northern Territory, planning processes have included Indigenous participation, including through membership of planning advisory groups.

Since 2014, 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 (2017b) approved the module *Engaging Indigenous Peoples in Water Planning and Management* to supplement the NWI National Water Planning and Management Guidelines. This guidance identifies ways to facilitate effective representation and engagement of Indigenous Australians 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.

Aboriginal engagement is a key requirement of water resource planning in the Basin Plan (chapter 10 of the Plan). A number of jurisdictions (including New South Wales, Queensland, South Australia, and the ACT) have indicated that they are significantly increasing Indigenous engagement (including with groups such as the 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 2016, the New South Wales Government ceased the AWI. The work of the AWI, which sat within the then NSW Office of Water, included collecting and maintaining a database of Indigenous water values in a culturally appropriate manner and helping to build the capacity of the staff and communities to recognise Indigenous cultural values, and develop and input appropriate rules in water sharing plans (Australian, State and Territory Governments 2017b). Moggridge (Canberra trans., pp. 23–24, 26) noted that the AWI also supported Aboriginal water needs by developing governance arrangements for water knowledge collection and security, and cultural awareness training for the department.

The NSW Department of Industry (sub. DR116) advised that it has maintained formal and informal engagement with Indigenous Australians, which is contributing to the development of the water resource plans required under the Basin Plan. For example, it noted Aboriginal stakeholders are represented on Stakeholder Advisory Panels for each water resource plan, and a process has been initiated to ‘co-design the engagement model for more direct, detailed consultation’ (sub. DR116, p. 2). It also noted peak representative Nation groups have been consulted on ways to incorporate the objectives of Aboriginal people in the development of water resource plans and the Long Term Environmental Watering Plans.

In Victoria, developments include the *Water for Victoria* plan and the *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) 2017b, 2017f).

As part of the development of Basin Plan water resource plans, the South Australian Government has:

- employed two part-time Aboriginal water coordinators based in Aboriginal organisations. The coordinators’ roles include capacity building for individuals as well as their Aboriginal representative organisations

-
- held three joint Aboriginal Nation water workshops (April 2016, December 2016 and May 2017) and 61 individual Nation meetings. This engagement has identified high-level objectives sought by Aboriginal Nations and informs the development of water resource plans (South Australian Government, sub. DR143).

The Aboriginal Partnerships Program works with Traditional Owners and Aboriginal groups to increase the participation of Aboriginal people in managing natural resources, including water (DEWNR (SA) 2017).

In August 2017, the *Aboriginal Heritage Act 1975* (Tas) was amended to establish the Aboriginal Heritage Council as a statutory body.

The Council provides advice to the Department of Primary Industries, Parks, Water and Environment regarding the major study of Aboriginal cultural values in the Tasmanian Wilderness World Heritage Area (Aboriginal Heritage Tasmania 2017).

The *Generic Principles for Water Management Planning* (DPIW (Tas) 2009) identified Aboriginal representation as a relevant peak stakeholder that could be consulted with as part of water planning processes. In January 2017, before the Aboriginal Heritage Council was a statutory body, a Council with the same name was invited by the Tasmanian Government to comment on the draft River Clyde Water Management Plan as part of the formal consultation process. The Council was not included on the consultative group for preliminary development of the draft plan (DPIPWE (Tas) 2017).

The Northern Territory Government's *Sustainable Water Use* policy paper indicated that an 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 2016).

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. (2014b, p. 31)

The NWC made a number of findings about individual jurisdictions.

- The New South Wales Government made cultural access licences (capped at 10 ML per year per application and unable to be traded) available to support Indigenous cultural requirements. Indigenous communities could also apply for community development licences to support commercial enterprises owned by Indigenous Australians in coastal unregulated surface water or groundwater areas.

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- In Victoria, there were 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).
 - Several Queensland water resource plans included Indigenous water reserves, which signalled the intent to provide future water access for Indigenous communities.
 - In Western Australia, water plans considered non-consumptive water needs for Indigenous cultural benefit where relevant. This was water that was not allocated and therefore left in situ to meet cultural needs. No plans provided specifically for Indigenous commercial interests, but these may have been met through the licensing process or if there was a native title provision.
 - In South Australia, several water allocation plans (including the Mallee, Tatiara and Padthaway prescribed wells areas) allowed unlicensed access and use for social, cultural and spiritual purposes, provided the flow of water was not diverted or impeded for collection.
 - Tasmania had neither legislative provisions that required 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 identified water requirements for Indigenous Australians for any purpose, cultural or economic. (However, under the *Generic Principles for Water Management Planning* (DPIW (Tas) 2009), values of cultural, heritage or spiritual significance should be given due consideration and appropriate cultural and heritage objectives should be included in water management plans accordingly.)
 - Water planning in the Northern Territory included identification and maintenance of Indigenous cultural water values. In addition, the Strategic Indigenous Reserve policy allowed a share of consumptive water to be set aside for the economic purposes of Indigenous communities. However in 2013, the Northern Territory Government announced that strategic Indigenous water reserves would no longer be considered for inclusion in water allocation plans, subject to consultation and review. (NWC 2014b)

Since 2014, a number of jurisdictions have amended water plans, or water planning processes, to more explicitly provide for the achievement of Indigenous cultural objectives. This is most evident in water resource plans being developed under the Basin Plan (where it is a requirement that jurisdictions identify Indigenous objectives and outcomes).

In New South Wales, 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.

Water for Victoria includes a number of commitments aimed at better recognising and providing for Indigenous values, 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
 - \$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).

Recent changes in Queensland include:

- the *Mineral, Water and Other Legislation Amendment Bill 2017* (Qld) was introduced into Parliament to amend the *Water Act 2000* (Qld) to include cultural outcomes for Indigenous Australians as something that must be stated in a water plan. The amendments require cultural outcomes to be specified separately from economic, social and environmental outcomes, and expands the definition of environmental flow objectives to specify that these objectives include protecting cultural outcomes (Queensland Parliament 2017)
- 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.

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 (DEWNR (SA) 2017). One project being conducted under this program is the Ngarrindjeri Partnerships Project (based in the Coorong / Lower Lakes / Murray Mouth area), which seeks to protect and manage the cultural values of sites (DEWNR (SA) 2015c).

The South Australian Government (sub. DR143, p. 5) is amending the Mallee and Peake, Roby and Sherlock water allocation plans ‘to better acknowledge and recognise Aboriginal nations and their water-related interests’. Similar amendments are planned for the Eastern Mount Lofty Ranges and Marne Saunders water allocation plans. The Government is also exploring broad capacity building and information provision processes on water rights and water markets, which will include mechanisms to build the capacity of Indigenous stakeholders to participate in the water market.

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.

The Northern Territory Government (2017) released a policy framework for the reintroduction of Strategic Aboriginal Water Reserves (previously Strategic Indigenous Reserves) in October 2017. A Strategic Aboriginal Water Reserve is a reserved percentage

of water from the consumptive pool within a water allocation plan area, which is set aside for exclusive access by eligible Aboriginal communities to use or trade for their economic benefit. Licences granted from a water reserve 'will be subject to the same standard conditions and licence security protocols that apply to all other water extraction licences in that water allocation plan area' (Northern Territory Government 2017, p. 5).

Accounting for native title rights

Native title rights to access water for personal, domestic, social and cultural purposes are commonly recognised in native title determinations (Robison et al. 2017). The right to use water for commercial purposes has not, to date, been expressly recognised in a native title determination (Macpherson 2017). The NWI requires signatories to take account of these rights, and to account for water allocated to native title holders.

The existence of native title rights in water (either recognised through a determination or subject to a claim) are generally considered during the consultation phase of water planning. For example, water resource planning under the Basin Plan requires consultation to have regard to the views of Indigenous communities on native title determinations, claims and Indigenous Land Use Agreements during the development of a plan (MDBA 2013).

While the NWC's 2014 assessment made reference to native title, it did not assess the extent to which individual water plans account for the existence of native title rights, or the effectiveness of provisions designed to account for those rights.

Since 2014, the Australian, State and Territory Governments have released guidelines on *Engaging Indigenous Peoples In Water Planning And Management* (2017i, p. iii). The guidelines, which include case studies, provide direction on how to account for native title and other Indigenous land rights in water planning.

The Commission's view

Indigenous representation in water planning

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 Federation of Victorian Traditional Owners Corporations 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)

It has been argued that New South Wales' current model of engagement is less effective in identifying Indigenous cultural values than under the previous AWI. Moggridge (sub. DR117, Canberra trans., p. 26) noted that Aboriginal Elders are now expected to sit on Stakeholder Advisory Panels with limited capacity and understanding of water management and suggested that this type of approach was ineffective in the past and unlikely to work in the future. Moggridge stated that engagement with Aboriginal people was strengthened by the use of Aboriginal staff and facilitators through the AWI. MLDRIN also expressed concern about the future of the AWI.

... 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)

In response to some of these concerns, the New South Wales Government noted that it held a training day specifically for Aboriginal Stakeholder Advisory Panel members to provide capability support (NSW Department of Industry, pers. comm., 28 November 2017). Moreover, the database of Indigenous water values developed under the AWI program has been secured and protocols for access have been established to prevent unauthorised use of the information and to protect intellectual property (NSW Department of Industry, pers. comm., 28 November 2017).

Notwithstanding, the Commission considers that jurisdictions have generally made positive and sustained progress against the Indigenous representation provisions of the NWI. The majority of States and Territories have now established specific mechanisms for engaging with Indigenous groups in the development of water plans — the exception is Western Australia where there does not appear to be any dedicated mechanisms for engaging Indigenous communities in water planning. In several cases, including the new arrangements in New South Wales, it is 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

Participants have questioned the effectiveness of some strategies to achieve Indigenous objectives. For example, one noted:

... current frameworks for recognition of Indigenous cultural flows under the *Water Act 2007* (Cth) and most State water rights systems remain inadequate. Indigenous peoples often have the right to 'consultation', but generally no substantive rights or cultural entitlements. (Law Council of Australia, sub. DR119, p. 6)

Regarding the licensing arrangements that New South Wales has put in place, Hartwig and Jackson (sub. DR92, p. 6) noted that ‘very few of these Indigenous specific licences have been applied for and granted’. As of mid-2017, there were two active cultural access licences (NSW Department of Industry, sub. DR116, p. 2) and two Aboriginal community development licences (DPI Water, pers. comm., 31 July 2017).

Although some good progress has been made — particularly in recent years — there is considerable scope for jurisdictions to better recognise and accommodate Indigenous Australians’ 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.

There may also be value in State and Territory Governments actively sharing lessons from experiences in this area to date, to inform and inspire developments elsewhere.

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.

Accounting for native title rights

While most jurisdictions have policies in place to consider native title rights and interests in water planning processes, some commentators have raised concerns about the implementation of those policies.

Contributions to this inquiry have raised concerns that planning processes in New South Wales have not accommodated newly-recognised native title claims. Hartwig and Jackson (sub. DR92) noted the apparent failure of water sharing plans to allocate water for the recognised native title rights of the Barkandji people of Western New South Wales (chapter 3). The New South Wales Government intends to account for the Barkandji determination when the water plan is updated as part of the MDB Water Resource Planning project (NSW Department of Industry, pers. comm., 28 November 2017).

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.⁹¹

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 2014c).

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 2014b, p. 33)

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.

⁹¹ NWI paragraph 55 to 57.

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- 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.⁹² Under the NSW Healthy Floodplains Project, DPI Water (NSW) 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 the 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.

The Commission's view

Key requirements for meeting the objectives and outcomes of the NWI include:

- 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, States and Territories apply cost-effective planning, management and regulatory measures (which may involve incorporating activities into the entitlements 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

⁹² The Floodplain Harvesting Policy was first published in 2013, setting out a five-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.

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 in 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 the 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 water (including overland flow) and groundwater systems.⁹³

The development of water resource plans for the Basin Plan requires MDB jurisdictions to assess the nature of connections between surface water and groundwater resources.

Progress to date

State and Territory Governments have taken steps to recognise connectivity between surface water 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 2014b, 2014c). As noted in section B.7 (knowledge and capacity building), there have also been improvements to foundational information requirements for better groundwater management.

⁹³ NWI Schedule E.

Table B.4 Integrated management of surface water 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 groundwater dependent ecosystems and define rules to limit impacts. Guidelines on Resource Sharing, Groundwater Licensing and the Protection of High Value Groundwater Dependent Ecosystems 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 water 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 <i>Think Water Act Water</i> 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 (2014b); Responses to State and Territory information requests.

Development since 2014

Since 2014, several jurisdictions have progressed measures to facilitate integrated management of connected surface water 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 ecosystems 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 water 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 water and groundwater resources.
- 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 water and groundwater planning. A draft new Strategic Management Plan has been developed for the Great Artesian Basin for 2017 to 2032 (Australian Government 2015a; DAWR 2017b).

The Australian, 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).⁹⁴

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 2014b). 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.

The International Association of Hydrogeologists argued that further progress is required in relation to managing surface-groundwater connectivity and that states are yet to fully achieve their NWI commitments. It noted surface-groundwater connectivity 'has been largely ignored by some States' and 'superficially addressed by others' (sub. DR91, p. 2). However, it did not provide any details regarding which States were particularly deficient in this area.

Nelson argued for greater consistency in the approach to managing physical connectivity between surface water and groundwater.

... although connectivity is increasingly recognised in water plans, the way in which it is recognised is not consistent between jurisdictions, and allows for differing levels of impact on resource security. In some cases, these impacts may be significant. In making assessments about when connectivity is significant and the management actions that should ensue, jurisdictions should ensure they consider the timing, direction and volume of interaction, its spatial and temporal scale, and its ecological relevance. (sub. DR109, pp. 5-6)

Participants to this inquiry, and the NWC previously, also noted that the 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.

⁹⁴ 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. (Horne et al., 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)

There is more work to be done to better quantify the interactions in a spatial and temporal way so it can be better accounted for. In some cases, the result has been to be conservative in the assessment due to a lack of knowledge and frameworks to realistically assess this. This issue is especially relevant to drought and climate change planning. (The International Association of Hydrogeologists, sub. DR91, p. 2)

Section B.7 discusses information and knowledge needs in more detail.

In 2014, the NWC sought to broaden the scope of integrated management of surface water 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 2014b, 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 policy makers, 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 objectives or intent of the NWI with respect to integrated management of surface and groundwater.

In light of clear progress to date by States and Territories — and the absence of more concrete examples of where they are not adequately managing physical surface water and groundwater connectivity in specific systems — on balance the Commission considers jurisdictions are broadly meeting their commitments in this area. However, a more detailed assessment (beyond the scope of this study) would be required to provide a definitive conclusion.

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 practicable)	Largely achieved	Important exceptions include entitlement exemptions for extractive industries in the Northern Territory and Queensland.
Water plans^b		
Statutory	Largely achieved	Western Australian 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 water 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	In Western Australia, water allocation plans and extraction limits are non-statutory.
Tradeable (where held as an entitlement)	Achieved	All governments with held environmental water (Australian, New South Wales, Victorian and South Australian) are legally able to trade water allocations and entitlements.

(continued next page)

Table B.5 (continued)

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
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.
Indigenous access		
Indigenous representation in water planning processes	Largely achieved	Most States and Territories — apart from Western Australia — have established and/or committed to specific mechanisms for engaging Indigenous communities in water planning.
Identification of objectives for Indigenous Australians 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.⁹⁵

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 MDB) 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.⁹⁶ 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
 - 4 per cent limit on the annual entitlement trade out of irrigation districts in 2014.

⁹⁵ NWI paragraph 58.

⁹⁶ NWI paragraph 60.

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- 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), 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 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, contrary to the requirements of the NWI, introduced 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 2014b). This was repealed in 2014, but only after the Australian Government decided 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 was 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 was suspended in 2011 to prevent impacts on the rights of other entitlement holders due to storage capacity issues
- interstate allocation trading between New South Wales, Victoria and South Australia was 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 has 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)
 - examine ways to improve interstate water trade in the MDBA through the trade adjustments project (ACCC, sub. DR124; MDBA, sub. DR120). Trade adjustments, in this context, refers to the arrangements for allowing interstate trade, while ensuring States' shares of water under the MDB Agreement are maintained. The project will explore whether there are opportunities to improve the way that trade adjustments are made, which could result in improving the transparency and efficiency of some trade restrictions.

New South Wales

- All 31 WSPs that commenced in 2004 have been replaced and a number of new coastal plans 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 New South Wales water users, in response to water user feedback. The new arrangements include clear opening and closing triggers, and 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 that were submitted within time but were unsuccessful because account limits had been reached.
- In 2016, most operational water management functions were transferred from DPI 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.

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- A number of areas for development have been identified, including developing trading frameworks to allow markets to be established 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’ (Southern Rural Water 2015, p. 1).
- An interface with the MDBA’s 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 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).

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- 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 (NT), specifically the (unintended) requirement for trade to be subject to the Notice of Intention advertising requirements and timeframes (that is, 30 days) applicable to any licence issued. This adds both time and transaction costs to trade. Steps are being taken to clarify the Act so that trades continue to be transparent but are able to be finalised more quickly.

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:

- removing restrictions and other barriers that had been 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 be beneficial to buyers and sellers. The benefits come from avoiding adverse effects on third parties that would have resulted had the trades occurred. 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 for improvement.

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 in other ways. Of particular concern are:

- various State Governments giving 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), which has imposed high costs on the community (discussed further in chapter 4)
- the Australian Government's decision to limit buybacks of water entitlements to 1500 GL across the MDB, effectively dictating that higher cost water recovery options (such as infrastructure upgrades) be used.

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).⁹⁷ 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 to establish 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, 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.

⁹⁷ NWI paragraph 59.

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 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). (sub. 13, p. 15)

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) (2017e); DPI (NSW) (2017c); DPIPWE (Tas) (2016b); DWER (WA) (2017b); EPSPD (ACT) (2017); Queensland Government (2016, 2017a); South Australian Government (2015, 2017); 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 include 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 (2014b, 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 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 2014b). 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 2014b). 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 (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 amended the Water Management Act (NSW) to streamline the registration process for trades, but these amendments are yet to commence.
- South Australia:
 - is currently undertaking a project that aims to make existing trade registry data on trade prices and volumes more accessible
 - will commence a project to upgrade its water register and associated systems, subject to Australian Government funding. This project will aim to modernise water trading systems and improve trade processing times and application processes in South Australia (South Australian Government, sub. DR143).

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. When improving water registers, jurisdictions should take account of approaches used in other states and explicitly consider synergies and cost savings of coordinated approaches.

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 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 (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 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
- 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)
- ABARES' weekly *Australian Climate, Water and Agricultural Update*, which includes information on allocation prices in the southern MDB, market developments, water availability and water allocations
- the Department of Agriculture and Water Resources (DAWR) 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 asking prices identified from surveys of water brokers and trading exchanges
- irrigation infrastructure operator's 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

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- 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 2014b). 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).
- 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.
- In Queensland, 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 awarded grants of up to \$100 000 each to four 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). In September 2017, one of these firms, Marsden Jacob Associates, was awarded a grant of \$1 million to develop a proof of concept for their proposed solution (DAWR, sub. DR113).
- 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).

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- 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 it 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 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 when 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 on ensuring that basic trade data recorded in water registers, as well as information about water resources and market rules, 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 2014b)), 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 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 unwarranted 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 (including the Australian Government's cap on purchases of water for the environment). 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 NWI⁹⁸, 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.

⁹⁸ 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 irrigated 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' (that is, in a metropolitan area) and 'regional' (that is, 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'.^a Further, jurisdiction-wide providers are classified as 'metropolitan'.

^a 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).

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.

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’.⁹⁹ However, rural and regional services were to achieve lower bound pricing outcomes (box B.7).

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.

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.

⁹⁹ NWI paragraph 66(v)(b).

Progress to date — Metropolitan pricing

In 2014, the NWC (2014b, p. 44) found in relation to urban water that ‘most jurisdictions have made significant progress towards achieving full cost recovery’. 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’ (2014b, p. 49).

Appendix B of the NWC’s 2014 assessment discussed pricing approaches and outcomes in general terms.

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 exception is that the regulated return on capital used to set prices for TasWater is below a fully market-reflective level. Specifically, TasWater can only earn an inflation-adjusted return on some assets (‘existing assets’ transferred to TasWater’s predecessors before 1 July 2011) of 2.13 per cent (OTTER 2015).¹⁰⁰

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.

¹⁰⁰ The Tasmanian Government will take to the next election a policy that could slow the rate of price increases in that State, and therefore further reduce TasWater’s return on capital.

Table B.8 Components of metropolitan water prices

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	✓	✓	✓	✓
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 (2017a); ESC (2013b, 2016b); ESCOSA (2016); ICRC (2013); IPART (2016b, 2016c); OTTER (2015); QCA (2017c).

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 assets¹⁰¹ 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.

¹⁰¹ 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’).

The NPR publishes financial information for many urban water providers (BOM 2017i). 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 defined in table B.9. 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.

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 calculate a WACC.

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 (2014f).

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 cent¹⁰² 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.

102 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, 2017; ESCOSA 2013; IPART 2012, 2016a, 2016b).

In cases where financial statements were not available, the Commission has looked at the ERRR published through the NPR.

The analysis below sets out the Commission's comparison of rates of return for metropolitan or jurisdiction-wide water service providers for the past four financial years. Data for 2016-17 (table B.10) are based on company financial statements only, as NPR data for that year were not available at the time of finalising this report. Data for 2015-16 are published in table B.14 and are based on financial statements wherever possible and, where available, NPR data. The same metrics are produced for 2014-15 and 2013-14 in table B.15 and table B.16 respectively.

Table B.10 Financial outcomes from annual reports, metropolitan and jurisdiction-wide providers, 2016-17

<i>Provider^a</i>	<i>Jurisdiction</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>
		\$m	\$m	\$m	\$m	\$m	%	%	%
Sydney	NSW	2 652	2 483	1 310	284	17 548	6.0	5.1	5.5
Hunter	NSW	335	294	135	55	2 575	5.6	4.0	4.8
Melbourne	Vic	1 783	1 593	512	384	14 707	6.0	4.7	5.4
CWW	Vic	684	613	461	50	1 992	8.7	5.1	6.9
SEW	Vic	1 029	890	667	90	3 689	7.4	3.6	5.5
YVW	Vic	985	906	668	105	4 353	4.9	3.1	4.0
Seqwater	Qld	866	857	236	254	10 975	3.4	3.3	3.4
QUU	Qld	1 377	1 061	685	182	5 382	9.5	3.6	6.5
Unitywater	Qld	662	520	328	81	3 367	7.5	3.3	5.4
WC	WA	2 535	2 324	873	503	16 798	6.9	5.6	6.3
SA Water	SA	1 352	1 254	503	341	13 686	3.7	3.0	3.4
TasWater	Tas	313	291	188	68	2 032	2.8	1.7	2.3
Icon Water	ACT	329	306	169	51	2 235	4.9	3.9	4.4

^a CWW = City West Water; SEW = South East Water; YVW = Yarra Valley Water; QUU = Queensland Urban Utilities; WC = Water Corporation.

Source: Company financial statements.

The Commission's analysis indicates that most metropolitan providers are pricing at or near upper bound levels (table B.11). It highlights two cases where prices have been consistently below upper bound levels over the past four years — Seqwater and TasWater. However, in the case of Seqwater, rates of return have increased noticeably over this period to the point where they have almost reached a fully cost-reflective level (that is, upper bound levels). Further, while these providers have not been consistently 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'¹⁰³ (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 proposes to limit the rate at which TasWater's prices increase, and to remove 'tax equivalent' payments, citing affordability concerns. While legislation implementing this policy has been rejected by the Tasmanian Legislative Council (2017a), the Tasmanian Government will take the policy to the next State election.

Other than the case of TasWater, which was discussed above, table B.11 suggests some other cases where prices may deviate slightly from upper bound levels. In the cases of Sydney Water, Seqwater, the Water Corporation, City West 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 2014) 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. 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.

103 NWI paragraph 66(i).

Table B.11 Assessment of metropolitan pricing outcomes, 2013 to 2017

<i>Provider</i>	<i>Basis of assessment</i>	<i>Assessment</i>
Sydney Water ^a	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 ^a	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 B.8).
Melbourne Water	Financial statements	Pricing at upper bound levels.
City West Water	Financial statements	Pricing at or just above upper bound levels. The deviation above upper bound levels is too small to indicate significant issues.
South East Water	Financial statements	Pricing at upper bound levels.
Yarra Valley	Financial statements	Pricing at upper bound levels.
Seqwater	Financial statements	Prices have increased to be just below upper bound levels over the past four years.
Queensland Urban Utilities	Financial statements	Pricing at upper bound levels.
Unitywater	Financial statements	Pricing at upper bound levels.
Gold Coast ^a	NPR data	Prices have moved to upper bound levels over the three years to 2015-16.
Logan ^a	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 ^a	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. The deviation below upper bound levels is too small to indicate significant issues.
TasWater	Financial statements	Pricing below upper bound levels.
Icon Water	Financial statements	Pricing at upper bound levels.
Power and Water Corporation ^a	NPR data	The ERRR metric suggests that prices are significantly above upper bound levels, particularly in 2015-16. ^b 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. The Power and Water Corporation's reported asset value reduced by over 20 per cent between 2013-14 and 2015-16.

^a Last data available are for 2015-16. ^b 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.

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 — the 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 2014b, 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'.¹⁰⁴

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.

¹⁰⁴ NWI paragraph 66(v)(b).

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.12), 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.12 Components of regional water 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>
Regional New South Wales ^a	✓	✓			
Regional Victoria	✓	..	✓	✓	✓
Regional Queensland ^b	na	na	na	na	na

na not available .. 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 6.8), 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 (section 6.7).

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 6.8). 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 Indigenous 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 2017 these totalled about \$30 million, or approximately 0.7 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 kL 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 kL (City of Townsville 2017), which is less than Townsville's average household consumption in 2015-16 of 369 kL (BOM 2017i).

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 the two previous years (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.13).

Three Victorian regional providers with significant irrigation operations (Lower Murray Water, Grampians Wimmera Mallee Water and Coliban Water) are excluded from this analysis. 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 generally achieving lower bound pricing, though there are some instances of possible underpricing (Westernport Water in 2015-16 and South Gippsland Water and North East Water in 2016-17). Other than these cases, providers 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. Given the low number of possible underpricing incidents and the scrutiny of the ESC regulatory process, pricing practices in regional Victoria are likely to be broadly consistent with the NWI.

Table B.13 Financial outcomes from annual reports for Victorian regional providers, 2014-15 to 2016-17

	Year	ERRR equivalent income	WACC equivalent income	Oper- ating costs	DAI	Book asset value	ERRR equivalent	WACC equivalent RoR	Mid- point
		\$m	\$m	\$m	\$m	\$m	%	%	%
Barwon	14-15	207	177	94	65	2 263	2.2	0.8	1.5
	15-16	218	184	86	67	2 636	2.5	1.2	1.8
	16-17	213	179	95	74	2 649	1.6	0.4	1.0
Central Highlands	14-15	95	85	50	20	885	2.8	1.7	2.3
	15-16	98	90	53	22	1 125	2.0	1.3	1.7
	16-17	99	89	55	23	1 132	1.9	1.0	1.4
East Gippsland	14-15	33	31	18	10	328	1.8	1.0	1.4
	15-16	34	32	19	10	445	1.0	0.7	0.9
	16-17	34	33	20	12	444	0.6	0.3	0.5
Gippsland	14-15	129	117	75	34	1 073	1.9	0.7	1.3
	15-16	142	127	78	37	1 111	2.4	1.1	1.7
	16-17	134	126	79	38	1 113	1.6	0.8	1.2
Goulburn Valley	14-15	80	72	42	25	768	1.7	0.6	1.2
	15-16	82	76	45	26	859	1.2	0.6	0.9
	16-17	81	72	48	23	873	1.1	0.1	0.6
North East	14-15	61	55	36	20	698	0.7	0.0	0.3
	15-16	66	60	38	20	740	1.0	0.3	0.7
	16-17	64	57	43	21	734	0.0	-1.1	-0.5
South Gippsland	14-15	29	27	17	9	310	0.9	0.2	0.6
	15-16	29	29	19	9	388	0.3	0.1	0.2
	16-17	28	26	19	12	385	-0.7	-1.1	-0.9
Wannon	14-15	77	74	44	23	548	1.8	1.2	1.5
	15-16	77	74	43	22	737	1.7	1.3	1.5
	16-17	74	69	47	21	736	0.8	0.1	0.4
Western	14-15	82	70	41	18	677	3.3	1.5	2.4
	15-16	102	76	53	19	779	3.8	0.5	2.2
	16-17	101	69	52	22	836	3.2	-0.6	1.3
Westernport	14-15	21	19	13	6	177	1.5	0.4	0.9
	15-16	21	20	15	6	206	0.0	-0.5	-0.3
	16-17	22	21	14	7	206	0.5	-0.1	0.2

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 TasWater is below upper bound levels. While Tasmania's policy is to increase TasWater's prices over time, which would be broadly consistent with the NWI, the Tasmanian Government will take to the next election a policy that 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 persistently 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. Despite isolated cases of providers earning negative rates of return, pricing practices in regional Victoria are broadly 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 five 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 (section 6.7)).
- 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; this is particularly needed in New South Wales (discussed further in chapter 6 (section 6.5)).
- 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 (section 6.5)).
- Performance data (including financial indicators) should be transparently published for providers of all sizes to promote competition by comparison. In particular, this requires reform in Queensland to ensure that financial information is published in relation to smaller providers to give greater transparency on their pricing practices (discussed further in chapter 6 (section 6.5)).

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.14 **Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2015-16**

<i>Provider^a</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>
		\$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	331	289	130	51	2 504	6.0	4.3	5.2	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	177	77	1 985	2.1	0.9	1.5	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 (2017i); Company financial statements.

Table B.15 **Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2014-15**

Provider ^{a,b}	Jurisdiction	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	2 713	2 551	1 324	253	15 471	7.3	6.3	6.8	2 715	1 249	44 110	1.7
Hunter	NSW	319	280	137	65	2 613	4.5	3.0	3.7	317	147	6 889	2.0
Melbourne	Vic	1 732	1 615	471	411	14 199	6.0	5.2	5.6	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 (2017i); Company financial statements.

Table B.16 **Financial outcomes from annual reports and NPR, metropolitan and jurisdiction-wide providers, 2013-14**

Provider ^{a,b}	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	2 608	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	1 700	1 610	506	352	14 074	6.0	5.3	5.7	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	2 486	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 (2017i); Company financial statements.

Rural water

For the purposes of this assessment of progress ‘rural water’ refers to water provided mainly for irrigated agriculture, which 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 ensure the NWI outcomes are achieved.

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).

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’ (2014b, p. 45).¹⁰⁵

No jurisdiction has changed its approach to the pricing of bulk water services since the NWC’s 2014 assessment (table B.17). In all jurisdictions (with the possible exception of South Australia), full cost recovery is occurring, with prices consistent with lower bound principles (at a minimum).

In South Australia, a lack of transparency with respect to the recovery of River Murray Operations costs from users means it is not clear to the Commission the extent to which effective cost recovery is occurring.

¹⁰⁵ This assessment included Tasmania where bulk water services pricing is unregulated.

Table B.17 Components of rural bulk water services 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>
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 MDB jurisdictions (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 and there is no evidence to indicate pass through of RMO costs to 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 services¹⁰⁶
- 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.

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.18. As outlined in chapter 7 (section 7.4), there are also undisclosed subsidies and/or cross-subsidies between users that arise from bulk

¹⁰⁶ 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.

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.18 Government subsidies for bulk water supplies to irrigators

	<i>Average annual subsidies (\$ million)</i>	<i>Period</i>	<i>Comments</i>
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 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	na		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 and current arrangements lack transparency.

^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. **na** not available.

Sources: ERA (2017b); IPART (2017); NWC (2014b); Responses to State and Territory information requests; Seqwater (2016); SunWater (2016); Tasmanian Irrigation (2016a).

Progress to date — Rural distribution services pricing

The NWC (2014b) 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.19).

Table B.19 Ownership and pricing arrangements for distribution services: 2017

	<i>Location</i>	<i>Ownership and pricing arrangements</i>
NSW	Inside MDB	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Infrastructure is user-owned — operators are unregulated and set their own prices.
Vic	Inside MDB	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Infrastructure is publicly owned — maximum prices are set by the ESC.
Qld	Inside MDB	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> For publicly owned infrastructure — maximum prices are set by the Government. For user-owned infrastructure — prices are set by the operator.
WA	Statewide	<ul style="list-style-type: none"> Infrastructure is user-owned — operators set their own prices but the Government can request these be reviewed by the economic regulator.
SA	Statewide	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.18).

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 has been set to move toward cost recovery.

With respect to South Australia, the framework for passing through RMO costs to users is unclear, with current arrangements lacking transparency and any potential subsidy remaining unreported. The Commission considers there is a need for enhanced transparency regarding the extent to and manner in which RMO costs are recovered from users (chapter 7).

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, are considered in chapter 8.

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 ...'.¹⁰⁷ This requirement applies to both urban and rural water uses. Each is considered in turn below.

Urban water (metropolitan and regional)

Progress to date

The NWC (2014b, p. 65) found that 'while all jurisdictions have implemented reforms to deliver economic regulatory oversight, many governments continue to blur their roles as

¹⁰⁷ NWI paragraph 77.

owner, policy setter and regulator. There is evidence that independence is not always maintained’.

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, Tasmania¹⁰⁸ 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.20.

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 the Tasmanian Government’s election commitment to implement a policy that would greatly constrain the role of the Office of the Tasmanian Economic Regulator (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’.¹⁰⁹ 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 the Tasmanian Government will take to the next election a policy that would greatly constrain the role of the independent economic regulator in that State.

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 outcomes and support the broader NWI outcome of the efficient and sustainable use of water infrastructure assets.

¹⁰⁸ The Tasmanian Government will take to the next election a policy that would greatly constrain the role of the independent economic regulator in that State.

¹⁰⁹ NWI paragraph 77.

Table B.20 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	The Essential Services Commission of South Australia sets maximum revenues for SA Water.	The Essential Services Commission of South Australia sets maximum revenues for SA Water.	No change
Tas	OTTER sets maximum prices for TasWater. ^b	OTTER sets maximum prices for TasWater. ^b	The Tasmanian Government will take to the next election a policy 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: DEWS (Qld) (2017); DNRM (Qld), pers. comm., 1 June 2017; DWE (NSW); ERA (2017a); ESC (2013b, 2016b); ESCOSA (2016); ICRC (2013); IPART (2016b, 2016c); NSW Government (2017d); OTTER (2015); QCA (2015, 2017b); qldwater (2017); Utilities Commission (NT) (2017).

Rural water

Progress to date

Table B.21 sets out a comparison of the NWC's (2014b) 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 New South Wales, Victoria and South Australia or the pass 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).

The NWC also did not consider the cost of operations undertaken by the Dumaresq-Barwon Border Rivers Commission (BRC) or the pass through of BRC costs to users. The BRC budget is provided through a standing contribution from the New South Wales and Queensland Governments, funded in equal shares to the value of \$2 million. Irrigators within the Border Rivers have called for greater transparency and direct independent oversight of BRC costs to ensure that they are prudent and efficient (chapter 7, section 7.4).

Table B.21 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 (2014b); 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'.¹¹⁰ 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.

New South Wales and Victoria are meeting their commitments under the NWI by having prices set by an independent economic regulator.

Queensland is partially meeting its NWI commitments. While prices are subject to scrutiny by the QCA, 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 of investment decisions, the 'depoliticisation' of pricing decisions and improved efficiency 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 8.

¹¹⁰ NWI paragraph 77.

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 (2014b, pp. 64–65) expressed concern that ‘existing planning and regulatory structures are not well placed to encourage optimal future long-term infrastructure and service planning decisions’. Table B.22 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.22). Further, the South Australian Government, as an election commitment, has recently proposed to decorporatise SA Water, which is likely to affect the process by which investment decisions are made in that State.

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.

Table B.22 Investment decision-making frameworks for urban providers

	<i>Arrangements in 2014</i>		<i>Arrangements in 2017</i>
	<i>Metropolitan</i>	<i>Regional urban</i>	
NSW	<p>Service providers are corporatised.</p> <p>Planning for Greater Sydney and the Hunter region occurs through metropolitan water planning processes coordinated by the NSW Government.</p> <p>Investments are subject to independent economic regulation, but some past decisions have been excluded from scrutiny by government.</p>	<p>Investment plans in accordance with <i>NSW Best Practice Management of Water Supply and Sewerage Framework</i>.</p> <p>A range of subsidies for investment, including through the Country Towns Water Supply and Sewerage Program.</p>	<p>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.</p> <p><i>Review of Best Practice Framework</i> commenced.</p>
Vic	<p>Service providers are corporatised.</p> <p>Planning occurs through Integrated Water Cycle Strategies.</p> <p>Investments are subject to independent economic regulation, but some past decisions have been excluded from scrutiny by government.</p>	<p>Service providers are corporatised.</p> <p>Planning occurs through Integrated Water Cycle Strategies.</p> <p>Investments are subject to independent economic regulation.</p>	<p>Planning occurs through, Sustainable Water Strategies, integrated water cycle management plans, Urban Water Strategies and, for metropolitan Melbourne, through a Melbourne Water System Strategy.</p>
Qld	<p>Some service providers are corporatised, while others operate as part of local government.</p> <p>Investments are subject to limited scrutiny by economic regulator.</p> <p>Bulk water planning undertaken in accordance with chapter 2A of the <i>Water Act 2000</i> (Qld).</p>	<p>Subsidies for investment through the Royalties for Regions program.</p>	<p>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.</p>
WA	<p>Service providers are corporatised. Investments subject to scrutiny by economic regulator. Planning arrangements are not formalised.</p>		<p>No change.</p>
SA	<p>Service provider is corporatised. Investments subject to independent economic regulation. Unclear planning arrangements..</p>		<p>The SA Government proposes to decorporatise SA Water</p>
Tas	<p>Service provider is corporatised. Investments are subject to independent economic regulation. Informal planning arrangements.</p>		<p>No change.</p>
NT	<p>Service provider is corporatised. Investments are not subject to independent scrutiny. Informal planning arrangements.</p>		<p>No change.</p>
ACT	<p>Service provider is corporatised. Investments are subject to independent economic regulation. Informal planning arrangements.</p>		<p>No change.</p>

Sources: DEWS (Qld) (2017); DILGP (Qld) (2017b, 2017c); DNRM (Qld), pers. comm., 1 June 2017; DPI (NSW), pers. comm., 6 June 2017; DPI (NSW) (2016a, 2017d, nd, nd); DSD (Qld) (2017b, 2017c, 2017d); DWE (NSW) (2007); ERA (2017a); ESC (2013b, 2016b); ESCOSA (2016); ICRC (2013); IPART (2016b, 2016c); NSW Government (2017a, 2017d); OTTER (2015); QCA (2015, 2017b); Utilities Commission (NT) (2017); Weatherill (2017a).

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.¹¹¹

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. (2014b, 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). (NWC 2014b, p. 16)

¹¹¹ NWI paragraph 66(v)(c).

The performance of the jurisdictions against the NWI and the NWC's recommendations has been mixed.

- None of the 11 government-funded projects announced since 2014 have met the NWC's recommendation for a transparent cost-benefit analysis (table B.23)
- All projects (in the opinion of the jurisdictions) are consistent with or will be required to be consistent with NWI principles (table B.23) 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 8, 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.
- All jurisdictions have frameworks for assessing the environmental sustainability of projects through environmental impact assessment processes provided for by environmental and planning legislation. Where concerns have been raised with respect to the lawfulness and soundness of environmental impact assessments existing review frameworks have facilitated scrutiny of assessments of environmental sustainability.

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 taxpayers 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.

Table B.23 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	Rookwood 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	na ^d	No (CIC)	na	na
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
SA	Northern Adelaide Irrigation District	156 ^e	No (CIC)	1.16:1	Yes
Tas	Southern Highlands Irrigation Scheme	23 ^e	No (CIC)	1.3:1	Yes
	Swan Valley Irrigation Scheme	14 ^e	No (CIC)	2.8:1	Yes
	Duck Irrigation Scheme	24 ^e	No (CIC)	1.5:1	Yes

.. not applicable **na** 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' (NSW Government 2017b). 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' (NSW Government 2016a, p. 4.15). A summary of the final business case has been published indicating an incremental-cost benefit ratio of 1.089 for the proposed pipeline, detailed information concerning the basis of determining the costs and benefits of the project have not been released and consequently, the veracity of the cost-benefit ratio cannot be assessed (DPI (NSW) 2017a). ^e Includes funding from both the Australian and State Governments.

Sources: Responses to Commonwealth, State and Territory information requests; Tasmanian Irrigation (2015, 2017a).

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 8). 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 8.

Cost recovery for water planning and management activities

The NWI requires 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 (2014b) 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.24).

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.

Assessing best practice cost recovery for water planning and management activities has several elements. While the correct identification and attribution of costs is one of these elements, the Commission has not examined this in detail. This is, in part, because issues about identification and attribution of costs were not commonly raised by inquiry participants, and in part because in some jurisdictions, more fundamental questions about the transparency of existing arrangements, or the extent that costs are or should be recovered, need to be considered first.

Table B.24 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 (2014b); 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 two 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. In order to make this judgment however, jurisdictions need to be able to quantify the costs they face.

Second, water planning and management activities need to be undertaken before new development can proceed (chapter 8) to ensure that extractions proposed under new entitlements are environmentally sustainable. Appropriate planning and management activities also support the specification of entitlements and provide long term certainty to

users, facilitating investment in water dependent industries. 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 the 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 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)'¹¹²
- 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.25 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.

¹¹² NWI paragraph 73(i).

Table B.25 Management of environmental externalities

	<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
NSW	<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
Vic	<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</i> (Vic), the proceeds are applied to initiatives which assist in the sustainable management of water and/or address adverse water related environmental impacts. 	No change
Qld	<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
WA	<ul style="list-style-type: none"> • Licensing the take of water is the main approach to managing environmental externalities. 	No change
SA	<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 eight NRM regions and is determined by the NRM boards for the individual regions. • the <i>Water Industry Act 2012</i> (SA) 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
Tas	<ul style="list-style-type: none"> • Water planning and regulation are the main means of managing environmental externalities. 	No change
NT	<ul style="list-style-type: none"> • Water planning and regulation are the main means of managing environmental externalities. 	No change
ACT	<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 (2014b); 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 with 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.26) and this is unchanged from 2014. The use of market mechanisms in the release of unallocated water is also unchanged from 2014.

Table B.26 Release of unallocated water

<i>Arrangements in 2014</i>	<i>Arrangements in 2017</i>
<p>NSW</p> <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
<p>Vic</p> <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
<p>Qld</p> <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; and impact on other water resources and entitlements. 	No change
<p>WA</p> <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
<p>SA</p> <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
<p>Tas</p> <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
<p>NT</p> <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 from within the general consumptive pool is by first-in-first-served.¹¹³ 	No change
<p>ACT</p> <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) (nd); DNRM (Qld) (2017b); DPI(NSW) (2017b); DPIPWE(Tas) (2005b, 2005a); NWC (2014b); 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 the Department of Primary Industries Water (DPI Water) in 2016. The change was intended to give DPI Water a sharper policy focus on water market regulation and the oversight of major government funded water infrastructure projects. DPI

¹¹³ Consent for access to water from within a Strategic Aboriginal Water Reserve is provided by the relevant eligible Aboriginal rights holder.

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).

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 2017d).

Rural water

The NWI called for the benchmarking of service providers and the public reporting of the price and service outcomes. The NWC (2014b) 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.27 reflects the collective progress of all jurisdictions toward the completion of best practice pricing actions set out in the NWI.

Table B.27 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 Tasmania.
Regional	Partially achieved	There is evidence of persistent 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 CSO payments 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	Independent 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 will take to the next election a policy 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. The South Australian Government's election commitment to decorporatise SA Water risks politicising investments in that state. Further, 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.27 (continued)

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
New infrastructure (continued)		
Rural	Partially achieved	<p>NWI-consistent water entitlement and planning arrangements have been applied (or are expected to be applied) for all of (the eleven) new major projects announced since 2014 that are receiving government investment. This has supported the environmental sustainability of new projects.</p> <p>Jurisdiction and national environmental impact assessment processes have been applied for new projects to ensure environmental sustainability. Where concerns have arisen with respect to the legitimacy of environmental impact assessment processes, existing avenues of review have facilitated rigorous assessment.</p> <p>The economic viability of the eleven projects for new and refurbished infrastructure 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.27 (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 that 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.¹¹⁴

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 outcomes¹¹⁵ of water management with as much specificity as possible.¹¹⁶

¹¹⁴ NWI paragraph 78.

¹¹⁵ 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.

¹¹⁶ 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 2014b).

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, generally on an annual basis. Watering proposals are submitted to environmental water holders, who prioritise water provision 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 how best to provide water 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 water 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 water studies (NWC 2014a, 2014b).

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- The Tasmanian Environmental Flows project aims to link flow events to ecological outcomes (DPIPWE (Tas) 2010).
 - Between 2008 and 2012, the \$82 million National Groundwater Action Plan funded projects to help overcome critical groundwater knowledge gaps, including in relation to the vulnerability of groundwater-dependent ecosystems (GDEs). Projects included:
 - a framework for assessing the ecological water requirements of GDEs
 - the National Atlas of Groundwater-Dependent Ecosystems, a web-based mapping application that supports consideration of GDE requirements in planning (Australian, State and Territory Governments 2017c; NWC 2012d).

In 2014, the National Water Commission (NWC) (2014b, p. 96) found that the National Atlas had facilitated consideration of GDE requirements in water planning, but noted that there remained ‘widespread uncertainty’ about GDE needs and making progress in this area remained a priority.

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 2014b). 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 (2014b) 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. Victoria also intends to amend the legislated objectives of the VEWH to

consider identified Aboriginal water-related environmental outcomes (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) 2016c). 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 water will also support recreational values (although the recreational values themselves are not specified) (New South Wales Government 2017a).
- 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) 2017a). These are then used as an input into water planning.
- The Northern Territory is developing water plans for the Western Davenport and Ti Tree areas that explicitly address the needs of GDEs for the first time (DENR (NT) 2017b).
- Victoria has completed long-term environmental watering plans for its three water resource plan areas, while South Australia has completed two plans (a third has been submitted in draft form) and Queensland has completed one. Further plans are in development in New South Wales, Queensland and the ACT (MDBA, pers. comm., 13 November 2017). The Basin Plan (s. 8.19) requires these plans to identify priority environmental assets in each area and the necessary water regimes to protect those assets.
- The Australian, State and Territory Governments (2017c) developed the *National Groundwater Strategic Framework 2016–2026*. The framework includes actions that seek to address deficiencies in groundwater knowledge and capacity, including in relation to GDEs.

The 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 water plans 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.

Some inquiry participants suggested that jurisdictions should give greater consideration to certain types of GDEs in developing water plan provisions for the environment. For example, Nelson (sub. DR109) argued that, in practice, jurisdictions focus on GDEs that rely on the surface expression of groundwater (such as rivers and wetlands), with less regard for subterranean and terrestrial GDEs that rely on subsurface water.

These comments are consistent with the NWC's 2014 finding that GDEs were better managed in areas with surface expression (NWC 2014b). They are also supported by evidence from the National Atlas of GDEs (BOM 2017a). While the atlas contains detailed information on surface GDEs, it does not include mapping of terrestrial GDEs in much of the Northern Territory and in north-west New South Wales, and subterranean ecosystems are only mapped in Queensland and Tasmania.

Jurisdictions have made considerable progress in identifying and improving their understanding of GDEs (primarily under the National Groundwater Action Plan, which concluded in 2012). However, developing a better understanding of the diverse range of GDEs would aid water planners in defining specific outcomes for those ecosystems (where the value of the GDE to the community warrants the definition of outcomes). The Commission considers that jurisdictions should continue to make progress in this area, including by implementing relevant actions from the 10-year National Groundwater Strategic Framework, which commenced in 2016 (Australian, State and Territory Governments 2017c).

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 water 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 water 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.¹¹⁷

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, which provide for the needs of both surface water- and groundwater-dependent ecosystems, 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 environmental outcomes are not jeopardised (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.28.

As shown in table B.28, all jurisdictions have identified entities with responsibility for defining and enforcing planned environmental water 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.

¹¹⁷ NWI paragraph 79(i).

Table B.28 Responsibilities for environmental water

<i>Jurisdiction</i>	<i>Planned environmental water</i>	<i>Held environmental water</i>
Australian Government	Murray-Darling Basin Authority ^a	Commonwealth Environmental Water Office Murray-Darling Basin Authority (The Living Murray)
New South Wales	Department of Industry (Crown Lands and Water)	Office of 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 has 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 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 (2014b, p. 96).

Most held environmental water is located in the MDB, with some entitlements also held outside the MDB in southern Victoria and in the Adelaide and Mt Lofty natural resource management region in South Australia (DEWNR (SA), pers. comm., 30 November 2017). The vast majority of entitlements relate to surface water, but a very small number are groundwater entitlements.¹¹⁸ 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

¹¹⁸ The Commonwealth Environmental Water Holder held groundwater entitlements with a long-term average annual yield of only 9 GL, out of a total of 1811 GL (registered holdings as of 30 September 2017) (DEE 2017b).

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 (GABSI), 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 GDEs. 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 water and groundwater systems

All jurisdictions recognise the need for common arrangements in managing significantly interconnected surface water 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.¹¹⁹ In relation to planned environmental water, jurisdictions have generally developed programs that measure water provision and hence are able to review the extent to which planned water regimes are being implemented (NWC 2014b). In addition, Queensland monitors the environmental outcomes of plan provisions through the Queensland Environmental Flows Assessment Program, and the ACT also assesses environmental water arrangements to inform future water provision.

¹¹⁹ Paragraph 80 of the NWI also explicitly requires monitoring of water being recovered and managed for environmental and other public benefit outcomes.

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 achieved through planned environmental water. For the period between 2008 and 2011, New South Wales published valley reports on the environmental and socioeconomic outcomes from environmental water provision, but a lack of such information limited a recent review of water sharing plans in New South Wales (NRC (NSW) 2016). Western Australia focuses its monitoring effort in high-value locations that are subject to stress, such as the Gngangara, Jandakot, Ord and Pilbara groundwater areas, but conducts some vegetation condition monitoring of GDEs at low risk from abstraction in the South West groundwater area. Tasmania and the 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). In general, there has been limited reporting on the outcomes of planned environmental water 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 New South Wales Office of Environment and Heritage (OEH), VEWB and CEWB publish annual reports on environmental outcomes (the VEWB 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 scrutiny 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 reviewed the arrangements in all jurisdictions for its Australian Environmental Water Management reports in 2010, 2012 and 2014. However, these reviews 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 evaluation of environmental water management arrangements. The lack of independent audit, review and reporting of environmental water outcomes and supporting management arrangements limits the accountability of environmental water managers.

Trading

All environmental water holders have the authority to trade. The CEWB has engaged in three trades (the first was in 2014) while the VEWB 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,¹²⁰ 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 ecological value aquatic ecosystems (Aquatic Ecosystems Task Group 2012). High ecological value aquatic ecosystems have been identified in Victoria and South Australia (NWC 2014b).

Developments since 2014

In 2014, the NWC (2014b, 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 (2014b, p. 52).
- There was an opportunity to ‘streamline’ arrangements to coordinate environmental watering activities by jurisdictions in shared resources such as the MDB (2014b, 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 (Joyce 2016).
- The Australian, State and Territory Governments (2017c) developed the *National Groundwater Strategic Framework 2016–2026*. The framework includes actions that aim to promote sustainable groundwater extraction by better integrating water quality into planning frameworks and increasing investment in monitoring, among other things.
- 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).

¹²⁰ *Water Act 2007* (Cwlth), s. 105(3).

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- 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 *Reflections*, its 2015-16 outcomes report, 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, a \$30 million project to monitor the outcomes of Commonwealth environmental water delivery in seven MDB regions from 2014 to 2019 (DEE 2016).

The 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.

As discussed in section B.1, jurisdictions have also made clear progress in developing common arrangements for inter-connected surface water and groundwater systems — although the Commission notes Nelson’s comment (sub. DR109) that a variation in thresholds for determining connectivity means jurisdictions accept differing levels of risk to GDEs.

Further work is required to fully meet the outcomes of the NWI in the two areas identified by the NWC in 2014: monitoring and reporting, and arrangements in shared resources.

While jurisdictions generally monitor whether environmental water is provided as intended and progress has been made through initiatives such as the CEWH’s Long-Term Intervention Monitoring Program (as discussed in chapter 5), there is scope to improve the capacity of jurisdictions to review and report on the outcomes from environmental water provision. 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. However, even in areas where the risk is relatively 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.¹²¹ 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 2014a). In other cases, water has been recovered by revising licence conditions, such as in South Australia (DEWNR (SA) 2013).

¹²¹ NWI paragraph 79(ii).

Since 2004, nearly 3000 GL of water (as a long-term average annual yield) has been recovered to achieve environmental outcomes within the MDB. This water (which is primarily surface water) includes 875 GL recovered prior to 2009 through programs including TLM and Water for Rivers (MDBA 2017e), and a further 2106.5 GL recovered toward the 2750 GL target outlined in the Basin Plan. Of the 2106.5 GL, the Australian Government has recovered 1228.2 GL through entitlement purchases and 701.5 GL through infrastructure projects (MDBA 2017f).¹²²

While much of the 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, including groundwater systems. Since 2007, Western Australia has been seeking to address overuse in the Gnamptara 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). GABSI, which sought to reduce groundwater wastage by capping and piping bores in the Great Artesian Basin, was in place from 2000 to 2017 (GABCC 2017).

Developments since 2014

Since 2014, the following changes have taken place.

- In 2015, the Australian Government amended the Water Act (Cwlth) to cap water purchases in the MDB at 1500 GL of the Basin-wide target of 2750 GL (Hunt 2015).
- In March 2017, water ministers in the MDB jurisdictions agreed that the remaining gap in water recovery in the southern MDB will be met through an agreed package of supply measures (MDBA 2017b). Supply measures include works to improve the efficiency of environmental water provision, changes to river operations and works to reduce evaporative losses (MDBA 2015c).
- In May 2017, the Australian Government announced it would provide \$8 million to fund the Interim Great Artesian Basin Infrastructure Investment Program for two years to 2018-19. The program aims to allow key infrastructure upgrades to continue following the cessation of GABSI on 30 June 2017 (GABCC 2017).

¹²² Estimates of contracted recovery as of 30 September 2017 (which differ from the CEWH's record of its registered holdings because registration can occur a number of months after the exchange of the contract to secure the entitlements (DEE 2017b)). The rest of the 2106.5 GL comprises 15 GL gifted to the Australian Government by the Queensland Government and 161.9 GL recovered by State Governments.

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, RM Consulting Group (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.29 summarises progress in achieving the NWI requirements against this element.

Table B.29 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 (with scope to improve the specification of outcomes for some types of groundwater-dependent ecosystems in particular). 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 Murray-Darling Basin (MDB), Great Artesian Basin and Lake Eyre Basin.
Common arrangements for connected surface water 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 National Water Commission).
Environmental water holders able to trade	Achieved	All governments with held environmental water (Australian, New South Wales, Victorian and South Australian) are legally able to trade water allocations and entitlements.
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 commitment 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.¹²³

This section considers progress in achieving the NWI 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 water 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 standardise reporting (to enable ready comparison of water use, compliance against entitlements and trading information).

Progress to date

All States and Territories collect and manage water data and information to inform water management within their respective jurisdiction. 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 (Cwlth), 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)¹²⁴
- collecting and publishing water information
- conducting regular national water resources assessments
- publishing an annual National Water Account

¹²³ NWI paragraph 80.

¹²⁴ States and Territories participated in the development of a range of national water accounting standards and reporting frameworks (NWC 2014b).

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- providing regular water availability forecasts
 - giving advice on matters relating to water information
 - enhancing the understanding of Australia's water resources (BOM 2008).

In undertaking these roles, BOM draws on information collected by State, Territory and Australian Government 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 to 80 per cent of Australia's annual water consumption occurs (BOM 2017e).

Since 2008, the BOM has expanded the range of available water information, such as water storage information, 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 ABS (2016) also produces the Australian Water Account, which provides information on the physical and monetary supply, and use of water in the Australian economy.

Developments since 2014

In 2014, the NWC recommended that work be done to streamline data collection and sharing requirements of Australian Government agencies (including 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 work more closely with data providers to improve services.

Since the NWC's 2014 assessment, the Australian Government (2014b) released an independent review of the Water Act (Cwlth), which recommended that an interagency working group produce options for reducing the reporting burden. The working group subsequently analysed the data needs of the relevant Australian Government agencies (including the costs and benefits of providing that information) 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 2017c).

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 ABS) for a selected region to clarify and promote the benefits of both, individually and in tandem'.

In November 2017, the MDBA (2017i, p. iii) released a water take report which contained ‘a set of accounts for the water use in the Basin for the first four years of the transition period (2012-13 to 2015-16)’. This was the first set of accounts that were consistent with the Basin Plan’s accounting framework, and that provided a set of comprehensive accounts for groundwater in the MDB.

The MDBA has identified scope to improve accounting methods, prior to the commencement of the formal register of take report in 2019-20:

The processes used by Basin states to collect and report water take data and those used by the MDBA to receive and assess that data are predominantly manual, labour intensive, time consuming, and prone to human error. This contributes to the ongoing challenge that Basin states face in providing annual reporting data within the statutory time frames, which in turn delays the timely assessment of that reporting data. (2017i, p. 11)

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, States and Territories have made good progress implementing state water registers that underpin the integrity of water markets and provide information, which is used for the 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).¹²⁵

The ANAO’s (2014, p. 24) 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’. 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’ (ANAO 2014, p. 24).

¹²⁵ The benefits relate to a range of services and products developed under the Improving Water Information Programme rather than national water accounts in particular.

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.¹²⁶

Progress to date

Environmental water managers in the MDB and southern Victoria — the CEWH, the VEWH, the MDBA (on behalf of The Living Murray program), OEH and the South Australian Department of Environment, Water and Natural Resources — all report publicly on their environmental water holdings. They also report annually on the total volume of water delivered under these entitlements. South Australia holds an additional 16 GL of water outside the MDB in the Adelaide and Mt Lofty NRM region (DEWNR, pers. comm., 30 November 2017), but there is no public reporting on the use of this water. 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 2014b).

Developments since 2014

The MDBA's (2017i) water take report (discussed above) included the first comprehensive account of all held environmental water within the MDB. The report also included information on held environmental water authorised for use (as a result of allocations and carryover, for example) and the held environmental water actually used over the period in the MDB.

The MDBA did not report on planned environmental water in its 2017 water take report because this aspect of annual reporting (required under the Basin Plan) is still 'in its infancy':

The MDBA is working with Basin states on providing better ways of reporting estimates on the amount of planned environmental water in the Basin. (MDBA 2017i, p. 183)

The Commission's view

Key requirements for meeting the objectives of the NWI include that:

- environmental water held as a water access entitlement is fully and publicly accounted for, as applies to other water access entitlement holders

¹²⁶ NWI paragraph 85.

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- 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 that is held as a water access entitlement, and its use, is fully accounted for (where relevant). However, as discussed in section B.4, jurisdictions need to develop their ability to monitor, evaluate and report on the outcomes achieved through the use of this water.

Jurisdictions also generally undertake public reporting on environmental water provided through planned (rules-based) arrangements, but as stated by the MDBA (2017i), there is scope to improve state reporting on the amount of planned environmental water.

Water metering and measurement

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).¹²⁷ 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 the 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 plans to document priorities and targets for non-urban water metering.¹²⁸ 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 the implementation of the Framework every two years from 2012 and that BOM would maintain and publish information from state and territory reports on its website.

¹²⁷ NWI paragraph 87 to 88.

¹²⁸ 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.

Progress to date

All State and Territories (apart from Tasmania and the Northern Territory) have developed and submitted implementation plans under the Non-Urban Metering Framework. Arrangements in Tasmania and the Northern Territory are discussed below.

Implementation of the Non-Urban Metering Framework has been subject to delays. The NWC (2014b) observed these delays had been partly because of difficulties associated with having meters certified to the required standard. All technical aspects of the Framework — such as the development of the Australian standards for non-urban meters and accreditation of meter testing facilities — are now complete (DAWR, pers. comm., 24 August 2017). However, progress in rolling out compliant metering is generally taking longer than the timelines set out in the Framework (DAWR, pers. comm., 24 August 2017).

Jurisdictions have not completed public reporting on the implementation of the Non-Urban Metering Framework.

Developments since 2014

There have been a range of policy developments since the 2014 assessment.

- 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).
- In New South Wales, 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 consultation expected to be undertaken in the later part of 2017. Following the release of the *Independent Investigation into NSW Water Management and Compliance: Interim Report* (Matthews 2017b), the NSW Minister for Regional Water, Niall Blair (2017), announced meters would be installed for large water entitlement holders within 12 months.
- The Victorian Government released the *Victorian Non-Urban Metering Policy* in May 2014 (which reaffirmed Victoria's commitment to the Non-Urban Metering Framework). Victoria's original commitment to meet the Framework objectives by 2020 — as outlined in the 2010 state implementation plan — was made subject to Australian Government funding. Because funding has not been forthcoming, Victoria has adopted an extended timeframe to meet specified commitments.

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- The Queensland Government introduced the *Queensland Non-Urban Water Metering Policy for Unsupplemented Extractions* in July 2014.¹²⁹ The policy reflects a decision to cease direct government involvement in the purchase, installation and maintenance of meters, and move to self-meter reading. The policy implements the Non-Urban Metering Framework and is supported by Queensland’s implementation plan. Both establish the framework for meter specification, installation, maintenance and replacement.
 - The Western Australian Government released the *Measuring the Taking of Water Policy* in January 2016. Under the policy, all licensed water use over 10 ML per year will be subject to metering or alternative measurement by 2020, except where there is minimal benefit from doing so. The Department of Water (WA) (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 and Environmental Regulation 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.
 - The South Australian Government reported that it completed compulsory metering of all significant extractions from prescribed water resources by the end of 2014.¹³⁰
 - In Tasmania, the 2014 *Tasmanian Standard for Non-Urban Water Meters* seeks to implement the Non-Urban Metering Framework.
 - The ACT Government advised that the 2015 *Water Meter Installation, Maintenance and Replacement Guideline* was implemented based on the Non-Urban Metering Framework (EPA (ACT) 2015).
 - In the Northern Territory, the Department of Environment and Natural Resources has established the *Non-Urban Water Metering Code of Practice for Water Extraction Licences*. The policy seeks to follow the intent of the Non-Urban Metering Framework to implement national standards for accuracy levels in the recording of water usage.

As part of a compliance review for the MDB (discussed more broadly in the next section), the MDBA (2017g, p. 14,17) found that coverage of metering in New South Wales and Queensland was ‘patchy’ and recommended that ‘pumping must not occur without a meter’ in the MDB.¹³¹

Setting a metering target of 95% per water resource area for meterable take would meet a ‘no meter, no pump’ principle, while avoiding undue cost burdens on small entitlement holders. In

¹²⁹ 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.

¹³⁰ 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 Australian Metering Policy and Meter Specifications.

¹³¹ The report also recommended that Basin jurisdictions ‘release a meter improvement plan by 1 July 2018 with annual reports on progress’ (MDBA 2017a, p. 18), although it is not clear how different this reporting would be from the biennial reporting required under the Non-Urban Metering Framework.

NSW, this target would equate to metering entitlement holders that take more than 20ML/year on average annually. (MDBA 2017g, p. 17)

The report also noted that not all forms of water take can be metered, and gave the floodplain harvesting or overland flows in the northern MDB as the most prominent example of this. On this issue, the MDBA recommended that New South Wales and Queensland ‘require that 95% of take by non-metered floodplain harvesting is accurately measured, for example, by calibrated storage level recorders by 30 June 2022 and publish annual milestones towards this objective’ (2017g, p. 19).

The Commission’s view

To meet the intent of the 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 noted that metering should be practical, credible and reliable.

All jurisdictions are yet to fully achieve this goal. As noted above, States 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 9, 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 communicates this to affected water users. As discussed in chapter 9 and below, government responses to the recent and ongoing reviews of compliance and metering arrangements in the MDB should be proportionate, well-targeted and should transparently consider both the costs and benefits of proposed measures (such as the proposed ‘no meter, no pump’ policy).

Although the accuracy of metering and metering coverage has improved in many parts of Australia (NWC 2014b), 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 resources. The Queensland Farmers’ Federation (sub. 61) highlighted that further work is required to implement metering and measurement for non-stock and domestic licenses in the Great Artesian Basin.

Compliance and enforcement

Progress to date

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 existing systems. The Australian Government's funding for the 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'
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 to publish annual reporting and compliance strategies and statistics (COAG 2012, p. 1,7,8).

Developments since 2014

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 ongoing work was needed by jurisdictions to further progress or potentially complete their milestone requirements and achieve alignment with the National Compliance Framework requirements. It noted that the most progressed and aligned elements of the Framework were risk based compliance and enforcement, best practice tools, public and stakeholder education and monitoring (table B.30).

The evaluation report noted that the legislative framework review has been the most challenging element to implement and achieve consistency with, 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 in 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 also 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 key implications are:

- The discontinuance or reallocation of resources including 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. (KPMG 2016, p. 45,55)
- New South Wales has over 50 000 licence holders and intend[s] to undertake more targeted, risk-based monitoring approaches which is expected to be just as effective in identifying non-compliance but will not require the same high level of resourcing. (KPMG 2016, p. 46)
- A narrower range of stakeholder information products will be maintained going forward (KPMG 2016, p. 55).

Table B.30 KPMG evaluation: Alignment with the 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 Compliance 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 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. **na** not available.

Source: KPMG (2016).

Since the evaluation report, the topic of compliance has generated considerable public interest as a result of the broadcast of an ABC Four Corners program in July 2017. The program raised issues about water management (including compliance) in the Barwon-Darling river system in New South Wales. A number of reviews were announced in response to issues raised by the Four Corners investigation (chapter 9).

Some of the reports were released only recently and others will be released in 2018.

- The interim and final reports for the *Independent Investigation into NSW Water Management and Compliance* by Mr Ken Matthews AO were released in September and November 2017, respectively (Matthews 2017a, 2017b).
- The NSW Ombudsman's (2017) progress report, published in November 2017, summarised themes from four investigations into compliance and enforcement that it has conducted since 2009. The final report for the latest investigation will be released after April 2018.
- The *Murray-Darling Basin Water Compliance Review*, released in November, contained a report by the MDBA and a report by an independent review panel (MDBA 2017g).
- In November, the ANAO (2017) released a limited assurance review of the Department of Agriculture and Water Resources' assessment of New South Wales' protection and use of environmental water under the National Partnership Agreement on Implementing Water Reform in the Murray-Darling Basin.
- The Senate Rural and Regional Affairs and Transport References Committee (2017) recommended extending the final reporting date for its inquiry into the integrity of the water market in the MDB to March 2018.
- The Queensland Government's independent audit of its regulatory frameworks for water measurement and compliance is due in March 2018 (DNRM (Qld) 2017c).
- On 26 November 2017, the South Australian Premier, Jay Weatherill (2017b), stated that South Australia would establish a Royal Commission into allegations of water theft in the MDB, to begin in early 2018.
- The outcome of investigations by the NSW Independent Commission Against Corruption into the allegations made by Four Corners are also forthcoming.

The MDBA's (2017g) review assessed Basin jurisdictions' compliance practices and found several areas for improvement.¹³² The MDBA raised concerns about a lack of transparency over compliance activity and outcomes in New South Wales, Victoria and Queensland. It found that New South Wales and Queensland both have low levels of compliance resourcing, and that the low level of compliance resourcing in New South Wales was a contributing factor to its ineffective and inconsistent compliance regime. In addition to reporting on compliance dropping off in recent years, the report found arrangements in Victoria are

¹³² The terms of reference stated that the MDBA would report its findings at the November 2017 meeting of the MDB Ministerial Council. The Ministerial Council will subsequently provide advice on the outcomes to COAG.

limited by not having an appropriate range of penalties and sanctions available for enforcement. The MDBA did not identify areas for improvement specific to South Australia and the ACT.

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 to establish a nationally-agreed standard for ensuring compliance with state-based water laws and regulations. However, it does not seek to cover all factors that may contribute to effective compliance, such as broader institutional and governance arrangements.

The recent evaluation of the National Compliance Framework suggests jurisdictions have implemented changes to their compliance and enforcement frameworks that will have ongoing benefits. However, it also highlights areas for improvement in most jurisdictions (such as reporting and consistency in water laws). As such, most jurisdictions are yet to fully achieve this commitment.

The evidence of poor compliance and enforcement with water laws and regulation in some Basin jurisdictions that has come to light following the Four Corners program and subsequent reviews warrants close examination by governments. Chapter 9 discusses the recent compliance reviews in further detail. Other reviews that will help shed further light on the extent and nature of compliance problems are not yet completed. The Commission will have the opportunity to consider compliance issues in 2018 as part of the inquiry into the implementation of the Basin Plan.

Summary

Table B.31 summarises progress with respect to specific commitments relating to water resource accounting.

Table B.31 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	Water accounting is generally providing practical, credible and reliable information.
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		
Held environmental water is fully and publicly accounted for	Largely achieved	All jurisdictions with held environmental water maintain publicly available records of their holdings (though there is a small volume of water in South Australia which is not publicly accounted for).
Public reporting on use of held environmental water	Largely achieved	Jurisdictions report on the provision of held environmental water, though there is scope to improve on the reporting of outcomes.
Public reporting on planned environment water	Partially achieved	Jurisdictions undertake some public reporting on water provided through rules-based arrangements, but further work is required in this area.
Water metering and measurement		
Develop and implement metering actions	Partially achieved	States 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.
Non-Urban 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). Evidence of poor compliance arrangements in some Basin jurisdictions has come to light.

^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:

- urban water 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’.¹³³ 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. (2014b, 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 water supplies. The ADWG are given effect through regulations imposed by the States and Territories, typically by health authorities. These jurisdiction-based regimes typically require service providers to establish risk-management, monitoring and reporting regimes consistent with those set out in the ADWG, and to report on instances where substances are present in water in concentrations outside those allowed by the ADWG.

While good regulatory practice involves reporting incidents where water quality is inconsistent with ADWG recommended values, the Commission recognises that this does not imply that providers must avoid all breaches of the ADWG. Such a stringent approach is unlikely to be feasible. Rather, achieving the broad NWI outcome of healthy and safe water supplies is best achieved through a risk-based approach that recognises it is not likely to be feasible or cost-effective to avoid all instances of non-compliance. Having said that, 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.

¹³³ NWI paragraph 90(i).

Current regulatory practice as established by the ADWG and jurisdictional regulators broadly reflects this approach. However, there may be scope for improvement to these jurisdiction-based regimes. For example, Infrastructure Australia has found that while most jurisdictions' regulatory regimes achieve minimum standards for the governance and implementation of drinking water quality regulation, none fully satisfies its definition of a best practice regulatory regime (2017). Infrastructure Australia also highlights a need to improve monitoring and enforcement of regulatory regimes in parts of regional Australia (2017).

While it is important that regulatory regimes are robust and fit-for-purpose, achieving the broad NWI outcome of healthy and safe water supplies requires that water quality outcomes themselves are satisfactory. The Commission has examined drinking water quality outcomes in each jurisdiction. These outcomes are summarised in table B.32.

The Commission's view

The Commission's analysis shows that jurisdictions and providers have taken action to address drinking water quality issues. New South Wales, Victoria, South Australia and the ACT all achieve good water quality results, with New South Wales in particular having made significant progress in improving regional drinking water quality over several decades.

Where water quality issues persist, jurisdictions have taken action to address them. 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 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).

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.

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.

Table B.32 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 the 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. However, a lack of consolidated reporting means that it is not clear whether water quality is persistently inconsistent with the ADWG. 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 May 2015 Auditor-General report examining 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. However, this cannot be verified through transparent public reporting.	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). 13 boil water alerts remain in place as of December 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. In 2015-16, six of 72 remote communities did not comply with the ADWG's microbiological guidelines 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: BOM (2017i); Cairns Regional Council, sub. 52; Department of Communities (Housing) (WA), pers. comm., 17 July 2017; DEWS (Qld) (2017); DHHS (Vic) (2017); DPI (NSW) (nd); Furner (2017); IES (2016, 2017); LGAQ, sub. 71; qldwater, sub. 41; Queensland Government, sub. 45; Queensland provider Drinking Water Quality Management Plan reports; TasWater (2016, 2017); Western Australian Auditor-General (2015); Western Australian Government (2016).

Water reuse, end use efficiency, water sensitive urban design and innovation

The NWI set 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’¹³⁴
- 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’.¹³⁵

Parties to the NWI agreed to 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 the National Centre of Excellence in Desalination and the Australian Water Recycling Centre of Excellence.

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. (2014b, 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. (2014b, 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.

¹³⁴ NWI paragraph 23(viii).

¹³⁵ 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 required jurisdictions to act collectively rather than individually. However, jurisdictions have individually implemented a range of policies that address similar objectives and outcomes. These are summarised in table B.33.

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’. This is in contrast to previous requirements that sought to restrict 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 for recycled water and the 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 chapter 6 (section 6.3), 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.

Table B.33 Actions to promote water reuse, end use efficiency, water sensitive cities and innovation since 2014

Key current and recent jurisdictional policies

NSW	<ul style="list-style-type: none"> • The New South Wales Government released guidance in 2015 to assist service providers to implement national guidelines on health and environmental risks of recycled water (NSW Guidance for Recycled Water Management Systems). • 2014 statutory review and subsequent revision of the <i>Water Industry Competition Act 2006</i> (NSW). • WaterSmart Cities program announced in the 2017 Metropolitan Water Plan • Changes to operating licences for Sydney Water and Hunter Water to determine and target an 'economic level of water conservation'.
Vic	<ul style="list-style-type: none"> • 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). • The 2016 Water for Victoria plan includes various initiatives, 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.
Qld	<ul style="list-style-type: none"> • 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. • 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.
WA	<ul style="list-style-type: none"> • The Western Australian Government announced an expansion of the Water Corporation's Groundwater Replenishment Scheme in 2016. • The Western Australian Government is working to update its policy for managed aquifer recharge, including supporting guidelines.
SA	<ul style="list-style-type: none"> • The South Australian Government formed Water Sensitive SA in 2015 to support knowledge sharing and capacity building for WSUD. • The South Australian Government has also undertaken reforms to its planning system, and supported research and benchmarking, to support WSUD.
Tas	<ul style="list-style-type: none"> • None identified.
NT	<ul style="list-style-type: none"> • The Power and Water Corporation runs the Living Water Smart program in Darwin and the Alice Water Smart program in Alice Springs.
ACT	<ul style="list-style-type: none"> • The ACT Government has developed the Healthy Waterways Program with the support of Australian Government funding, which is a WSUD project to improve water quality in the ACT and downstream within the MDB. • The WSUD General Code was reviewed in 2014 and the ACT Government is currently consulting on proposed amendments.

Source: Responses to State and Territory information requests.

The Commission's view

Overall, the Commission's view is that jurisdictions, both collectively and individually, have undertaken significant action in this area and largely 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.

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, are required to ensure that existing and new policies have clear objectives and that these are achieved in a cost-effective way.

Summary

Table B.34 summarises progress against NWI objectives, outcomes and actions in the area of urban water.

Table B.34 Assessment summary: Urban water reform

<i>NWI commitment</i>	<i>Assessment^a</i>	<i>Comments</i>
Achieving healthy and safe water supplies	Largely achieved	Drinking water quality generally meets existing guidelines. New South Wales, Victoria, South Australia and the ACT all achieve good water quality results, with New South Wales in particular having made significant progress in improving regional drinking water quality over several decades. Some issues remain in Queensland, Western Australia, Tasmania and the Northern Territory, particularly in remote areas, but these jurisdictions are all taking steps to address remaining concerns.
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.¹³⁶

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 and across catchments

¹³⁶ NWI paragraph 101.

-
- 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, 2014b) 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 (NWKRP) — 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)
 - *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 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, 2014b).

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 building the 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).

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.

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. This tool 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 water values, uses, objectives and outcomes; 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 for water planning areas (including assessing impacts of water use on groundwater flows; and salinity and ecological impacts of environmental watering and other management options on floodplains)
- a commitment to fund research in partnership with the Goyder Institute for Water Research (comprising an investment of \$2 million per year from 2015-16 to 2018-19)
- partnerships with research organisations including the National Centre for Groundwater Research, University of Adelaide, University of South Australia, South Australian Research and Development Institute and Flinders University.

Tasmania

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

The 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) 2014). 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 or 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 water 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 2017d).
- 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 Australian Government extended the Bioregional Assessments program to include studies of the potential impacts from shale and tight gas projects on the environment (including water resources) in three regions of Australia (Australian Government 2017c). The three regions where the assessments are to be conducted have not been announced yet.
- 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).

However, some initiatives have wound up in recent years.

- In 2008, COAG agreed to the development of the NWKRP to establish priority research themes and ensure a coordinated research effort (NWC 2014b) — NWKRP was released in 2012 (SCEW 2012). In 2016, it was 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 Productivity 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 and support future knowledge and capacity needs required to facilitate critical reforms and to adapt to imminent challenges. This is discussed further in chapter 9.

Summary

Table B.35 reflects the collective progress of all jurisdictions toward the completion of actions set out in the NWI.

Table B.35 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	The 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	The 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	The 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 the 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.¹³⁷

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.¹³⁸ The States and Territories also agreed to provide timely and relevant information to all stakeholders as part of the consultation process.¹³⁹

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 the legislative requirements, policies, governance arrangements, type of plan and the nature of change. Table B.36 outlines the legislative instruments that specify consultation requirements in each jurisdiction and provides selected examples of consultation and engagement practices.

137 NWI paragraph 93.

138 NWI paragraph 95.

139 NWI paragraph 96.

Table B.36 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)	<i>Water Act 2007 (Cwlth)^a</i>	Publication of proposed plan, call for submissions, community meetings, roundtables, provision of relevant information, publication of consultation report.
NSW	<i>Water Management Act 2000 (NSW)</i>	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 (Vic)</i>	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 (Qld)</i>	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 (WA)</i>	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 (SA)</i>	Release of draft plans, establishment of advisory committees, call for submissions, publication of consultation reports.
Tas	<i>Water Management Act 1999 (Tas)</i>	Formation of a consultative group, surveys, targeted consultation, public meetings, communication of supporting scientific assessments.
NT	<i>Water Act 1992 (NT)^c</i>	Release of draft plans, call for submissions, formation of advisory committees, public meetings, targeted consultation.
ACT	<i>Water Resources Act 2007 (ACT)^d</i>	Pre-plan consultation, call for public submissions on draft, feedback on trade-off decisions, workshops, meetings. ^e

^a For the Basin Plan. ^b For the development of Regional Waterway Strategies and Sustainable Water Strategies. ^c While the *Water Act 1992* (NT) 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 (2014c); Responses to State and Territory information requests.

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 2014b, 2014c). This improvement was driven by measures including: meetings with communities, community leaders and a wide range of stakeholders; calling for submissions on the proposed plan; and, establishing a greater presence for the MDBA (nd).

States and Territories provide information to communities and stakeholders on the progress of water planning arrangements in their jurisdiction. For example, jurisdictions report progress on plan implementation and outcomes relative to the social, economic and environmental objectives set out in water plans (NWC 2014b). 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 2014b, 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 2014c).

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 the 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 2016). Consultative approaches to the development of recent water allocation plans in the Northern Territory have included the re-establishment of water advisory committees (DENR (NT) 2017b). The Department of Environment and Natural

Resources (NT) (Water Resources Division) has developed the Water Licensing Portal to improve the transparency of water licence allocations and decisions (DENR (NT) 2017b).

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 statements of proposals, calls for submissions, the formation of consultation groups or committees, public information sessions and the 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) (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 Basin 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).

Central NSW Council (sub. DR110, p. 14) also noted that '[w]hile there is willingness by the [New South Wales] Government to engage Local Government in Water Resource Planning process' the progress in getting a local government representative on 'the Stakeholder Advisory Panel (SAP) for the development of Water Resource Plans has been slow'.

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.37). However, inquiry participants have noted that in some cases the information provided to facilitate engagement has not been easy to interpret:

... where the challenge now lies is in getting that information in a way that enables us to engage and I see that across a lot of this water planning area. We really want to be involved. There's willingness but they still don't know how to talk to us. ... So with ground water resource planning processes, we've been given this massive - like "Here's the risk paper". Now, for someone like me who is providing that sort of input and advice back, it's not in a format that I can really – it's very inaccessible. We have to go back and say, "Look, that's great but what are the implications of this for regional communities? What are the risks? How do you interpret this?" (Centroc, Canberra trans., pp. 20–21)

Table B.37 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 Department of Industry (Crown Lands and 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, hydrogeological assessment reports, and socioeconomic and cultural values 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), and the 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	Ecohydrological assessment (to inform the review of the River Clyde Water Management Plan).
NT	Review and monitoring report (Katherine Water Allocation Plan), announced allocation reports (Katherine Water Allocation Plan) and streamflow 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), and the State of the Environment Report by the Commissioner for Sustainability and the Environment (reports on the 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 and to provide it 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 2017c). 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 2017c). 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.36) 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 9). Similarly, disagreement by some stakeholders on the outcomes of the engagement process does not 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 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.

Effective stakeholder engagement will continue to play an important role in review processes, implementing future reforms and policies across the water sector, and managing

future challenges such as growing community expectations. Chapter 9 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.¹⁴⁰ 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.¹⁴¹

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 2011d).

Surveys and associated reports by Marsden Jacob Associates (MJA) (2012b, 2013) and Schirmer (2014) allowed the NWC (2014b) 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:

140 NWI paragraph 97.

141 NWI paragraph 97.

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- 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 was sold
 - water entitlement sales had allowed structural change to occur.

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.

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). Since 2008, the Australian Government has spent over \$8 billion on infrastructure and water efficiency measures ‘to minimise any adverse impact of water recovery as a result of the Basin Plan, as well as increasing the sustainability of irrigated agriculture across the Basin’ (DAWR 2017e, p. 6). It also recovered water for the environment through the direct purchase of water entitlements on the water market (as opposed to through the uncompensated attenuation of water rights). 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.

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.

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)

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- 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 (box B.10), although some of these opinions incorporate considerations beyond the effect of those programs on communities.

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 (2017e) 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 9 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.38 reflects the collective progress of all jurisdictions toward the completion of actions set out in the NWI.

Table B.38 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 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. There are possibly some refinements to the NWI that would better serve its overall goals of optimising economic, social and environmental outcomes.

^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) made 10 recommendations to Australian, State and Territory Governments in its final assessment of progress under the National Water Initiative (NWI) (NWC 2014b). This appendix sets 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 backsliding on reform.

- The Tasmanian Government plans to cease price regulation of Tasmania's main urban water utility and to 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 cost-reflective pricing and efficient use of water infrastructure.
- The South Australian Government has made an election commitment to decorporatise SA Water and incorporate it within a government department. If adopted, this would represent significant backsliding from the core urban water reforms of the 1990s and risks ongoing political involvement in investment decisions and operational matters. The lack of strategic and transparent decision making in service provision was one of the key reasons for reforms undertaken in this area of the economy.
- Price monitoring, which was in place for south-east Queensland retailer-distributors up until 2014, is currently not occurring.

In addition, there are a number of areas where some jurisdictions are yet to implement key reforms.

- Western Australia and the Northern Territory are yet to establish statutory-based entitlement and planning arrangements that provide for water access entitlements that are long-term, not tied to land, and tradeable.

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- In recent years, some State and Territory Governments 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 has not yet established specific mechanisms for engaging Indigenous communities in water planning.
 - 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 providers in regional New South Wales and regional 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 underpricing in Tasmania and regional New South Wales.
 - There have been recent unresolved allegations of non-compliance with water laws and regulations in New South Wales. There are also broader questions about the effectiveness of state-based compliance and enforcement regimes, which are critical to the integrity of the entitlement system and water markets.

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 Basin Plan and stressed the importance of maintaining momentum to ensure it is implemented on time and in full. At the Ministerial Council meeting scheduled for mid-December 2017, Ministers intend to discuss the implementation program for the

Sustainable Diversion Limit Adjustment Mechanism, including the resourcing of agreed supply measure projects and the design of efficiency measure programs.

The Murray Darling Basin Authority released a five-year progress report on implementation of the Basin Plan in mid-December 2017. The Productivity Commission will also 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
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.

The assessment of progress noted that:

- 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

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- legislative change is required in Western Australia and the Northern Territory if market mechanisms are to be used in the release of unallocated water
 - some progress has been made in developing new and emerging water markets, and in 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 to by State and Territory Governments.

The Productivity Commission's terms of reference for this inquiry specifically require it to consider whether NWI reforms are adequate to address emerging challenges in the urban water sector. The Productivity Commission's analysis indicates there is scope for further reform, including reforms that go beyond those included in the NWI, in order to address matters highlighted by the NWC in 2014.

The Productivity Commission's proposed suite of recommendations in chapter 6 represents a reform program which, if pursued, should improve outcomes in the urban water sector. These recommendations would provide a significant step towards the achievement of the NWC's recommendation and should be included in a renewed NWI.

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 the integration of water quality and quantity in planning. The Productivity

Commission understands that this work is near completion and will culminate in the publishing of a new website (www.waterquality.gov.au) in early 2018 that will include:

- updated national guidance documents (including the NWQMS Charter)
- revised Australian and New Zealand Guidelines for Fresh and Marine Water Quality, including associated default guideline values.

In addition, the Australian, State and Territory Governments have progressed several measures to better integrate water quality into planning.

- In the MDB, jurisdictions are developing water resource plans under the Basin Plan, which include a water quality management plan. In developing the plans, water planners are encouraged to consider the impacts that wider natural resource management and land management activities may have on water quality within their water resource plan area (MDBA 2017j).
- In 2017, the Department of Agriculture and Water Resources released *Characterising the Relationship between Water Quality and Water Quantity*, which aims to help water managers gain a greater insight into some of the key water quality issues across Australia (Sinclair Knight Merz 2013).
- The *National Groundwater Strategic Framework 2016–2026* includes an action to ‘[e]mbed water quality into planning, management and regulation frameworks utilising the National Water Quality Management Strategy: Guidelines for Groundwater Quality Protection in Australia ... to support national water management processes’ (Australian, State and Territory Governments 2017c, p. 8).

As discussed in chapter 3, the Productivity Commission considers there is scope to revise the NWI to better reflect interactions between water quality and quantity in water planning. The key outcome sought is that water planners think about water quality and the risk it could pose during the process of water planning, and make any necessary linkages with plans, actions and regulatory requirements undertaken through natural resource management and environmental protection frameworks.

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.

This recommendation has been acted on. As noted in appendix B (section B.5), an interagency working group analysed the data needs of relevant Australian government agencies (including the costs and benefits of providing that information) and recommended amendments to 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 2017b).

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 eleven major water infrastructure projects¹⁴² announced since 2014, but not one of those projects has met the NWC's recommendation for transparent cost-benefit analysis.

Benefit-cost ratios are available for eight of the projects, and those ratios indicate the projects are worthwhile. However, the Productivity Commission has been unable to confirm the veracity of those ratios as the full analysis for each project is not publicly available. This is discussed further in chapter 8.

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.

Progress against this recommendation is considered in appendix B (section B.3). As above, there have been eleven major water infrastructure projects announced since 2014. All but one of the eleven projects are consistent with, or are required to be consistent with, NWI principles. The exception is the Broken Hill Pipeline, 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: the National Water Infrastructure Development Fund and the 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 that:

¹⁴² Each project has a total cost in excess of \$5 million. The 11 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); Rookwood Weir (Qld); Northern Adelaide Irrigation District (SA); 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 2015, p. 47)

Projects should align with the National Water Initiative principles ... (Australian Government 2015, p. 51)

The Department of Agriculture and Water Resources 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 consistent water entitlement and planning frameworks are or *will be* put in place (emphasis added) (DAWR 2016a).

There is a risk that projects may be approved in the absence of NWI consistent water entitlement and planning frameworks. This area of concern is discussed in chapter 8.

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 petroleum operators. The Queensland Government has made changes to apply consistent water rights arrangements across mining and petroleum activities (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) extraction, coupled with a lack of social licence for the CSG industry. Such initiatives include:

- the National Harmonised Regulatory Framework for Natural Gas from Coal Seams
- 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 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 improve knowledge on the risks and potential impacts associated with Australia’s CSG and coal mining activities on water and water-dependent assets. In 2017, the Bioregional Assessments program was extended to include studies of the potential impacts from shale and tight gas projects on the environment (including water resources) in three regions of Australia (Australian Government 2017c). The three regions where the assessments are to be conducted have not yet been announced.

There is further scope to ensure that water entitlement and planning arrangements explicitly incorporate extractive industries. This is considered in chapter 3.

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