



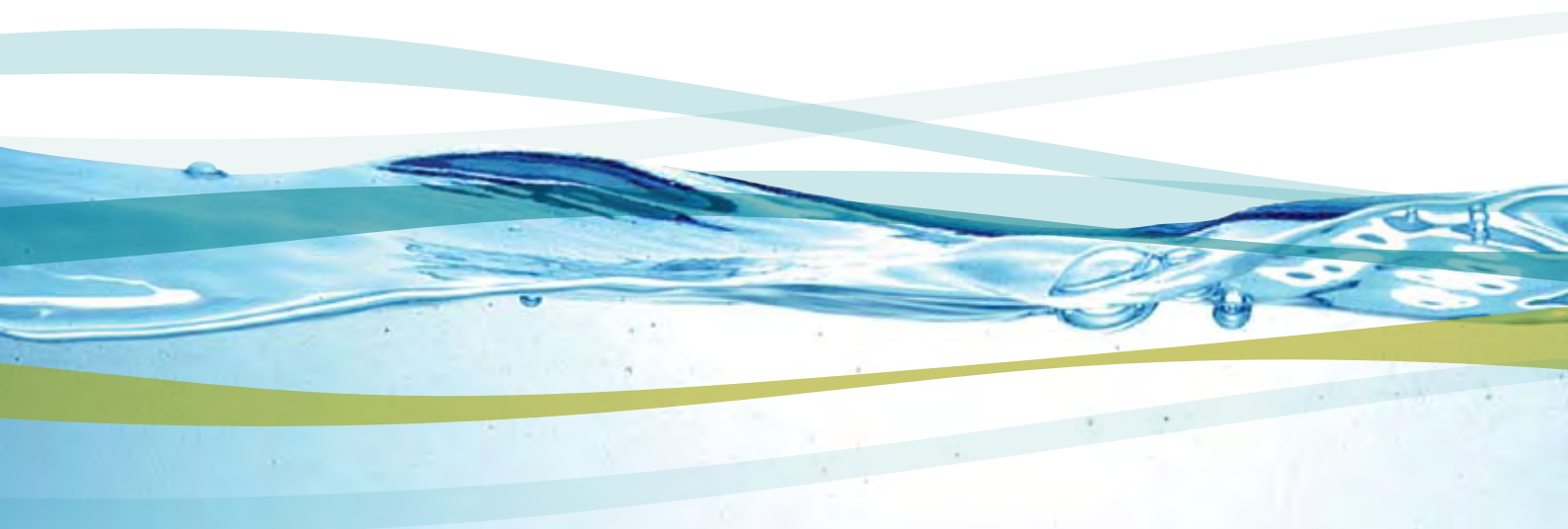
Australian Government  
National Water Commission

# Australian water reform **2009**

Second biennial assessment of progress in implementation  
of the National Water Initiative



Australian Government  
National Water Commission



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of the National Water Initiative

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**Australian Government**  
**National Water Commission**

**Chair and Chief Executive Officer**

The Hon Kevin Rudd MP  
Prime Minister  
Parliament House  
CANBERRA ACT 2600

Dear Prime Minister

I am pleased to provide you, as Chair of the Council of Australian Governments (COAG), with the National Water Commission's Second Biennial Assessment of Progress in Implementation of the National Water Initiative (NWI). This report is required under Section 7 of the *National Water Commission Act 2004*.

The report is an independent review of national progress in water reform. It is not a scorecard of the performance or failures of the states and territories. It recognises that successful national water reform requires cooperative contributions by all parties. The report includes over 100 findings about progress in different aspects of water reform and makes 68 recommendations. The great majority of the Commission's recommendations are no cost or low cost. Some of the recommendations are challenging and novel, but together they comprise a package of practical and logical next steps to improve the way our precious national water resources are managed.

The recommendations of the report are unapologetically a reform agenda. In the Commission's view, despite the steady deterioration in water circumstances of much of Australia as a result of drought and climate change, the quality of water management in Australia has not been improving fast enough and governments need to redouble their efforts. But while reform is urgent, it is necessarily a long-term process. Sustained attention and resources will be necessary and continued hands-on leadership from COAG will be vital.

Water in Australia is ultimately a state and territory responsibility. However in recent years the Australian Government has invested large sums in water management and provided strong leadership in inter-governmental reform processes. The Commission urges that this continue. In the Commission's view, the 68 recommendations in this report offer an excellent opportunity for the governments of Australia, through COAG, to sponsor a new round of collective, concerted action to renew and reinvigorate national water reform.

There are significant gains in national productivity and environmental sustainability to be made. To reap those gains the Commission has long been convinced of the value of financial incentives from the Commonwealth to encourage, and provide resources for, the states and territories to implement the necessary reforms. For that reason the Commission welcomed the incentive funds offered last year through COAG national partnership payment arrangements. However Commissioners are concerned that implementation of these arrangements has been too slow to be giving effect in the water sector and as Commonwealth/State negotiations proceed, it is proving difficult to structure arrangements to provide the necessary incentive effect to encourage reforms to be completed. Commissioners suggest that COAG look for opportunities to make these arrangements as effective as possible.

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The Commission's package of reform recommendations would affect all Australians but would be felt most in regional Australia. The report highlights the scale of the adjustment challenge ahead for many water-dependent industries, communities, families and individuals. For example the Commission has estimated that in northern Victoria the combined impacts of water buybacks and climate change on long-term average water available for consumptive use may be in the order of 30 per cent. Adjustment pressures of this order may comprise the biggest potential obstacle to successful water reform. To ensure reform continues, the Commission urges that affected communities be given clear information about future reform directions, buyback plans, environmental objectives, infrastructure investment plans and risk assignment arrangements. Governments also need to provide affected communities with greater clarity about how water will be managed in periods of unprecedented low flows. More opportunities for communities themselves to influence the change process also need to be found.

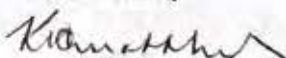
But these concerns for sensitive and inclusive dealings with regional communities should not dilute the rigorous and vital reform messages of the Biennial Assessment. For example the Commission is critical of the arbitrary four per cent limit to water markets, and the tit for tat responses by different states to the perceived impacts of water trade. The Commission recommends that all such measures be removed in a coordinated way. The Commission also recommends that governments make an historic commitment to the shared ultimate objective that all surface water and groundwater extractions across Australia should be licensed and metered or measured. The Commission fully appreciates that this far-reaching recommendation will be challenging for governments.

But challenging though the reforms may be, it is vital that they be delivered. When water extractions finally reach sustainable levels, irrigation-dependent families, farms, communities and regions will at last have the clarity and confidence for long-term planning they have been seeking since the NWI was first signed in 2004. Our national productivity will lift. Our water-dependent environmental assets will be more secure. The acrimonious disputes among state governments will reduce. Public concern and debate about water sharing and water use will begin to settle.

Water reform is a form of climate change adaptation. The central issue in water management in Australia has always been water sharing: how much for the environment, how much for consumption, and within that how much for different consumers. With climate change now pressing on us, these difficult public policy choices are intensified. Fortunately, Australia has the formula for successful choices available. The NWI is an internationally applauded prescription for better water management. It has been agreed by all the governments of Australia. It is now buttressed by very significant budgetary resources made available by governments, particularly the Australian Government. It enables concerted actions by all Australian governments toward shared objectives.

This Biennial Assessment shows that while governments have been working hard to implement the NWI reforms, progress has not been fast enough. The challenge is urgent and the reform process must be faster. The Commission urges COAG to use the assessment to trigger a renewed national effort to reform our water management, lift our productivity, and secure a sustainable future for water users, water-dependent communities and Australia's water-dependent environment.

Yours sincerely



Ken Matthews  
18 September 2009

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# Executive summary

The **National Water Initiative** (NWI) is a joint commitment by Australia's governments to make the nation's water use more efficient and sustainable, leading to greater certainty for investors, producers, communities and the environment. It is Australia's blueprint for managing the nation's water. Each state and territory has an implementation plan to bring the NWI into force.

The **National Water Commission** (NWC), established under the *National Water Commission Act 2004*, advises the Council of Australian Governments (COAG) and the Australian Government on national water issues and, every two years, reports formally on the progress of the NWI.

The **2009 Biennial Assessment** is the Commission's second two-yearly assessment of progress in the implementation of the NWI. It focuses on developments since the 2007 Biennial Assessment.

The assessment is also a contribution to the public debate on water reform, which has become much wider in recent years as a result of drought, climate change, and the urgent need to manage the nation's water resources more efficiently and sustainably, particularly in the Murray–Darling Basin.

This report—*Australian water reform 2009: Second biennial assessment of progress in implementation of the National Water Initiative*, by the National Water Commission—records significant achievements in water reform across Australia. It covers all states and territories, groundwater and surface water systems, and urban and rural areas. Because the Commonwealth now has a much greater role in water management, the assessment also considers how much the actions of the Australian Government have helped to achieve the objectives of the National Water Initiative (NWI).

In many areas, progress in the past two years has been good, but the Commission has identified some areas where reform has been slow or inadequate. Based on its findings, the Commission has made 68 recommendations for further action to refocus national reform efforts over the next two years.

The Commission understands that jurisdictions have differing priorities, and are at different stages of water reform. The states and territories sharing the Murray–Darling Basin (MDB) are obviously an important focus for many areas of water reform, but the Commission believes that many of the challenges in the basin apply elsewhere in Australia. Lessons from the MDB can benefit water management across the nation.

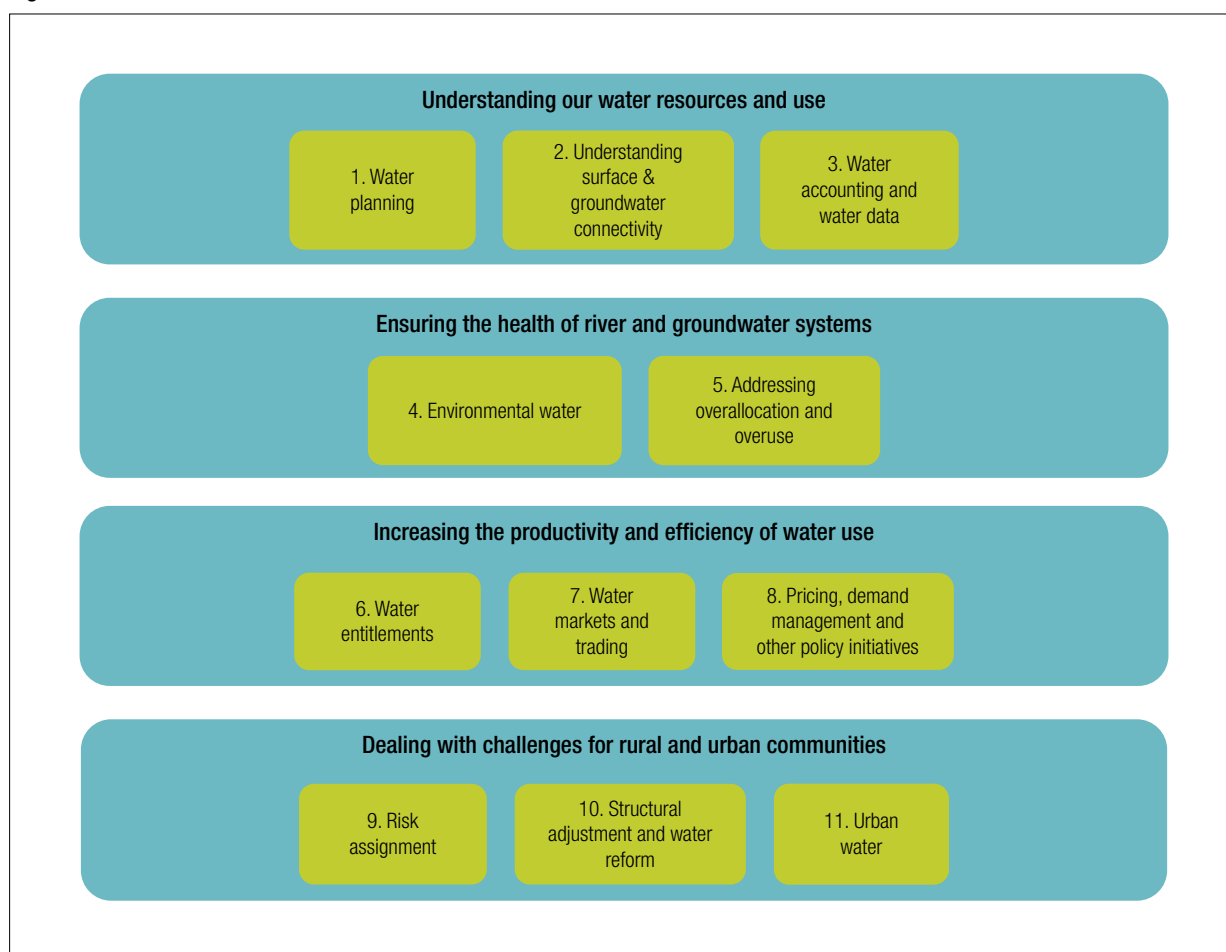
The Commission is convinced that further urban and rural water reform will contribute to the national micro-economic reform agenda and deliver enduring benefits across Australia. These include economic productivity gains, sustainable use of natural resources, and a more harmonised and efficient approach to water management. Such reform is essential as Australia tackles the challenges posed by global economic conditions and climate change.

To produce the 2009 Biennial Assessment, the Commission drew on a wide range of sources, including submissions from the public and NWI parties, many reports and studies, selected consultancies, and a stakeholder forum held in May 2009. The assessment includes examples and case studies to highlight progress, best practice and areas where more effort is needed. Many are jurisdiction specific, but the lessons are often applicable across Australia.

Each chapter of the 2009 Biennial Assessment relates to an objective of the NWI, with an additional chapter on urban water reform. The chapters are grouped into four themes, as shown in Figure 1.



Figure 1: Structure of the 2009 Biennial Assessment



The following overview provides a brief summary of some of the central findings and recommendations arising from each chapter. The full set of the Commission's findings and recommendations are presented within each chapter.

## Understanding our water resources and use

Water planning and accounting for our water resources have improved, but further implementation of the agreed national reform agenda is required to fulfil the objectives of the NWI.

### Water planning

Water plans are fundamental to water management because they establish a balance between environmental and consumptive uses. Under the NWI, transparent, statutory-based water plans should be developed for all surface water and groundwater management units in which entitlements to water are issued.

The necessary legislative reforms have been completed in all jurisdictions except Western Australia, but ongoing delays in completing and implementing water plans across much of Australia are preventing the full realisation of the benefits of an effective water planning regime envisaged under the NWI. Over the past two years, few new plans have been finalised. Many remain outstanding (in all jurisdictions except the ACT), and timetables for their completion need to be re-established. The Commission considers it is now timely for parties to reset and republish realistic timeframes for the rollout of remaining water plans.

In general, the plans now being developed include a number of improvements compared with earlier plans, such as the inclusion of climate change scenarios. However, at this stage only a few include robust strategies to adapt to climate change.

More generally, there is scope for further improvement in planning:

- + Plans still tend to handle hydrology better than ecological issues.
- + There is no agreed approach to understanding and balancing trade-offs between environmental and consumptive uses.
- + Drought contingency planning remains ad hoc and lacks transparency, which affects the security of water access entitlements.
- + Indigenous economic, cultural and spiritual interests should be more effectively incorporated into planning.
- + Progress continues to be slow in identifying and addressing significant interception of surface and groundwater.
- + In general, monitoring, review and reporting are underdeveloped, despite being essential elements of adaptive water management.

The development and commencement of water plans should be accelerated to allow water users to realise the full benefits of NWI reforms. At the same time, speeding up the pace should be balanced against quality, and particularly the quality of community consultation.

## Understanding surface and groundwater connectivity

The NWI parties have agreed to recognise the connectivity between surface and groundwater resources and to manage connected systems as single resources.

All jurisdictions have passed legislation or implemented planning processes that recognises the potential for connectivity, and all have begun assessments of connectivity, as required under the NWI, although their approaches vary significantly. Investments through the National Groundwater Action Plan are also improving our understanding of system connectivity.

All jurisdictions have made some progress in developing integrated management arrangements for identified connected systems. However, the continuing slow rollout of water plans, and a failure to adequately address overallocation in some systems, are inhibiting wide adoption of integrated surface water and groundwater management. The jurisdictions need to strengthen the foundations for integrated management by developing and implementing integrated plans, and by gathering additional data on the nature and extent of connectivity.

The Commission considers that ultimately, all surface and groundwater extractions, including for stock and domestic purposes, should be licensed and metered or otherwise measured. The Commission acknowledges the need for pathways to metering for groundwater extractions, taking into account the water management benefits of better metering, the level of risk to the resource, impacts on third parties, and cost effectiveness.

The Commission considers that unless and until it can be demonstrated otherwise, surface water and groundwater resources should be assumed to be fully connected, and water planning and management of the resource should be conjunctive. This is the reverse of the current situation.

## Water accounting

Water accounting tells us how much water is being delivered, traded, extracted for consumptive use, and managed for environmental and other public benefits. It is essential if water policymakers, planners and managers are to make sensible decisions about how to use water, and supports public and investor confidence.

The development of a national framework and standards for water accounting is on track for delivery in 2010. The Bureau of Meteorology, empowered and funded under the *Water Act 2007*, will become the nationally recognised institutional 'home' for Australia's water data and accounting effort. However, the bureau's role is focused on issuing standards, compiling water accounts and publishing the National Water Account. Its role does not encompass advancing the implementation of all aspects of water accounting across all jurisdictions, which remain responsible for many water accounting activities. Therefore, it is essential that the bureau and the jurisdictions continue to work closely together.

The National Water Accounting Development Project is developing standards for environmental water accounting. While there have been some advances in New South Wales, Victoria and the MDB, overall progress remains slow, and only limited success has been achieved in registration and reporting of environmental water as required by the NWI.

The recent finalisation of pattern approvals standards for non-urban meters is an important step forward, but considerable work remains to develop nationally standardised approaches to meter installation and testing, and to implement the standards. The jurisdictions are developing metering implementation plans, but resource constraints are likely to reduce their ability to deliver expanded and accurate metering in line with the plans.

In general, compliance and enforcement activities vary considerably in scope and effectiveness across Australia. The adoption of national principles to guide compliance and enforcement efforts would disseminate best practice and build community confidence, especially across state borders.

## Ensuring the health of river and groundwater systems

Progress towards achieving this objective has been disappointing. Moreover, the risk of irreversible environmental damage has intensified as a result of ongoing drought and climate change.

### Environmental water

Water-dependent ecosystems exist within waterways, wetlands, floodplains, riparian areas, estuaries and springs and can be supplied by both surface flows and groundwater. Without adequate water at the right time, they lose their capacity to provide environmental services and other public benefits. In some cases, the loss can be irreversible; in others, it can be difficult, costly or take a long time to reverse.

There have been improvements in the use of holistic and peer-reviewed, science-based methods to determine environmental water requirements, but further work is needed to integrate them into adaptive environmental management. Failure to use these robust methods in the past has contributed to the inadequate specification of environmental objectives and flow requirements. This has exacerbated the debate about overallocation and overuse across the country. Because water-dependent ecosystems are so complex, there is a need for better scientific research and systematic processes to apply the best available knowledge to understand and explain the links between environmental water delivery and ecosystem health, and to improve adaptive management.

The Commission is increasingly concerned about the security of environmental water access entitlements and rules-based environmental water, particularly during drought. The Commission considers that water plans should clearly and transparently specify desired environmental outcomes and fully define environmental watering protocols to achieve them under all inflow scenarios (including sequences of dry years).

The Commission is concerned that, in general, the role of environmental water managers is not adequately defined and resourced. They lack recognition, influence and authority, and their role and legitimacy in implementing and operating water plans is often unclear. Too often, they have other responsibilities, which can blur their accountability. The Commission also recommends that greater consideration be given to improving alignment and integration of programs for recovery and management of environmental water, across jurisdictions and geographical scales, and across land and water management.

At a jurisdiction, cross-jurisdictional (e.g. Murray–Darling Basin) or national level there are no consolidated, transparent, accessible and accountable mechanisms for registration of entitlements-based and non-entitlements-based environmental water, or reporting of environmental water delivery to meet specific objectives. Therefore, further work is needed to develop common approaches to registration of environmental water, to promote transparency and accountability and to demonstrate the effectiveness and efficiency of environmental waterings.

The increase in environmental water purchase programs, particularly the Australian Government's \$3.1 billion Restoring the Balance in the Murray–Darling Basin program, is a major positive policy change in environmental water management. The Commission strongly supports continued buybacks, including major purchases, as a strategic approach to improving environmental outcomes and adjusting to the new sustainable diversion limits to be developed under the new Murray–Darling Basin Plan. The Commission does not support the use, by states, of barriers to water trade to attempt to constrain environmental purchases and desirable adjustment.

The Commission considers that the relationship between buybacks, providing for environmental assets, and the transition to new sustainable diversion limits in the MDB is not well understood. Ongoing communication could continue to improve the transparency of these reforms, so building community understanding and support and enabling more informed decision making by entitlement holders. For example, the Commission recommends that the Murray–Darling Basin Authority progressively issue guidance on environmental objectives and environmental water management plans, locally and across the MDB.

### Addressing overallocation and overuse

The NWI Agreement aims to complete the return of all currently overallocated or overused systems to environmentally sustainable levels of extraction, and calls for 'substantial progress' in that direction by 2010.

On the basis of this Biennial Assessment, the Commission is disappointed to conclude that this central requirement of water reform will not be met. All reviewed water plans that identify overallocated or overused systems included pathways to return those systems to

environmentally sustainable levels of extraction, but very few, if any, such systems have been successfully transitioned to within sustainable extraction limits.

The Commission has been promoting nationally consistent terminology and definitions of 'overallocated' and 'overused' systems since 2005. Some slow progress has been made in this area, and work is ongoing, but further and faster work is needed to agree on and implement nationally consistent guidelines and approaches.

Groundwater systems make up the vast majority of the water systems currently identified by jurisdictions as overallocated, overused, or both. The Commission is seriously concerned that surface water systems may be under-represented in current assessments by jurisdictions, particularly in the MDB, given evidence such as the Sustainable Rivers Audit and the CSIRO Sustainable Yields Study.

Widespread and prolonged drought over the past decade has resulted in critical environmental degradation in the MDB and across southern Australia. High-profile cases of ecological decline, such as in the Lower Lakes and the Coorong in South Australia, have been linked to a combination of drought and unsustainable levels of extraction. Concerns about poor ecological health have been a reason for governments to recover water for the environment.

Without a clear definition of the sustainable level of extraction in many water systems, uncertainty and debate continue to undermine confidence in the management of Australia's water resources. The agreement to develop new sustainable diversion limits for surface and groundwater systems across the MDB under the new Basin Plan should address this longstanding national challenge in the MDB.

As work progresses on sustainable diversion limits in the MDB, jurisdictions should in the meantime continue with buybacks and other water recovery initiatives (in accordance with NWI principles). The Commission recognises the short timelines the MDBA is working to in the development of the Basin Plan, but in order to promote public confidence, the MDBA should take opportunities to demonstrate how water recovery initiatives are contributing to dealing with specific environmental challenges and to explain the relationship between buybacks and the transition to sustainable diversion limits.

## Increasing the productivity and efficiency of water use

On the whole, there have been significant advances towards this objective. Further efforts and reforms to enhance market performance, promote competition and efficient investment, and develop a more seamless regulatory environment are likely to deliver substantial national productivity benefits both in the short and long term.

### Water entitlements

Where access to water is insecure, users are likely to lack the necessary confidence to invest in new capital equipment, better management and infrastructure. Water entitlements of various forms have long been used to define users' access to water, and concern about the clarity, flexibility and consistency of those entitlements was a significant driver for water reform. The NWI established a framework for developing clear, nationally compatible and secure water access entitlements, to be defined in statute as a perpetual or ongoing and exclusive entitlement to a share of water.

Significant progress is being made in this area through legislative reform and the 'unbundling' of water entitlements from land. However, implementation of the NWI water access entitlements framework remains slow in some jurisdictions. How far jurisdictions intend to roll out NWI-consistent water access entitlements, particularly in unregulated surface and groundwater systems, remains unclear. Where they do not intend to fully adopt the NWI framework, they have not documented alternative plans to improve the security of entitlements. The Commission recommends that jurisdictions review and reset their implementation plans within six months to spell out the proposed extent and timetable for entitlement reforms across all water systems.

The development of water markets and the challenges of drought have highlighted the need for more complete and transparent specification of water entitlements and allocation methods, particularly during sequences of low-inflow years. Despite examples of positive reforms and good practice, the Commission is concerned about the robustness and transparency of allocation systems during periods of critical water shortage, which are expected to become more frequent as a result of climate change.

Entitlements for new and alternative sources of urban water supply, such as stormwater and managed aquifer recharge, need further consideration, while recognising the interdependent nature of urban water sources.

The Commission considers that miners, plantation forests and a range of other large industrial water users now need to be better integrated into the water access entitlements framework, so that those industries can reap the benefits of more secure water access and trade and further contribute to national productivity gains and long-term economic performance. Where full integration is not possible, appropriate alternative arrangements need to be clarified and implemented as soon as possible.

## Water markets and trading

Water markets provide opportunities for water to be reallocated between competing uses, and an effective market for water trading gives entitlement holders the flexibility they need to respond to drought and climate change. The development and enhancement of water markets represents a centrepiece of national water reform, and provides an example of successful national micro-economic reform, boosting Australia's economic performance during challenging times.

Over the last two years, good progress has been made to ensure that jurisdictions have the institutional, regulatory and administrative arrangements to enable trade in water, particularly in the MDB. Water trading is already delivering tangible benefits for buyers and sellers inside and outside the MDB. Without the ability to trade, the impacts of the prolonged drought on industries, communities and individuals across the MDB would have been much worse.

Outside the MDB, planning and entitlement reforms need to be pushed along to develop new and expanded markets for water. Within the basin, the Commission argues strongly that remaining artificial trade barriers, which are distorting and hampering adjustment and efforts to address overallocation and overuse, be removed. In particular, the annual 4% limit on water entitlement trading out of an irrigation area is being reached in regions in several basin states, with a wide range of undesirable consequences. The 4% limit is:

- + impeding the use of buyback programs to help return overallocated water systems to sustainable levels of extraction
- + unfairly and arbitrarily penalising willing sellers of irrigation entitlements
- + distorting patterns of water trade out of irrigation areas (including interstate trade)
- + inhibiting desirable and necessary structural change
- + complicating interstate collaboration in other areas of water reform.

Under the *Water Act 2007*, the Minister for Climate Change and Water, based on advice from the Australian Competition and Consumer Commission (ACCC), is to develop new water market and water charge rules to apply in the MDB. The rules are an important step in addressing a range of other barriers to trade and encouraging a more harmonised approach, but it will be important that they are implemented effectively across the basin. More broadly, a number of potential market distortions, such as interstate and intrastate allocation processes and government interventions, require further investigation.

There have been some improvements in the processing of water transactions and water market performance. However, processing delays, especially for trade in water access entitlements (compared with allocation trade), continue to undermine the efficiency and effectiveness of water markets. Public reporting of performance against recently agreed COAG service standards is expected to drive significant future improvements in trade processing times, both within and between jurisdictions.

Significant efforts have been made to improve confidence in market intermediaries, in particular through the provision by authorities such as the ACCC of better information about rights and obligations under consumer protection legislation. Some cases of misconduct have been reported, but the low number of complaints suggests that there is not yet a compelling case for industry-specific regulation of water market intermediaries, beyond the trade practices and consumer protection regulations.

## Pricing, demand management and other policy initiatives

A central aim of the NWI is to implement policies that promote water use efficiency and innovation in urban and rural areas.

Efficient pricing or charging for water-related services underpins investment and provides signals for the efficient use of water services. Getting the price signals right by ensuring that they fully reflect the efficient costs of providing the services is a key element in encouraging innovation and efficient water use. Jurisdictions have made some pricing reforms over the past two years, and substantial progress has been made towards the development of national NWI pricing principles. These principles have not yet been adopted and in the Commission's view, it is time they were. Despite their slow development, once the principles are agreed they will guide more substantive future reform. The Commission considers that implementation of further pricing reforms has the potential to drive innovation and deliver significant economic benefits across Australia, in a sustainable manner.

The Northern Territory is the only jurisdiction yet to achieve lower-bound pricing and establish a pathway towards upper-bound pricing for metropolitan water storage and delivery services. However, the territory has recently announced significant price increases in order to move towards lower-bound pricing by 2011–12.



Progress in meeting NWI commitments for cost recovery for water planning and management for both surface and groundwater has been very limited. Further advances in this area are needed in Queensland, Western Australia, Victoria and South Australia and nationally to implement consistent approaches. While the *Water Act 2007* gives the Minister powers to develop water charge rules for water planning and management activities (based on advice from the ACCC), it is difficult to apply these rules in the way envisaged in the NWI Agreement.

Governments have invested significantly in demand management initiatives, particularly in urban areas, and those initiatives have been useful in contributing to reductions in per capita consumption and managing the impacts of drought. However, while water use efficiency technologies are a good tool for demand management, uptake will be improved if efficient pricing mechanisms are in place. A clear price signal provides an incentive for individuals and businesses to make sound decisions about water use and investments in water-saving technologies and alternative supplies. While non-price approaches to demand management (regulatory requirements, subsidies, restrictions) are useful in some cases, their costs, benefits and sustainability need to be assessed. For example, with water restrictions, the costs to the community are usually hidden. The Commission supports efforts to improve consumer information and to remove regulatory barriers to innovation. Such measures will be more effective in moderating demand if coupled with appropriate pricing.

## Dealing with challenges for rural and urban communities

Since the 2007 Biennial Assessment, risk assignment, structural adjustment and urban water reform have gained greater prominence, particularly in the light of ongoing drought, climate change, and new institutional and policy arrangements aimed at managing reduced water availability.

### Risk assignment

The NWI risk assignment framework defines how the risks of reduced or less reliable water allocations are to be shared between water access entitlement holders and governments. It is intended to give water access entitlement holders more planning and investment certainty about how changes in water availability will be dealt with, and so contribute to a robust, transparent and sustainable water planning framework in the long term. However, the NWI risk assignment framework is not well understood by stakeholders.

The NWI Agreement requires jurisdictions either to adopt the specific NWI risk assignment provisions or devise an alternative approach. New South Wales and the Commonwealth (in the context of the Murray–Darling Basin) are the only jurisdictions that have adopted the specific NWI risk assignment provisions. Queensland and the ACT have stated that they intend to amend legislation to adopt the NWI provisions as a result of recent changes to the *Water Act 2007*. Other jurisdictions have adopted (or intend to adopt) alternative risk assignment approaches, or have not yet decided their approach.

Under the NWI Agreement, the NWI risk assignment framework only applies once NWI-consistent water plans are in place and overallocation has been addressed. However, there is significant uncertainty about the definition and classification of overallocation, particularly in the MDB. There is evidence that this is contributing to uncertainty (in the MDB irrigation community and in governments) about the commencement of the provisions and how they relate to new sustainable diversion limits under the new Basin Plan.

It is also not clear how easily governments will be able to implement the NWI risk assignment provisions in practice, given that multiple factors are likely to reduce future water availability for allocation to water access entitlements. In addition, there is little guidance for assessing whether alternative approaches to risk assignment developed by jurisdictions meet the overarching objective of providing certainty and security to entitlement holders, and limited understanding of how those approaches will align with the new institutional arrangements in the MDB.

The Commission considers that there is a need to clarify these ambiguities and uncertainties, and to ensure that the risk assignment provisions and the methods and processes for their effective implementation are clearly defined and understood.

### Structural adjustment and water reform

Structural adjustment is the continuing process of change in the size, composition and characteristics of industries, which occurs naturally in response to a range of market, technological and environmental factors, as well as in response to government policy reforms. Adjustment should be seen as a necessary and positive phenomenon bringing opportunities for innovation and improved productivity. Across much of Australia, and in particular in the MDB, future reductions in water availability, combined with many other factors such as commodity prices, exchange rates and social trends, will contribute to ongoing adjustment in the irrigation sector and irrigation-dependent communities.

Future reductions in water availability for irrigation in the MDB are expected to result from a combination of factors including drought, climate change and the establishment of sustainable diversion limits for surface and groundwater systems. For broad planning purposes, it is important to understand that these reductions are likely to be very significant. For example, the Commission estimates that in the order of 30% less water could be available for irrigated agriculture in northern Victoria in the years ahead.<sup>1</sup> So while irrigation industries and communities have been responding to many and varied forces of change for decades, reduced water availability will add to these pressures.

Water reforms outlined in the NWI aim for more environmentally, economically and socially sustainable water management. Water markets play a critical role in this transition to sustainability by giving entitlement holders the opportunity to make their own adjustment, investment and production decisions. By removing barriers to trade and other policies which otherwise impede the natural and continuing process of adjustment, governments can facilitate this necessary and positive process. Water trade and environmental water purchase programs should be allowed to proceed in a timely, agreed and coordinated way, unencumbered by artificial trade barriers. At a time of drought and difficult market conditions, irrigators need more options and flexibility rather than less.

Government interventions (e.g. in the form of financial assistance or barriers to trade) which slow down the natural and desirable process of adjustment can distort important water reform objectives such as movement of water to its highest value use. Governments should bear these implications in mind when considering any policies and programs, and aim to ensure that distortions are minimised wherever possible. The Commission considers that, where governments are concerned about the outcomes of adjustment processes, there could be benefit in adopting a consistent and transparent approach to assessing the need for government intervention. Carefully considered and clearly explained policy in this area is important in sending the right signals for efficient investment and adjustment, which will benefit Australia's long-term productivity. Irrigation-dependent communities too will benefit from being able to make more informed and confident decisions as they respond to the pressures and opportunities for change.

## Urban water

Urban water supply has become a critical national issue. Population growth and declining water availability as a result of prolonged drought have led to severe water restrictions in many of Australia's towns and cities. Governments are responding in various ways, including investing in new water supplies, improving the management and delivery of urban water services, and allowing for greater innovation and more efficient water use. As governments have moved to diversify supply sources away from the traditional reliance on rainfall-dependent dams, they have been confronted by issues relating to planning, regulation, pricing, market and institutional reforms, and public confidence.

COAG-led reforms to develop draft national pricing principles, national urban water planning principles and a set of urban water reform actions under the 2008 COAG Work Program on Water provide a platform for further national reform. Much more work is required to fully implement these agreed principles, in particular to establish transparent urban water supply security standards, and to develop strategies for urban water security that are flexible and robust, and which will secure water supplies in an uncertain climate. 'Readiness' strategies that progressively stage commitments to large, capital-intensive projects while uncertainty is reduced are critical in minimising the costs and risks of oversupply and undersupply.

Significant institutional and regulatory reforms are underway in the Australian urban water sector. For example, the recent development of sophisticated national guidelines for safe and effective potable and non-potable reuse of water is the first step in support of growth in new and alternative sources of water supply. However, further work is required if enduring, cost-effective and sustainable solutions are to emerge. For example, the Commission supports the agreement in the COAG Work Program on Water to promote the use of competition and further examine the case for micro-economic reform in the urban water sector.

In summary, while good progress has been made in delivering the limited set of urban water actions committed to under the NWI, new challenges that were not as evident when the NWI was signed have arisen: changing and less predictable rainfall and runoff patterns, uncertainty about climate change, community demands for sustainable water supply solutions, and increases in water prices to pay for new water infrastructure. Given the scale of the challenges, a lot remains to be done to achieve reliable, healthy, safe and sustainable urban water supply.

<sup>1</sup> The Commission stresses that this estimate is intended to be indicative only, and that to obtain an accurate estimate a much more rigorous analysis would be required. As discussed in detail in section 10.2.2, a number of caveats apply and various simplifying assumptions were made. Importantly, this figure is not an estimate of the reductions that might eventuate as a result of the new Basin Plan, which will aim to address past overallocation as well as the impacts of climate change.

## Additional actions necessary for water reform in a challenging environment

Despite the progress that has been made over the past two years, there have been delays in implementation in almost every area of the NWI. Moreover, the fundamental challenges driving the NWI in 2004 persist. Indeed, the need for more significant reform to move Australia's water resources to a sustainable footing has, if anything, intensified.

Drought has caused potentially irreversible environmental degradation, including of important natural ecosystems such as the Lower Lakes and Coorong and the river red gum forests along the Murray River. Drought, combined with market factors, has also had a devastating impact on irrigation businesses and irrigation-dependent communities. The water reform challenges are broadening, as new needs are emerging across the urban water cycle and in the mining and industrial sectors.

Dealing with these and other emerging challenges in the long term requires more than adopting the Commission's recommendations in each of the individual areas discussed in the biennial assessment. In the Commission's view, the key cross-cutting actions needed to achieve the objectives of the NWI in Australia's current circumstances include:

- + **Painting a clearer picture of the move to a more sustainable level of extraction across the MDB.** The new institutional arrangements for the MDB provide a historic opportunity to address a critical national challenge. The commitment to establish new sustainable diversion limits under the Basin Plan needs to be integrated with complementary initiatives, such as environmental purchase programs and investments in irrigation infrastructure renewal. This integrated vision needs to be communicated to the irrigation community and other stakeholders to enable a smooth transition to a more certain yet sustainable future.
- + **Embedding flexibility and robustness into water planning and management to cope with uncertainty associated with climate change.** Climate change is now more evident and accepted than in the past. In the two years since the previous biennial assessment, it has become increasingly clear that adaptation to the potential impacts of climate change needs to be embedded in all aspects of water planning and management. Water management needs to go from merely assessing the potential impacts of climate change to developing robust but flexible strategies to provide security for entitlement holders and the environment, in increasingly uncertain circumstances. Low-flow contingency strategies should become a transparent component of 'normal' management and operational arrangements, rather than a reason to suspend or modify pre-existing plans, or adopt ad hoc rules.
- + **Ensuring that lessons from the MDB are reflected in a principled and proactive approach to water management elsewhere.** The MDB experience provides lessons for northern Australia and Tasmania, where there is potential future irrigation development. It is critical that the mistakes of the past are not repeated. In particular, principled approaches to water planning and management need to be adopted. For example, tough decisions about overallocation and overuse should not be deferred, and subsidies for the provision of water (which encourage overuse) should be avoided. A proactive approach is required, with the right policies and principles put in place *before* problems arise.
- + **Remaining focused on outcomes.** While agreed definitions and national consistency are important, further effort is needed to avoid time-consuming and costly debate among officials about technicalities and to remain focused on achieving the planned outcomes of the NWI. Reform effort needs to recognise the differences in the levels of development and understanding of water systems across Australia and tailor reforms to suit particular needs, while remaining true to the underlying principles of the NWI.
- + **Addressing resource and capacity constraints within the water industry.** As in many other industries, the water sector's workforce includes an ageing cohort of highly experienced technical and policy professionals, and a significant proportion of relatively new recruits. Over the coming years, training and professional development will be needed to ensure that the industry maintains the necessary human capital and other resources required to deliver on the national water reform agenda. As reform goes ahead, it will be increasingly useful to draw on new skills from other sectors, for example to support new approaches to water accounting and data management.
- + **Clarifying roles and responsibilities.** As institutional arrangements in water management have evolved it has become increasingly important to clarify the roles and responsibilities of government agencies to minimise duplication and improve policy coordination. The role of COAG in promoting reforms needs to be clearly defined and delineated from the roles of the jurisdictions. Similarly, the Bureau of Meteorology, the Murray–Darling Basin Authority and the ACCC, in taking up roles defined in the *Water Act 2007*, should ensure their activities are clearly distinguished from those of other agencies at the state or regional level. Policies will need to be sequenced appropriately so that the transition costs of reforms are minimised. Further institutional reforms that reinforce the separation of policy, regulatory, audit and service provision roles may need to be considered.

- + **Community partnerships and improved communication.** To ensure that water reforms endure, it is essential that they be informed by knowledge and understanding of water resources held within the community, and accepted by the community. This does not mean that tough decisions should not be made, but that Australians are more likely to accept decisions involving some hardship if they understand and support the goal: sustainable water use, sustainable ecosystems, and a sustainable and prosperous economy. The Commission encourages all governments to more clearly communicate the benefits of a unified and principles-based approach to water reform, especially those benefits that will flow from a move to more sustainable levels of extraction and a more sustainable, confident and secure irrigation sector.

The Commission encourages renewed effort by all parties to ensure that Australia obtains maximum benefit from the NWI, which the Commission continues to regard as an enduring and internationally recognised blueprint for water management.



## Introduction



# Introduction

## Purpose of the 2009 Biennial Assessment

This report documents the findings of the National Water Commission's (the Commission) 2009 Biennial Assessment of progress in water reform across Australia. Its purposes are:

- + to undertake an objective assessment and report on progress by the Commonwealth, states and territories in implementing agreed reforms under the National Water Initiative (NWI)
- + to report on implications of non-NWI actions or other events impacting on the water policy environment
- + to recommend actions required to better realise the objectives of the NWI, taking into account changing circumstances since the signing of the NWI in 2004.

This report fulfils the Commission's responsibility under the NWI, reflected in the *National Water Commission Act 2004*, to report biennially to the Council of Australian Governments (COAG). It records the significant achievements that have been made in water reform across Australia (focusing on progress since the previous 2007 Biennial Assessment) but also identifies those areas where reform has lagged.

The Commission has sought to ensure that this report goes beyond a 'compliance audit' of the specific actions required under the NWI. It is also intended to contribute to the wider public debate on the future water reform agenda with due consideration of the extraordinary challenges that have arisen in recent years.

## The National Water Initiative

The NWI is an intergovernmental agreement spelling out a comprehensive national agenda for water reform. The NWI was signed by the Commonwealth of Australia and the states and territories. Agreed in 2004<sup>2</sup>, the NWI represents a shared commitment by the Commonwealth and state and territory governments to achieve 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'.<sup>3</sup>

Full implementation of the NWI is expected to achieve (NWI clause 23):

- + **Effective water planning:** more sophisticated, transparent and comprehensive water planning that deals with key issues such as the natural variability of water systems, major water interception activities, the interaction between surface and groundwater systems, and the provision of water to achieve specific environmental outcomes
- + **Resolution of overallocation and overuse:** the return of overallocated systems to sustainable levels of extraction as quickly as possible, including effective management of significant adjustment issues
- + **Conjunctive management of surface and groundwater resources:** so that the connectivity between surface and groundwater resources is recognised, and connected systems are managed in an integrated manner
- + **Clear, nationally compatible and secure water access entitlements:** providing more confidence for those investing in the water industry due to more secure water entitlements, better and more compatible registry arrangements, better monitoring, reporting and accounting, and improved public access to information
- + **Improved environmental water outcomes:** the identification and effective and efficient delivery of water to sustain the health of water-dependent ecosystems which exist within waterways, wetlands, floodplains, riparian areas, estuaries and springs
- + **Clear assignment of the risks associated with changes in future water availability:** ensuring that the risks associated with reductions in the pool of water available for consumptive use are borne appropriately by various parties and to provide investors and entitlement holders with certainty over how changes will be dealt with

<sup>2</sup> The governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory signed the agreement in 2004, while Tasmania and Western Australia signed the agreement in 2005 and 2006, respectively.

<sup>3</sup> NWI Agreement, clause 23

- + **Effective water accounting:** providing information on how much water there is, where it is, who has control of it, who is using it, and what it is being used for in order to support public and investor confidence in the amount of water being delivered, traded, extracted for consumptive use, and managed for environmental and other public benefit outcomes
- + **Open water markets:** removal of artificial barriers to trade in water entitlements and allocations, bringing about more productive water use and enabling more cost-effective and flexible recovery of water to achieve environmental outcomes
- + **Smooth structural adjustment:** ensuring that water policy, planning and management are facilitating and expediting adjustment rather than impeding it
- + **Water use efficiency and innovation:** facilitating a level and pattern of water use and related investment that maximises the economic, social and environmental benefits of Australia's water resources.

In addition, the NWI seeks better and more efficient management of water in urban environments, for example through the increased use of cost-effective sources of recycled water and stormwater.

Although the above objectives are listed separately in the NWI, there are clearly close interrelationships between them, such that they need to be addressed as an integrated package.

The NWI specified a number of 'actions' necessary to achieve these objectives, which NWI parties agreed to implement through the development of implementation plans.

The NWI also provided for the establishment of the Commission to assist with the effective implementation of the NWI Agreement. The Commission was tasked with accrediting the NWI parties' implementation plans, and regularly assessing progress against the NWI. Specifically, commencing in 2006–07, the Commission was required to regularly assess progress with the NWI, and advise COAG on actions required to better realise the objectives and outcomes of the agreement.

## Context for this assessment

This 2009 Biennial Assessment of progress in implementation of the NWI needs to be seen as part of a longer term process of achieving a more integrated, sustainable and efficient water sector in Australia.

The need to move management of Australia's water resources onto a more sustainable and efficient footing was first recognised at a national level in the 1994 COAG water reforms. Following almost a decade of mixed progress, the need for a more integrated and effective national approach to water management led to the development of the NWI in 2004. The NWI provides a strategic national framework to deliver the more difficult COAG water reform commitments, and focuses on areas in which greater compatibility across jurisdictions would enhance outcomes.

The Commission believes that, for the most part, the NWI remains a world's best practice blueprint for ensuring integrated, environmentally sustainable and economically efficient water management and use in response to a range of competing demands and in an environment of scarce and variable supplies. Given the high quality of the NWI concepts and aspirations, the biennial assessment process focuses on their effective implementation.

## Previous assessments of reform progress

The Commission's first biennial assessment of implementation of the NWI (henceforth the '2007 Biennial Assessment') assessed progress against NWI implementation actions up to March 2007. It focused on specific actions committed to under the NWI, as it was 'too early to determine progress against desired outcomes and objectives' (NWC 2007, page 14).

Overall, the 2007 Biennial Assessment found that good progress had been made in implementing NWI actions, and that the agreement remained the primary and enduring national blueprint for water reform in Australia. However, the assessment also noted that much work remained to be done, particularly in the following areas:

- + **Overallocation of water resources.** There was no shared national understanding of what was meant by overallocation—despite the fact that all states indicated that some of their water systems were stressed.
- + **Groundwater – surface water interaction.** There was limited recognition of surface-groundwater connectivity in water plans. More effort was needed to build knowledge of groundwater and how to manage it.

- + **Interception of water from land-use change.** There was insufficient understanding of the impact of these activities, and no nationally consistent approaches to dealing with them.
- + **Integrated management of environmental water.** Entities responsible for managing delivery of environmental outcomes did not have sufficient capacity or clear authority. There was a need for improved river health monitoring and incorporation of that information into adaptive management of water resources.
- + **Water accounting, measurement and compliance.** Water accounting was still immature and ad hoc.
- + **Urban water management.** Institutional and structural reform in the water sector had not kept pace with other sectors such as gas, electricity and transport. Actions taken in response to urban water scarcity were often in the nature of an emergency response. NWI actions needed to be enhanced, to include better urban planning, institutional and market arrangements, and on-ground delivery of water supply and demand management options.
- + The **slow delivery of NWI-consistent water plans** was a potential threat to overall NWI outcomes.

To inform the development by COAG of a package of further reforms to the water sector, in February 2008, the Commission provided the *Update of progress in water reform* as an input to the COAG Working Group on Climate Change and Water (NWC 2008; henceforth referred to as the '2008 Update'), which updated the findings of the 2007 Biennial Assessment to take into account changes in the water policy environment. The 2008 Update reiterated the need to address the issues identified in the 2007 Biennial Assessment. It also noted that:

- + there was a need to improve the **quality and extent of science** underpinning water plans, especially understanding the relationships between water and the environment
- + water plans needed to incorporate **Indigenous interests** more effectively
- + there was a need to improve **monitoring and compliance** in line with the risk to the water resource.

COAG subsequently endorsed a set of further water reforms to accelerate progress in particular areas of concern, including in response to climate change.

## Recent developments

The NWI continues to provide the policy foundations for the continuing water reform initiatives of Australian governments. Without it there would be a real risk of incoherence in the national water reform process and no clear framework or objectives to guide national water reform. However, the Commission considers that this biennial assessment must go beyond the NWI, to take into account a number of new developments impacting on the attainment of NWI objectives and outcomes. In particular, it needs to encompass:

- + the impacts of prolonged drought and uncertainty associated with climate change
- + extensive institutional change, including the significant increase in the role of the Commonwealth and agencies both nationally and in the management of the Murray–Darling Basin (MDB).

## Drought and climate change

This assessment comes at a time of continuing and unprecedented water scarcity across southern Australia. Over the 36 months to 30 June 2009, rainfall deficiencies were among the most severe on record in most of Victoria, southern New South Wales and southern South Australia (BoM 2009). The scale of the challenges in future water availability and variability are becoming increasingly clear:

- + A clearer picture of the poor state of our environmental assets is emerging. Much public attention has focused on the environmental condition and dire outlook for the Coorong and the Lower Lakes (of the River Murray).
- + The irrigation sector in much of Australia confronts a future of significant reductions in water availability as a result of prolonged drought and climate change, as well as national efforts to address overallocation and return our surface and groundwater systems to sustainable levels of extraction.
- + Our cities and towns face significant challenges in implementing new approaches to urban water planning and supply, including the development and funding of more diversified portfolios of new and alternative water sources, interlinked grids, and new institutional arrangements. The magnitude of these urban water challenges in Australia was not envisaged when the NWI was developed.

## New policy and institutional arrangements

Recognising these unprecedented challenges, state and territory governments around the country have responded with considerable new investment and a range of policy, institutional and regulatory reforms. A particularly conspicuous change since the previous biennial assessment has been the significant expansion of the Australian Government's funding of, and role in, water policy and management, especially in the MDB.

In March 2008, COAG set new directions for water reform and commissioned work in selected reform areas, including:

- + addressing overallocation and achieving environmental outcomes
- + actions to enhance water markets
- + actions to progress urban water reform
- + water information and capacity building.

In April 2008, the Australian Government released its \$12.9 billion Water for the Future plan. Water for the Future comprises a 10-year plan with four key priorities: (i) taking action on climate change; (ii) using water wisely; (iii) securing water supplies; and (iv) supporting healthy rivers. Initiatives under the plan include:

- + The *Restoring the Balance in the Murray–Darling Basin Program*, which seeks over the next 10 years to purchase \$3.1 billion worth of water in the Murray–Darling Basin, to be held by the Commonwealth Environmental Water Holder and used to protect or restore environmental assets. An Environmental Watering Plan is to be established to guide the effective use of environmental water. It will be informed by the MDBA's ongoing Sustainable Rivers Audit program, which monitors river health across the basin.
- + Investments in rural water projects that save water by upgrading outdated, leaky irrigation systems under the \$5.8 billion *Sustainable Rural Water Use and Infrastructure* program. Funding arrangements for priority projects nominated by each basin state, including terms and conditions and agreed water reform outcomes to be achieved, are being negotiated through a bilateral agreement between the Commonwealth and each basin state.
- + Towns and cities are being provided with financial assistance to secure their water supplies through the *National Urban Water and Desalination Plan* and *National Water Security Plan for Cities and Towns*. The \$1 billion available under the *National Urban Water and Desalination Plan* is to support desalination, water recycling and stormwater reuse.

The Commonwealth *Water Act 2007* and 2008 Intergovernmental Agreement on Murray–Darling Basin Reform (henceforth the 'MDB IGA') have put in place institutional changes including:

- + establishment of the Murray–Darling Basin Authority (MDBA), with responsibility for developing a basin-wide plan by 2011 with environmentally sustainable diversion limits for the basin's surface and groundwater resources
- + new powers and functions for the Bureau of Meteorology (BoM), which is now responsible for producing the National Water Account and administering the \$450 million Improving Water Information Program, which is improving the accuracy of monitoring, assessing and forecasting the availability, condition and use of water resources
- + a role for the Australian Competition and Consumer Commission (ACCC) in advising the Minister on water charge and water market rules in the basin
- + establishment of a Commonwealth Environmental Water Holder
- + providing the National Water Commission with the power to conduct audits of the effectiveness of the implementation of the Basin Plan and basin water resource plans.

In November 2008 a new COAG Work Program on Water was agreed, which includes actions to:

- + enhance water markets
- + progress urban water reforms
- + improve water information and capacity building.

## Approach to this assessment

While the 2007 Biennial Assessment sought primarily to assess progress against actions committed to in the NWI Agreement and in NWI implementation plans, the 2009 Biennial Assessment shifts focus to the achievement of the agreed objectives and outcomes of the NWI.

This shift of focus recognises that since the 2007 assessment further progress has been made towards achieving NWI objectives. As detailed above, it also recognises that significant new developments and new actions have been initiated in Australian water reform since the NWI was signed in 2004, and that many elements of reform are currently underway. In this regard, the assessment aims to include information up to the end of June 2009.

To provide guidance on what is to be achieved, and therefore a basis for assessing progress, the Commission has sought to identify 'indicators of success'—an overall 'vision' in each area of water reform. While the outcomes listed in the NWI<sup>4</sup> provide guidance for what was to be achieved through the NWI, the agreement does not clearly link specific outcomes to the 10 objectives described in NWI clause 23. Through these 'visions', this assessment seeks to bridge that gap.

The biennial assessment is a national assessment of progress across all states and territories, groundwater and surface water systems, and urban and rural areas. Where possible, results of the assessment have been reported across all jurisdictions, and the Commission has made a number of careful yet strong findings, emphasising both positive and negative outcomes and results. In many areas, examples and case studies are used to highlight progress, best practice and areas where reform effort has slowed or been inadequate. While these examples may be jurisdiction specific, the lessons are often applicable across the nation.

Importantly, in the light of the new and expanding role of the Commonwealth and its agencies in water management, the assessment also considers the extent to which Commonwealth actions are contributing to the achievement of the NWI objectives.

In some areas, the Commission has identified a number of challenges that jurisdictions have faced in implementing the detailed or specific requirements of the NWI (e.g. in relation to risk assignment and overallocation). The Commission maintains its support and strong endorsement for a nationally compatible system of water management and believes that agreed definitions and consistent approaches remain an important part of achieving better outcomes for water users, taxpayers and the environment. Therefore, rather than critiquing jurisdictions on issues of interpretation, the Commission has endeavoured to remain focused on national outcomes, and has identified areas of the NWI where clearer shared interpretations would be of benefit.

The assessment recognises that different jurisdictions are at different stages of the water reform process and have different priorities. The MDB jurisdictions are the focus of much of the public attention in relation to water management in Australia and are obviously an important focus for many areas of water reform. However, the MDB is not irrelevant to water reform in the rest of Australia. The Commission believes that many of the challenges and lessons from the MDB are applicable and transferable to other parts of the country, particularly as the pressure on our nation's water resources increases.

The assessment highlights issues that are critical to future planned reform efforts, including the new Basin Plan scheduled for 2011. While recognising the significant future impacts of the new Basin Plan as defined in the *Water Act 2007*, the Commission's findings reflect the view that the new plan should not excuse inaction in the present. In developing its recommendations, the Commission was also cognisant of the risk of further heightening the already considerable expectations being placed on the new plan.

By focusing more on water reform outcomes, this assessment lays foundations for the third (2011) biennial assessment, which is to be a comprehensive review of progress in implementing the NWI (clause 106(b)). The 2011 Biennial Assessment will cover the extent to which implementation of the agreement contributes to the national interest and include an assessment of the impacts of implementing the NWI on regional, rural and urban communities.

Under clause 104(ii) of the NWI, the Natural Resource Management Ministerial Council (NRMMC) was tasked with developing a comprehensive national set of performance indicators for the National Water Initiative. As part of the 2011 Biennial Assessment, the Commission is required to review progress against the indicators developed by the NRMMC. To help prepare for the 2011 Biennial Assessment, this assessment seeks, where practicable, to comment on progress against the NRMMC indicators, and the utility of those indicators for assessing progress in water reform (see Table 1).

4 NWI clauses 25, 58, 64, 78, 90, 93, 94 and 100.



## Information sources

The 2009 Biennial Assessment draws from a wide range of sources, including:

- + information provided by NWI parties, through a formal submissions process and through ongoing consultations and interaction with jurisdictional officials
- + public submissions (see Box 1)
- + an extensive range of existing reports and work (references are listed at Appendix 1, and cited throughout this report)
- + consultancies commissioned to provide advice on specific topics of interest to the assessment (a list is in Appendix 5, and specific consultancies are also described, where relevant, in individual chapters of this report)
- + a stakeholder forum held on 7 May 2009 (see Box 2).

### Box 1: Public submissions to the 2009 Biennial Assessment

On 16 December 2008, the Commission released a discussion paper inviting stakeholders to make submissions to inform the 2009 Biennial Assessment (see Appendix 3). The paper described the purpose of the biennial assessment and indicated some topics that stakeholders might wish to discuss in their submissions.

Forty-six submissions were received from a range of individuals and organisations. Where relevant, views expressed in individual submissions are referred to in the substantive chapters of this assessment.

The Commission is grateful for the thought, effort and resources put into the submissions by these interested parties.

A full list of submissions is in Appendix 4. The discussion paper and submissions are also available on the Commission website at [www.nwc.gov.au/www/html/147-introduction.asp?intSiteID=1](http://www.nwc.gov.au/www/html/147-introduction.asp?intSiteID=1).

### Box 2: The Stakeholder Forum

More than 50 irrigation, environment, Indigenous, urban water, research and industry representatives attended the National Water Commission's Stakeholder Forum on 7 May 2009. The one-day forum provided an opportunity for stakeholders to be briefed on the major reform findings emerging from the assessment to date and to provide input to the assessment. Stakeholders expressed broad support for the emerging findings of the Commission's 2009 Biennial Assessment. Through the ideas contributed by stakeholders, the Commission gained a clearer understanding of the strengths, gaps and opportunities for improvement of the assessment undertaken to that point in time.

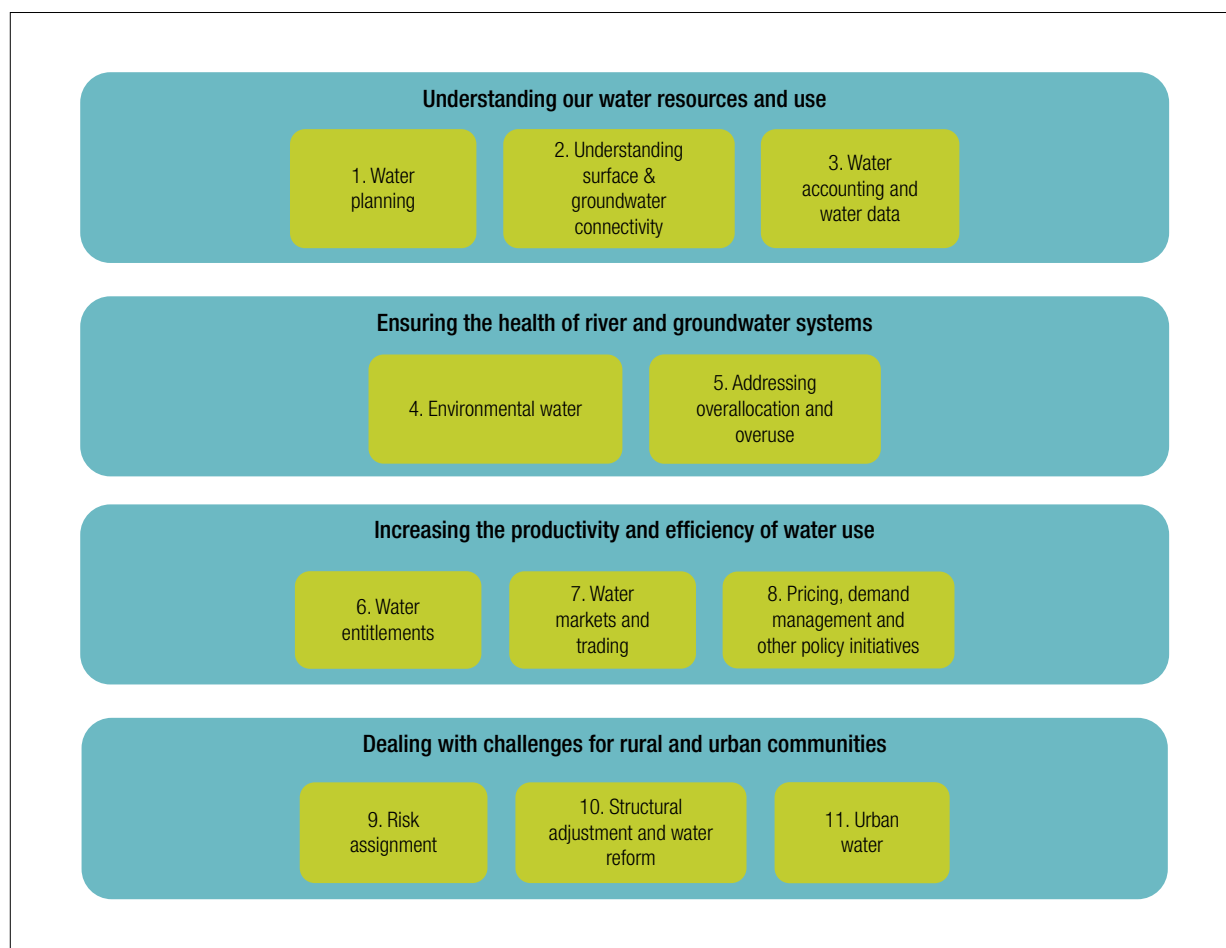
Participants urged the Commission to be forthright in identifying those areas where further and faster reforms are needed to get water reform 'back on track'.

The forum underscored the importance of collaboration as part of a renewed commitment to national water reform by all governments, industry partners and the private sector.

## Structure of the report

The format of this report reflects the framework for integrated water management outlined in the NWI and the increased focus of the 2009 Biennial Assessment on NWI objectives and outcomes. Each chapter of the report relates to an objective of the NWI, with an additional chapter for urban water reform. However, rather than following the order of the objectives as outlined in the NWI, the report adopts a thematic approach, as demonstrated in Figure 2.

**Figure 2: Thematic approach to the biennial assessment**



**Understanding our water resources and use.** Effective water management begins with a well-developed understanding of our water resources and their use.

- + **Chapter 1. Water planning.** Water plans are a fundamental element of the NWI. They represent the key tool for consolidating knowledge and understanding of water resources and establishing clear and transparent management objectives. The chapter assesses progress in water planning across Australia.
- + **Chapter 2. Understanding surface and groundwater connectivity.** This chapter assesses the extent to which surface and groundwater connectivity is understood and recognised in planning and management of Australia's surface and groundwater systems.
- + **Chapter 3. Water accounting and water data.** Effective water accounting is essential for understanding how water resources are used, and for accountability and transparency of water management. This chapter assesses progress in the development of nationally consistent approaches to water accounting.

**Ensuring the health of river and groundwater systems.** The long-term viability of our water systems, environmental assets and ecosystems needs to be protected.

- + **Chapter 4. Environmental water.** This chapter examines how environmental objectives are set, how environmental water is secured, and how environmental outcomes are monitored and reported on.
- + **Chapter 5. Addressing overallocation and overuse.** This chapter describes efforts to assess and categorise the status of water systems with respect to overallocation and overuse, and to implement pathways to return threatened systems to within environmentally sustainable limits.

**Increasing the productivity and efficiency of water use.** This theme focuses on reform efforts aimed at encouraging efficient, flexible and innovative water usage and investment decisions, without unduly compromising environmental outcomes.

- + **Chapter 6. Water entitlements.** Secure access to water is a fundamental precursor to efficient investment and usage decisions. It also forms the basis for water markets and trade. This chapter examines progress in the development of clearly defined, robust and nationally compatible entitlements that are separate from land, and tradeable wherever possible.
- + **Chapter 7. Water markets and trading.** Markets and trade help water users make flexible and efficient decisions, particularly in times of low water availability. Markets also increasingly provide opportunities to purchase water to achieve environmental objectives. This chapter assesses progress in the establishment of water markets and the removal of artificial barriers to water trade as required under the NWI.
- + **Chapter 8: Pricing, demand management and other policy initiatives.** Cost-effective pricing in both the rural and urban sectors provides signals to water users that encourage efficient usage and investment decisions. Efficient pricing should reflect the full costs of water services, including any environmental externality impacts. This chapter assesses pricing reforms and other reforms relating to water use efficiency and innovation, including demand management and other initiatives to manage the environmental impacts of water use.

**Dealing with challenges for rural and urban communities.** This theme focuses on aspects of water reform where the actions and policies of today will have a significant effect on our ability to deal with challenges in the future.

- + **Chapter 9. Risk assignment.** Risk assignment is the process of clearly defining who bears the risk of changes in future water availability. It recognises that society's objectives may change over time, that external factors such as climate change might pose a threat to the achievement of objectives, and that improved knowledge may necessitate changes in the balance between environmental and consumptive water use—but that users require certainty in relation to how these issues are to be addressed. The assessment examines the NWI risk assignment framework, as well as the broader context of risks to water availability.
- + **Chapter 10. Structural adjustment and water reform.** This chapter discusses adjustment in greater detail than outlined in the NWI. It highlights the importance of water markets in facilitating smooth and effective adjustment in response to reductions in water availability, and the importance of addressing social issues arising as a result of structural adjustment through separate and well-targeted mechanisms.
- + **Chapter 11. Urban water.** This chapter focuses on the achievement of NWI objectives in relation to urban water, recognising that the NWI actions in the urban sector were limited, but that urban water reform is now a critical national issue.

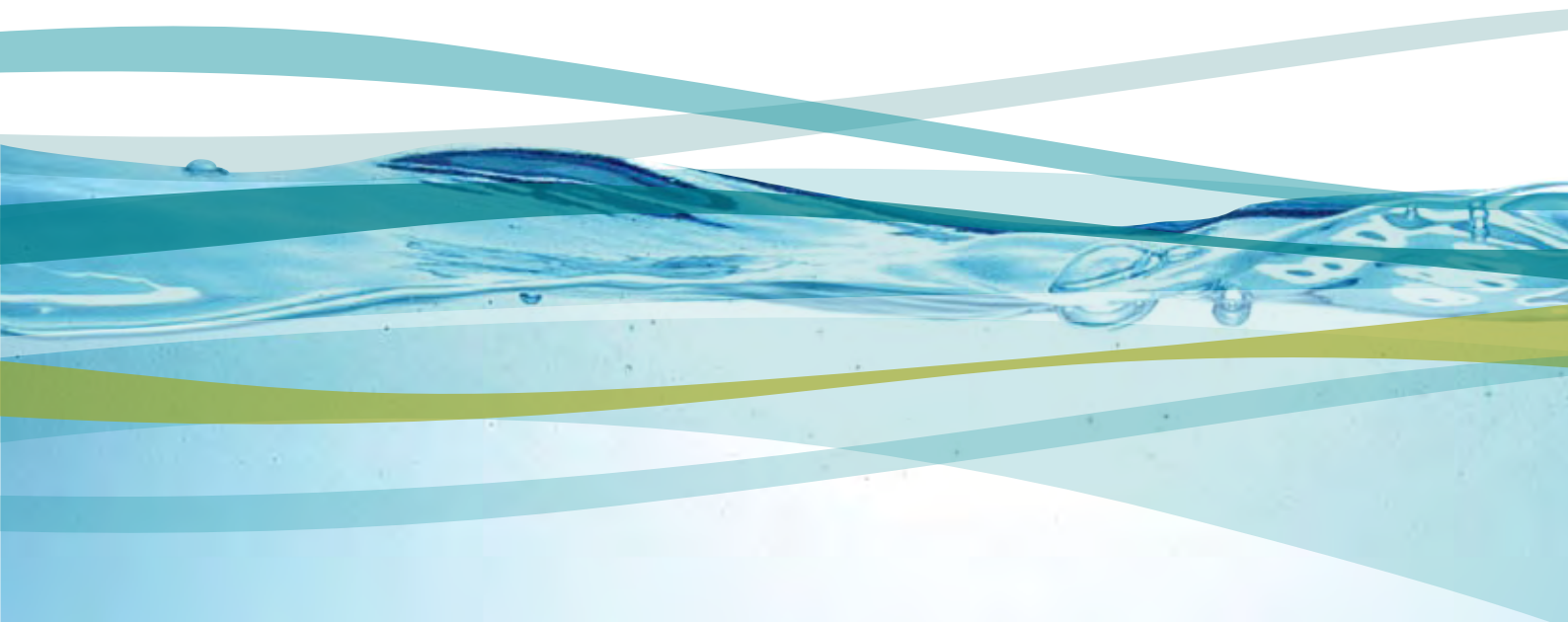
**Table 1: Natural Resource Management Ministerial Council—National Water Initiative performance indicators**

NWI Objective	Performance indicator as approved by the Natural Resource Management Ministerial Council
<b>Objective 1.</b> Clear and nationally compatible characteristics for secure water access entitlements	<b>1.1</b> The number of decisions by governments that revoke or change the security of statutory water access entitlements and the reasons for these decisions
<b>Objective 2.</b> Transparent, statutory-based water planning	<b>2.1</b> The proportion of surface water systems and proportion of water volume used [of inflow and storage volume] <ul style="list-style-type: none"> <li>a) Covered by a water plan</li> <li>b) Not covered by a water plan, but identified as requiring one</li> <li>c) Not covered by a water plan and not yet assessed in terms of requirement, or</li> <li>d) Not covered by a water plan but identified as not requiring one</li> </ul> <b>2.2</b> The proportion of groundwater systems and proportion of water volume used [of aquifer recharge and storage volume] <ul style="list-style-type: none"> <li>a) Covered by a water plan</li> <li>b) Not covered by a water plan, but identified as requiring one</li> <li>c) Not covered by a water plan and not yet assessed in terms of requirement, or</li> <li>d) Not covered by a water plan but identified as not requiring one</li> </ul>
<b>Objective 3.</b> Statutory provision for environmental and other public benefit outcomes, and improved environmental management practices—To assess the environmental and other public benefit outcomes in plans:	<b>3.1</b> Proportion of water use for consumptive and non-consumptive purposes <b>3.2</b> Extent to which actions have been implemented to achieve environmental and other public benefit outcomes defined in water planning frameworks (for 2004–05) <b>3.3</b> Improved resource condition outcomes <b>3.4</b> Number and proportion of water systems for which: <ul style="list-style-type: none"> <li>a) High conservation value aquatic ecosystems have been identified;</li> <li>b) Plans or other instruments addressing high conservation value components have been completed; and</li> <li>c) Actions consistent with the plan have been undertaken</li> </ul>
To assess improved environmental management, including amongst water service providers and environmental water managers:	<b>3.5</b> Environmental compliance by urban water service providers <b>3.6</b> Environmental compliance by rural water service providers.

NWI Objective	Performance indicator as approved by the Natural Resource Management Ministerial Council
<b>Objective 4.</b> Complete the return of all currently overallocated or overused systems to environmentally sustainable levels of extraction	<b>4.1</b> Number and proportion of water systems for which a water plan has been completed that: <ul style="list-style-type: none"> <li>a) have not been assessed for overallocation;</li> <li>b) have been assessed for overallocation and are determined not to be overallocated;</li> <li>c) are assessed as being overallocated (and the level of overallocation) with a pathway in place to address the overallocation; and</li> <li>d) are assessed as being overallocated (and the level of overallocation) with no pathway in place to address the overallocation</li> </ul> <hr/> <b>4.2</b> Number and proportion of water systems for which a water plan has been completed that: <ul style="list-style-type: none"> <li>a) have not been assessed for overuse;</li> <li>b) have been assessed for overuse and are determined not to be overused;</li> <li>c) are assessed as being overused (and the level of overuse) with a pathway in place to address the overuse; and</li> <li>d) are assessed as being overused (and the level of overuse) with no pathway in place to address the overuse.</li> </ul>
<b>Objective 5.</b> 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—For assessing market activity:	<b>5.1</b> Percent (by volume and number) of entitlements / allocations traded permanently, temporarily or leased
For assessing activities that facilitate trade, including removal of barriers to trade:	<b>5.2</b> Water trade approval times
	<b>5.3</b> Number and proportion of applications rejected by state and territory approval authorities, by reason for rejection
	<b>5.4</b> Cost of doing a trade of a water entitlement, including permanent and temporary trade
<b>Objective 6.</b> Clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool	<b>6.1</b> Application of risk management framework in jurisdictions and regular public reporting to aid risk management
<b>Objective 7.</b> 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	<b>7.1</b> Percent of total water and proportion of water systems accounted for, audited and reconciled in accordance with the agreed accounting system standards



NWI Objective	Performance indicator as approved by the Natural Resource Management Ministerial Council
<b>Objective 8.</b>	<b>8.1</b> Rate of use of more efficient irrigation systems
Policy settings which facilitate water use efficiency and innovation in urban and rural areas—For assessing water use efficiency and innovation in rural sector:	<b>8.2</b> Gross value of irrigated agricultural production by state per megalitre (ML)
	<b>8.3</b> Water application rates for irrigated agriculture
	<b>8.4</b> Household water use per annum
For assessing water use efficiency and innovation:	<b>8.5</b> Percentage of water supplied to users by source
	<b>8.6</b> Percentage of water losses in distribution systems
	<b>8.7</b> Consistency of pricing arrangements—lower bound
	<b>8.8</b> Consistency of pricing arrangements—Upper bound
	a) Rate of return being generated on asset base for rural providers.
	b) Rate of return being generated on asset base for urban providers.
	<b>8.9</b> Operating costs per ML of water delivered
	<b>8.10</b> Money invested in water infrastructure by water service providers
<b>Objective 9.</b>	No specific indicator has been developed for this objective.
Addressing future adjustment issues that may impact on water users and communities	Compliance with the NWI requirements is to be assessed as part of annual reporting to the NRM Ministerial Council and COAG.
<b>Objective 10.</b>	<b>10.1</b> Proportion and spatial area within water plans:
Recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource	a) with no assessment of connectivity between surface and groundwater systems;
	b) that are assessed and have no connectivity between surface and groundwater systems;
	c) that identify interconnected surface and groundwater systems but do not have integrated management; or
	d) have integrated management for interconnected surface and groundwater systems



# 1

## Water planning

## 1.1 Overview

Under the NWI, transparent, statutory-based water plans should be developed for all surface water and groundwater management units in which entitlements are issued (NWI clause 36). Water plans are fundamental to water management, transparently establishing the intended balance between environmental and consumptive use outcomes and often setting out the terms and conditions of access to water for consumptive and non-consumptive users and the environment. Effective water planning processes enable scientific and community input and debate to inform water management and allocation decisions.

Water planning links closely to many other NWI objectives. It provides a framework for achieving environmental outcomes (**Chapter 4**), addressing overallocated and/or overused water systems (**Chapter 5**), developing water entitlements and markets (**Chapters 6 and 7**), assigning risks for changes in allocations (**Chapter 9**), and recognising and managing the connectivity between surface and groundwater resources (**Chapter 2**). Water planning also provides for the recognition of Indigenous needs in relation to water access and management and the protection of the integrity of water access entitlements from unregulated growth in water interception as a result of land-use change.

It is anticipated that when a fully effective water planning regime is in place, it will:

1. Provide a **clear and secure basis for water access entitlements and allocations**, thereby providing certainty to water users and the environment.
2. Enjoy the support of the community, by **appropriately balancing economic, social and environmental considerations**, drawing on and utilising the best available science, socioeconomic analysis and community input.
3. Clearly establish how to deal with currently overused and/or overallocated systems, thereby helping return necessary water to the environment and **ensure environmental and resource sustainability**.

In the Commission's view, some progress is being made in better understanding our water systems and the social, economic and environmental values they support, and developing the frameworks and processes for water planning across Australia, but scope remains for improvement. In particular, the ongoing delays in completing and implementing water plans across much of Australia are significantly impeding the realisation of the benefits of an effective water planning regime.

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### Finding 1.1

The Commission considers that progress in the development and commencement of statutory water plans is now critically inadequate, with over 40% of the total scheduled water plans yet to commence, although as noted in this chapter, there are limitations to reporting on progress of water planning on the basis of the number of plans completed. The Australian Capital Territory is the only jurisdiction to have commenced all of its scheduled plans. Despite improving its water planning to deliver some outcomes of the NWI, Western Australia is yet to prepare legislation to enable NWI-consistent statutory water plans. If the current rate of progress across Australia continues, most of the remaining scheduled plans will not commence until well after the 2009 NWI commitment. Delays in the delivery of NWI-consistent water plans necessarily mean delays in the delivery of many other benefits of the NWI.

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### Recommendation 1.1

The Commission strongly urges the immediate acceleration of the development and commencement of water plans to allow water users to realise the full benefits of NWI reforms. The Commission considers it is now timely for parties to reset and publish realistic timeframes for the rollout of remaining water plans. However the Commission considers that accelerating the pace of water planning should be balanced against quality, and particularly the quality of community consultation.

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### Finding 1.2

The presentation of 'best available' information in many water plans is often focused on the physical condition of the water resource, with limited description of ecological conditions and socioeconomic factors. Where information gaps have been identified in a water plan, there is too little explanation of the specific data and knowledge required or steps in place to gather that information, or of how it will assist the development or revision of plans.

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### Recommendation 1.2

The Commission recommends that, as plans approach their renewal date, jurisdictions review existing water plans to identify information gaps. Identified gaps should be prioritised and addressed effectively and the results of new research should be incorporated into new and existing plans.

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<b>Finding 1.3</b>	There are some good examples where water plans have incorporated latest information on climate change; however, this is not widespread, particularly where water plans were developed several years ago. The Commission acknowledges that some jurisdictions, for example New South Wales and Queensland, plan to incorporate climate change scenarios into their future water plans.
<b>Recommendation 1.3</b>	The Commission recommends that all future water plans consider explicitly the impacts of climate change on water resources and the environment, and are sufficiently resilient to accommodate a broad range of climate change outcomes.
<b>Finding 1.4</b>	There is scope to improve the transparency of water plans by clearly stating the nature of trade-offs between competing users, communicating this to stakeholders and the community in the planning process, and better reflecting those trade-offs in the decisions to allocate water between various users and the environment.
<b>Finding 1.5</b>	As also found in Chapter 6 (Finding 6.8), while the NWI recognises through special clause 34 the potential for further policies and measures beyond the agreement for minerals and energy industries, the circumstances in which they would apply are not defined and identified in a consistent and transparent manner. Little progress has been made in the five years since the signing of the NWI in fleshing out the special provisions for the minerals and related industries. As a consequence, there remains limited integration of those industries with broader water markets and water planning processes, despite the potential for considerable benefits in many cases.
<b>Finding 1.6</b>	It is rare for Indigenous water requirements to be explicitly included in water plans, and most jurisdictions are not yet engaging Indigenous people effectively in water planning processes. The Commission notes that Indigenous groups are, at their own initiative, currently developing the capacity to participate more fully in water planning processes.
<b>Recommendation 1.4</b>	The Commission recommends that all jurisdictions develop and publish processes for effective engagement of Indigenous people in water planning. Parties should ensure that all new water plans (including statutory reviews of existing water plans) provide for Indigenous access to water resources by at least incorporating Indigenous social, spiritual and customary objectives and strategies for achieving those objectives. Jurisdictional processes should also make clear how Indigenous groups can pursue their legitimate economic objectives.
<b>Finding 1.7</b>	Across most jurisdictions, progress continues to be slow in identifying and addressing significant interception of surface and groundwater. There is no evidence that parties, other than South Australia, have formally identified significant interception activities in water systems or articulated policy responses that will enable full implementation of their NWI commitments to deal with water interception.
<b>Recommendation 1.5</b>	To reduce the potential for further erosion of security of existing water access entitlements, the Commission recommends that significant and potentially significant water interception activities be immediately identified and quantified, and a process for addressing them clarified within the next six months. This will enable jurisdictions to meet their commitment to include any proposals for additional water interception activities above an agreed threshold size into existing water access entitlement regimes by no later than 2011.
<b>Finding 1.8</b>	Management objectives in water plans are often too general to be able to be measured and assessed to determine the success of the plan. Furthermore, plans provide very limited or no explanation of how the 'best available' information was used to determine the objectives, or what assumptions were made.
<b>Recommendation 1.6</b>	The Commission considers that all water plan objectives need to be specific and measurable, and plans should incorporate monitoring arrangements specifically designed to measure performance against each objective, which in turn will enable improved adaptive management.
<b>Finding 1.9</b>	The Commission considers that, in general, rules for consumptive and non-consumptive water provisions are sufficiently well defined in water plans. However, rules do not always deal adequately with interception (refer to Finding 1.7), nor periods of exceptionally low inflows (refer to Finding 1.10).

<b>Finding 1.10</b>	The difficult recent seasonal conditions have revealed that many water plans have not adequately defined how systems will be operated during unanticipated sequences of low inflows.
<b>Recommendation 1.7</b>	The Commission recommends that jurisdictions and national agencies further invest (taking account of work already underway through the COAG work program) in best practice guidelines, streamlined processes and training to improve the quality, the effectiveness of the processes, and the resilience and community acceptance of water plans.
<b>Recommendation 1.8</b>	The Commission recommends that all existing and new plans be tested to ensure that they clearly define how water will be allocated to various categories of users and the environment under the full range of inflow conditions (including sequences of dry years), and to ensure that plans adequately specify how systems will be operated in times of extremely low water availability. This should include publicly defining the exceptional circumstances in which a plan would be suspended or qualified, the processes and principles then to be followed, and the arrangements for reinstatement of plans when conditions improve.
<b>Finding 1.11</b>	Water monitoring arrangements across jurisdictions are improving, with a number of jurisdictions implementing comprehensive statewide monitoring programs. However, water plans generally lack detailed description of their specific monitoring arrangements, and lack clarity about how plan-specific and statewide monitoring arrangements can each contribute to assessing achievement of the plans' objectives.
<b>Finding 1.12</b>	The quality and transparency of processes for reporting on the outcomes of water plans are inadequate in many jurisdictions. Ideally, such reports should be prepared at arm's length, clearly show how the plans' objectives are being achieved, discuss areas of success and failure and recommend any changes to the provisions of the plans (within the bounds of the plans' review provisions).
<b>Finding 1.13</b>	Considering the magnitude of the task ahead, the Commission observes that the MDBA has had a disappointingly slow start, with an intergovernmental delay in appointing authority members and growing pressure on timelines to complete the development of the Basin Plan. Effective community consultation is crucial to the basin planning process. There is a risk that the pressure on timelines may affect the quality of that consultation. The Commission supports the MDBA's work to develop strategies to engage the community in the preparation of the Basin Plan.
<b>Recommendation 1.9</b>	The Commission recommends that the MDBA further clarify the intended planning processes and ground rules for the development of the new Basin Plan in consultation with affected parties, to engage stakeholders in what the new plan will involve, to better manage expectations, provide more certainty, and facilitate a more cooperative approach with the MDB jurisdictions. In particular, the Commission recommends greater public consultation, progressive release of background and issues papers and, where possible, interim, progressive guidance from the MDBA on specific environmental, economic and social objectives or outcomes likely to be targeted in the plan.
<b>Recommendation 1.10</b>	To account for delays in progress to date and new developments, the Commission recommends that NWI parties revise and resubmit, within six months for accreditation by the Commission, their jurisdictional plans for implementation of their NWI commitments.

## 1.2 Context for this assessment

The 2007 Biennial Assessment (NWC 2007) and 2008 Update (NWC 2008) found that while almost all jurisdictions had made good progress in developing and implementing water planning frameworks, particularly for high-priority water systems, the rollout of water plans remained slow. The 2007 assessment also found that:

- + Indigenous issues needed to be taken into account more effectively
- + further progress was required with respect to improving the quality and extent of science underpinning water plans
- + there needed to be greater recognition of the connectivity between surface water and groundwater systems
- + overallocation and overuse must be addressed as a priority
- + further progress was needed in dealing with water interception
- + there needed to be improvements in monitoring and compliance.

At its March 2008 meeting, COAG commissioned the development of a comprehensive new water reform work program including dealing with water interception, overallocation, and improving environmental outcomes. The acceleration of the adoption of NWI water interception commitments is a priority under this work program and includes the development of a nationally consistent, risk-based approach to assessing and managing risks posed by groundwater extraction and other interception activities (WGCCW 2008).

Summaries of the COAG work addressing integrated management of connected surface and groundwater systems, environmental outcomes, and overallocation/overuse are noted in Chapters 2, 4 and 5, respectively, of this report.

## 1.3 The Commission's assessment and findings

### 1.3.1 Progress in water planning

#### **Background: Terminology and relevant National Water Initiative clauses**

The NWI states that 'statutory water plans will be prepared for surface water and groundwater management units in which entitlements are issued ... water planning is an important mechanism to assist governments and the community to determine water management and allocation decisions to meet productive, environmental and social objectives ...' (NWI clause 36).

Under the NWI, jurisdictions have committed to 'review any plans developed for the 1994 COAG framework to ensure they now meet the requirements of the NWI ... and proceed on a priority basis to develop any new plans.' (NWI clause 26)

This assessment examines the current and potential coverage and current status of NWI-consistent water plans against what was agreed in the jurisdictional NWI implementation plans. Table 2 reports on how many plans were described in NWI implementation plans, how many are in place now, and how many were in place at the time of the 2007 Biennial Assessment.

The Commission recognises that there are limitations to reporting progress of planning on the basis of numbers of plans. For example, in New South Wales, the completed plans cover a large percentage of total surface and groundwater extraction (approximately 90%); most of the remaining plans address smaller systems. However, volumetric and area-based measures of planning progress can also be deceptive. For example, in Queensland, total surface water is dominated by the Cape York Peninsula; however, consumptive water use, and therefore the need for water plans, is much greater in the south-east of the state. For these reasons, the Commission has decided to continue to report on the number of plans in place, while recognising these issues.

In addition, plans in different jurisdictions are not always directly comparable. As noted by Hamstead et al (2008), 'the various plans are a function of state legislation, policy and practice that has been developing since well before the advent of the NWI. This affects the overall purposes of the various plans, which range from dealing with water sharing only, to water sharing and use, to total water cycle management (in the case of the Victorian sustainable water strategies). It also affects the geographical scope of the plans ...'



**Table 2: National summary of water plans finalised against targets set in the NWI implementation plans**

Jurisdiction	Type of water plan	Number of plans to be completed as listed in NWI implementation plans	Number of finalised plans 2009 Biennial (2007 Biennial)	Current status
<b>ACT</b>	Water Resources Management Plan	<b>1</b>	<b>1</b> (1)	
<b>NSW</b>	Water sharing plans	54 (subsequently revised to 40)	40 (37)	NSW has advised that the number of water sharing plans and macro water sharing plans has been revised from 93 to 84 and are now to be completed by 2012, not June 2009 as originally scheduled in the NSW NWI Implementation Plan.
	Macro water sharing plans	39 (subsequently revised to 44)	5 (0)	
	Total	<b>84</b> (previously 93)	<b>45</b> (37)	
<b>NT</b>	Water allocation plans	<b>4</b>	<b>3</b> (1)	Alice Springs and Ti Tree Water Resource Strategies completed. Water allocation plan for the Katherine Tindal has been completed. Plans for the Ooloo aquifer in the Daly and the Tindal aquifer at Mataranka are being developed and are expected to be completed in 2010. Darwin Rural regions and Tiwi Islands planning processes have commenced and are expected to be completed by the end of 2011.
<b>Qld</b>	Water resource plans	23	20 (17)	At the time of the Commission's assessments for the 2006 National Competition Policy payments, Queensland gave undertakings to the Commission that 13 resource operations plans would be completed (or amended) by July 2007. By July 2007, 10 plans had been completed. As at the end of June 2009, 12 plans had been completed.  All outstanding resource operations plans are now scheduled to be completed by mid-2010 (with the exception of the Wet Tropics and Baffle).
	Resource operations plans	22	12 (9)	
	Total	<b>45</b>	<b>32</b> (26)	
<b>SA</b>	Water allocation plans	<b>22</b>	<b>19</b> (15)	Note that the number of completed plans includes 14 plans released prior to the NWI, which have undergone a five-year review. It also includes five new plans that have been adopted.  Three new plans are being developed.

Jurisdiction	Type of water plan	Number of plans to be completed as listed in NWI implementation plans	Number of finalised plans 2009 Biennial (2007 Biennial)	Current status
<b>Tas.</b>	Water management plans	<b>11</b>	<b>5</b> (5)	<p>Eight plans are currently being prepared; a further four are anticipated over the next two years. The Great Forester Plan is currently under review. Preparatory work is underway in advance of a scheduled review of the River Clyde and Lakes Sorrel and Crescent plans.</p> <p>Tasmania has noted that plans need to be developed in areas where new irrigation schemes are to be built. The government is working on the development of plans in these areas; however, they are unlikely to be in place before the irrigation developments obtain Commonwealth approval. This may be relevant to the provision of Commonwealth funding for new irrigation developments. The Tasmanian Government has indicated that the new developments are expected to result in only a relatively small increase in extractions in comparison with the sustainable yield.</p>
<b>Vic.</b>	Sustainable water strategies (SWSs)	<b>4</b> (previously 5)	<b>1</b> (0)	<p>Victoria has bulk entitlements in place for all its water systems, which share the available resources. The SWSs identify the threats to water resource availability and opportunities to improve reliability for towns, irrigators and the environment. The number of SWSs has been revised from five to four, but coverage remains the same. The Central Region SWS is now complete, the Draft Northern Region SWS has been released publicly, and the Western and Gippsland regional strategies are under development and due for completion by mid-2010 (the Victorian NWI Implementation Plan indicated completion by end 2009).</p>
<b>WA</b>	Surface water management area plans	9	1 (1)	<p>Six non-statutory (<b>non-NWI consistent</b>) plans are in place. These will be transitioned to statutory plans once the enabling legislation is passed. All statutory plans are due to commence by 2011.</p>
	Groundwater management area plans	15	5 (4)	
	<b>Total</b>	<b>24</b>	<b>6</b> (5)	
<b>Total plans<sup>a</sup></b>		<b>195</b>	<b>112</b> (90)	

a These totals differ from those used in **Chapter 5**, as that chapter examines all plans currently in place (NWI and non-NWI consistent).

Table 2 shows that all jurisdictions have made progress in putting in place frameworks for developing NWI-consistent water plans.

However, under the states' NWI implementation plans the development and commencement of all identified water plans was due by the end of 2009 (with the exception of Western Australia). To date, over 40% of these scheduled plans have not yet commenced. Progress since the 2007 Biennial Assessment has also been limited, with only a further 22 plans put in place.

Western Australia has improved its water planning with the aim of delivering key outcomes of the NWI within the existing legislative framework. However, Western Australia is yet to prepare legislation to enable statutory water plans and deliver the complete set of outcomes promoted by the NWI. Continuing delay in the passage of this legislation will prevent Western Australia from meeting its commitment to have all scheduled plans in place by 2011.

The Commission recognises that in some cases jurisdictions are preparing new water plans not previously identified, or have consolidated some plans into single plans. However, such plans represent only a handful of the scheduled plans due. The Commission notes that most jurisdictions will fail to meet the timeframes for completion of water plans, as set out in their NWI implementation plans. For example, New South Wales advises that its outstanding scheduled water plans will now be completed by 2012. However, the Commission also acknowledges that the new Murray–Darling Basin Plan (see Box 3) has impacted upon the context and timeline for water plans within the MDB. In the case of New South Wales, therefore, all inland plans are now planned to be completed by 2011 to align with the Basin Plan. Issues associated with the new Basin Plan are also discussed in Section 1.3.4.

The Commission is strongly of the view that the absence of statutory plans creates uncertainty for water users and can jeopardise the sustainable management of water systems. In some cases, the absence of a water plan also delays the potential introduction of water trading (see Section 7.3.1.8).

### Box 3: The Murray–Darling Basin Plan

In line with the Commonwealth *Water Act 2007*, the Murray–Darling Basin Authority is currently preparing a basin-wide plan which will provide for the integrated and sustainable management of water resources in the basin. The plan is due to commence in 2011.

The *Water Act 2007* requires the Basin Plan to set limits on the amount of water (both surface water and groundwater) that can be taken from the basin, identify the risks to water resources and the responsibilities for managing those risks, specify an environmental watering plan, and set out trading rules for basin water resources.

Under the Act, the relevant jurisdictions will need to ensure that new water plans within the basin are consistent with the Basin Plan<sup>5</sup> in order to be accredited under the Act (noting that under the transition arrangements of the Act, current water-sharing arrangements in existing water plans will remain in place until those plans expire).

It is intended that the Murray–Darling Basin Plan will provide the framework for the jurisdictions' water plans within the basin, while also setting limits on the amount of water that can be taken from the basin.

Given the experiences of most governments in water planning to date, the Commission reiterates the importance of designing from the outset effective, broad-ranging consultation and transparent decision making processes to ensure the accuracy, integrity and public acceptance of the Basin Plan.

### ■ Finding 1.1

The Commission considers that progress in the development and commencement of statutory water plans is now critically inadequate, with over 40% of the total scheduled water plans yet to commence, although as noted in this chapter, there are limitations to reporting on progress of water planning on the basis of the number of plans completed. The Australian Capital Territory is the only jurisdiction to have commenced all of its scheduled plans. Despite improving its water planning to deliver some outcomes of the NWI, Western Australia is yet to prepare legislation to enable NWI-consistent statutory water plans. If the current rate of progress across Australia continues, most of the remaining scheduled plans will not commence until well after the 2009 NWI commitment. Delays in the delivery of NWI-consistent water plans necessarily mean delays in the delivery of many other benefits of the NWI.

### ■ Recommendation 1.1

The Commission strongly urges the immediate acceleration of the development and commencement of water plans to allow water users to realise the full benefits of NWI reforms. The Commission considers it is now timely for parties to reset and publish realistic timeframes for the rollout of remaining water plans. However the Commission considers that accelerating the pace of water planning should be balanced against quality, and particularly the quality of community consultation.

5 *Water Act 2007*, ss.55(2), 63(6)

## 1.3.2 Quality of plans developed

### Background: Terminology and relevant National Water Initiative clauses

NWI clause 36 states that ‘recognising that settling the trade-offs between competing outcomes for water systems will involve judgements informed by best available science, socio-economic analysis and community input, statutory water plans will be prepared for surface water and groundwater management units in which entitlements are issued (subject to NWI clause 38). Water planning is an important mechanism to assist governments and the community to determine water management and allocation decisions to meet productive, environmental and social objectives.’

NWI clause 25(iii) states that ‘once initiated, water access entitlements and planning frameworks will be characterised by planning processes in which there is adequate opportunity for productive, environmental and other public benefit considerations to be identified and considered in an open and transparent way.’

NWI clause 37 states that ‘broadly, water planning by States and Territories will provide for: (i) secure ecological outcomes by describing the environmental and other public benefit outcomes for water systems and defining the appropriate water management arrangements to achieve those outcomes, and (ii) resource security outcomes by determining the shares in the consumptive pool and the rules to allocate water during the life of the plan.’

While timely implementation is very important, the quality of a water plan will determine its ultimate success in achieving an optimal balance between the competing demands on the water resource and its acceptance by the community. There are a number of elements that drive quality in the water planning process, including the use of best available information, effective consultation, and the development of clear, measurable and achievable objectives.

The assessment and findings presented in this section draw partly from an assessment of a sample of water plans from across Australia, using the template set out in Appendix 6. The assessment aimed to identify NWI-consistent planning processes (as outlined in NWI clause 36 and Schedule E), as described in water plans or referenced secondary documents. It considered the two most recently approved water plans in each jurisdiction or, where approved plans were not available, plans that were in the most advanced stage of development (for example, in Victoria, the Northern Sustainable Water Strategy). Table 3 lists the plans assessed.

**Table 3: Water plans reviewed by the Commission to inform the biennial assessment**

Jurisdiction	Water allocation plans
ACT	Not assessed
NSW	Hunter Unregulated and Alluvial Water Sources Water Sharing Plan (draft) Water Sharing Plan for the Lower Gwydir Groundwater Source 2003 (as amended)
NT	Alice Springs Water Resource Strategy Draft Ti-Tree Region Water Resource Strategy (amended Ti-Tree Region Water Resource Strategy 2002–2007)
Qld	Burnett Water Resource Plan and Resource Operational Plan Pioneer Water Resource Plan and Resource Operational Plan
SA	Barossa Prescribed Area Water Allocation Plan (under review) McLaren Vale Prescribed Area Water Allocation Plan (under review)
Tas.	Lakes Sorell and Crescent Water Management Plan Little Swanport Catchment Water Management Plan
Vic.	Central Region Sustainable Water Strategy Northern Sustainable Water Strategy (draft)
WA	Esperance Groundwater Area Water Management Plan Gnangara Groundwater Area Water Management Plan

This section also draws on other sources of evidence, including the NWC Waterlines paper *Water allocation planning in Australia—Current practices and lessons learned* (Hamstead et al 2008), a paper on Indigenous access to water and management (Jackson et al 2009), submissions by NWI parties for the purposes of this assessment, and public submissions.

An extensive and comprehensive review of the quality of *all* water plans was beyond the practical scope of this assessment. Therefore, given the largely sample-based methodology used, the findings in this section are illustrative rather than exhaustive.

Furthermore, as noted previously, there are significant differences in the types of plans included in the NWI implementation plans, including the extent to which water allocation plans are integrated with regional natural resource management plans, urban water supply planning and other water planning activities such as floods and water quality management. Hamstead et al (2008) found that:

*... in general, the broader the plan in terms of either geographic or thematic scope, the less specific it is about practical management rules, and the less clarity there is about factors affecting individual water entitlement holders' resource security, and about specific environmental management rules. Conversely, the more specific plans are, the less they consider wider trade-offs and broader supply and natural resource management (NRM) issues (including other catchment impacts on river health). Most commonly, there is a trend towards detailed plans sitting in a context of broad strategic plans or statewide 'default' policies and rules. Any attempts to compare plans in different jurisdictions must recognise these differences.*

### 1.3.2.1 Collection and use of information to develop a water plan

Water plans should be informed by the best available hydrological, biotic and socioeconomic information. This information is needed to develop an understanding of the condition of a water system and water user needs, and to identify management priorities and options.<sup>6</sup>

Jurisdictions have different approaches to gathering information to inform the development of water plans. In its review of a sample of currently active water plans in each jurisdiction, the Commission found the following:

- + While there are examples in which information is cited (for example, technical reports informing plan development in Queensland are referenced in plan documentation), the information used to prepare water plans is often poorly referenced. As such, it is often not clear what information was gathered and how it was used to inform the decision-making processes in developing the plan (Hamstead et al 2008; plans assessed in Table 3).
- + The presentation of best available information in the plans is often focused on the physical condition (e.g. hydrology, geomorphology), with limited or no description of the ecological condition and socioeconomic aspects of the water resource area (Hamstead et al 2008, plans assessed in Table 3).
- + Some plans acknowledge that there are broad information gaps and the need for further research, with general comments along the lines of 'there is not sufficient information to determine water requirements'. However, little or no explanation is provided about the specific information required or steps in place to gather that information, or how it will assist the development, or revision of the plans to achieve their objectives.
- + Across Australia, there is still limited progress in the identification and common management of connected surface water and groundwater systems (this matter is discussed in Chapter 2).

Obviously there are trade-offs between the cost and resources required to obtain information for use in water plans. For example, Western Australia has advised that it adopts a risk-based approach, whereby resources are focused in areas considered to be most at risk. Extensive ecological assessments were conducted for the South West Groundwater Areas plan, which is approaching full allocation; on the other hand, the level of environmental investigation was not as comprehensive for the Carnarvon Artesian Basin, where use is only 20% of the allocation limit.

While supporting such an approach in principle, the Commission believes that much greater emphasis needs to be placed on obtaining quality information across Australia. For example, Hamstead et al (2008) found that in Queensland 'recent work done for Condamine–Balonne water planning has provided more accurate data about the storage potential of offstream storages built during the last 15 years. Future funding of extraction and flow monitoring using telemetry will improve knowledge about cumulative effects of overland flow harvesting.'

<sup>6</sup> NWI Schedule E, clause 1(ii): description of 'the current health and condition of the system'.

NWI Schedule E, clause 1(vi): description of 'the uses and users of the water including consideration of indigenous water use'.

NWI Schedule E, clause 6(ii): includes 'consultation of the best available scientific knowledge and, consistent with the level of knowledge and resource use, socio-economic analyses'.

NWI Schedule E, clause 6(iii): includes 'adequate opportunity for consumptive use, environmental, cultural, and other public benefit issues to be identified and considered in an open and transparent way'.

The Commission sees considerable opportunity for water planners in all jurisdictions to share with each other best practice approaches to gathering information for water planning purposes. Indeed, the Commission has itself initiated processes through which such lessons can be shared among water planning practitioners.

### ■ Finding 1.2

The presentation of 'best available' information in many water plans is often focused on the physical condition of the water resource, with limited description of ecological conditions and socioeconomic factors. Where information gaps have been identified in a water plan, there is often little explanation of the specific data and knowledge required or steps in place to gather that information, or of how it will assist the development or revision of plans.

### ■ Recommendation 1.2

The Commission recommends that, as plans approach their renewal date, jurisdictions review existing water plans to identify information gaps. Identified gaps should be prioritised and addressed effectively and the results of new research should be incorporated into new and existing plans.

One area of particular importance in the water planning process is the incorporation of information on the possible impacts of climate change on water availability. In short, climate change may lead to river flows, groundwater recharge and evapotranspiration that are quite different from those experienced during the last 50 years. Consequently it is critical to consider the possible effects of climate change on consumptive use, the environmental assets to be protected in water plans and the provision of flows to maintain those assets, and the overall management and operation of the system.

Across Australia, few water plans currently consider the possible future effects of climate change. Hamstead et al (2008) found that 'the Victorian Central Region SWS included the only practical application of the latest information on projected climate change. It provides a useful case study in how this information can be used to project possible future inflow patterns and in how the associated uncertainty can be handled.' Subsequently, the draft Victorian Northern Region Sustainable Water Strategy (DSE 2008a) provides scenarios based on different projections of the severity of climate change. Table 4 shows the possible impacts on total inflows to the Murray system across a range of scenarios compared with the long term average.

**Table 4: Forecast impacts on total inflows to the Murray system over 50 years**

	2012	2034	2062
Scenario A: Low climate change	2%	5%	8%
Scenario B: Medium climate change	-5%	-10%	-21%
Scenario C: High climate change	-12%	-20%	-40%
Scenario D: Continuation of low inflows	-43%	-43%	-43%

Source: DSE (2008a).

In the Commission's view, adequate consideration of the uncertain impacts of climate change and development of flexible strategies that are able to cope with climate change will increasingly become an essential element of good water planning. Without it, plans will lack resilience for the years ahead and lose public and scientific credibility. While the scenarios outlined above demonstrate aspects of good practice in Victoria, other states have also included climate change scenarios in their planning processes. Most importantly, Table 4 shows that climate change will be a critical consideration in the development of the Murray–Darling Basin Plan, which is required, under the *Water Act 2007*, to include the effects of climate change.

### ■ Finding 1.3

There are some good examples (particularly in Victoria) where water plans have incorporated latest information on climate change; however, this is not widespread, particularly where water plans were developed several years ago. The Commission acknowledges that some jurisdictions, for example New South Wales and Queensland, plan to incorporate climate change scenarios into their future water plans.



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### ■ Recommendation 1.3

The Commission recommends that all future water plans consider explicitly the impacts of climate change on water resources and the environment, and are sufficiently resilient to accommodate a broad range of climate change outcomes.

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#### 1.3.2.2 Consultation and the trade-off process

The development of water plans inherently involves transparent trade-offs between competing demands for the water resource. To assess and manage these demands, water planners must first establish the environmental water requirements of a system, based on the best available science, and then transparently incorporate economic and social factors in any trade-offs made, to best reconcile competing demands. Consultation with the community and stakeholders in this process is essential in building understanding of the trade-offs involved, engendering confidence in the process, and enabling those affected by water plans as well as the broader community to contribute to the resultant plan outcomes. Ultimately, effective consultation will be critical in gaining acceptance of plan outcomes. During consultation with the jurisdictions, the Northern Territory government commented that the water planning process is one of the most useful tools emanating from the NWI.

In general however, the processes used to settle on any necessary trade-offs between competing water uses is poorly documented in water plans or referenced documents, making it difficult for the Commission to assess the quality of those processes. Description of the nature of trade-off decisions that were made, including the reasons for the decisions and the risks and uncertainty in the plan eventually adopted should be documented (Hamstead et al 2008; plans assessed in Table 3). Where they are available, examples of consultation processes can be informative. Box 4 and Box 5 outline key findings by Hamstead et al (2008) in relation to (i) the integrated approach to consultation and water planning adopted in Victoria, which demonstrates an effective process and (ii) examples from case studies that demonstrate where consultation processes on trade-offs have resulted in lack of community acceptance of water plan outcomes and costly interplay between governments and the community.

#### **Box 4: The Victorian Central Region Sustainable Water Strategy**

'The Victorian Central Region Sustainable Water Strategy (SWS) was the best example of integration we saw. The SWS is a regional strategic plan sitting over the top of river health and urban water supply planning. It identifies strategies that can meet multiple objectives relating to river health and water supply. It is essentially an integrated investment strategy that balances river health with economic and social outcomes and also links the management of water with catchment investment strategies driven by the NRM National Action Plan and Natural Heritage Trust.

'Commenting on the Central Region SWS, several interviewees noted the value of having urban and rural water authorities and catchment management authorities working together to come up with ways to achieve both environmental and water supply objectives. All the participants were forced to see beyond their immediate systems and areas of responsibility to the larger picture of water supply and river health. They worked together in the broader context to deliver an integrated outcome, across multiple water sources, that considered options for both supply and demand.

'One criticism levelled at the Victorian approach was that water entitlement planning (which is quarantined from this process as a matter of state policy) should be brought under this umbrella also. The SWS dealt with adjusting entitlements (where it was considered warranted) by planning for investments in such things as water efficiency savings, which could be traded off for water entitlement reductions. Provision for across the board changes to water entitlements to increase environmental water, which is a fundamental aspect of water allocation plans in the other states, is managed through a separate review process in Victoria at 15-year intervals ...'

Source: Hamstead et al (2008), page x

#### Box 5: The importance of consultation processes and transparency in determining community acceptance of water plans

'In the case of the Gwydir groundwater plan in NSW, a very difficult decision had been made to cut entitlements by a large amount. The affected licence holders had largely accepted the need to make the cut, and in 2004 a plan was approved (but not commenced), which provided for proportionally equal cuts in entitlements for all licence holders; however, there remained considerable unhappiness about the way the 'pain' was shared. Consequently, these licence holders continued to lobby for financial assistance from government, which eventually came from a joint state–Commonwealth fund. Additionally, a group of licence holders pushed for a change in the way the cuts were distributed between licence holders to take more account of the level of development of the entitlement. Eventually the Minister and Cabinet overturned the previous decision and required the alteration of all the major inland groundwater plans to reflect a different distribution of the cuts, which included a weighting for the level of development.

'This illustrates how perceived equity in trade-offs can be critical to the success of a plan ... The case studies suggest that significant unaddressed concerns of a particular stakeholder group are likely to result in change to a plan because that group will continue to use all the political and legal processes available to have their concerns addressed. This is apparent in the Clyde Valley in Tasmania, where the water users are unhappy with the plan because they feel they have been unjustly treated. They have recently lodged an appeal against the plan in the courts and continue to lobby at all levels for change.

'Similarly, downstream water users in NSW continue to lobby against bearing what they perceive are inordinate costs to themselves and the environment for upstream development in Queensland's Condamine–Balonne and their perception that water planning has not gone far enough to address it ...'

Source: Hamstead et al (2008), page xiii

Improved transparency in the decision-making process for allocating water will increase understanding and acceptance of why water is allocated to one user over another, and provides a better basis for assessing the success of the plan's objectives. As outlined by Hamstead et al (2008, page xiii), 'while equity and fairness in water sharing is an objective common to all jurisdictions, the methods for achieving it are not defined and seem to be left to the personal qualities of the planners, community feedback, and (in the end) to political processes at Government level ... achieving distributional equity in water planning is of vital importance ...'

In its submission, Queensland Conservation notes its view that the over-representation of consumptive water users on the water resource plan community reference panels (the primary consultative mechanism for the development of plans in Queensland) has led to the majority of water resource plan objectives being slanted in favour of consumptive users. At the same time, the Queensland Farmers' Federation notes that the confusion that occasionally arises in the implementation of water plans may be due to a lack of understanding among consumptive users of how the plan will achieve environmental outcomes. The Commission acknowledges that the Queensland *Water Act 2000* stipulates that community reference panels are to include representatives of cultural, economic and environmental interests in the proposed plan area.<sup>7</sup>

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#### ■ Finding 1.4

There is scope to improve the transparency of water plans by clearly stating the nature of trade-offs between competing users, communicating this to stakeholders and the community in the planning process, and better reflecting those trade-offs in the decisions to allocate water between various users and the environment.

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Giving due consideration to the views and information contributed by all stakeholders in a plan's development is an important step in minimising any unforeseen negative outcomes. A number of public submissions specifically noted the lack of recognition of the potential development of mining activities in water plans. Cumulative impacts of a number of mines were raised by a number of stakeholders. Rivers SOS Alliance (NSW) and Amanda Albury (NSW) argue that the lack of consideration of mining activities in plan development is resulting in unregulated water use by, and unmonitored return flows from, the industry. Issues associated with entitlements for mining activities are addressed in Section 6.3.3.2.

From another perspective, the Minerals Council of Australia is also concerned about the lack of recognition of mining in the planning framework, noting that mining and some other industries are not provided with the same entitlement security and water trading opportunities available to other consumptive users.

<sup>7</sup> *Water Act 2000* (Qld), s. 41(2).

The Commission notes that while clause 34 of the NWI provides for special management arrangements being put in place for mining and petroleum activities, it does not *preclude* parties from including the minerals or petroleum sectors in their water planning regimes. For example, in South Australia, minerals developments can be managed within the water planning regime or under specific arrangements outside the water planning regime, or through a combination of the two. However, as a general finding, the question of how mining activities relate to water planning processes appears to require further consideration in most jurisdictions.

### ■ Finding 1.5

As also found in Chapter 6 (Finding 6.8), while the NWI recognises through special clause 34 the potential for further policies and measures beyond the agreement for minerals and energy industries, the circumstances in which they would apply are not defined and identified in a consistent and transparent manner. Little progress has been made in the five years since the signing of the NWI in fleshing out the special provisions for the minerals and related industries. As a consequence, there remains limited integration of those industries with broader water markets and water planning processes, despite the potential for considerable benefits in many cases.

### 1.3.2.3 Indigenous participation

#### Background: Terminology and relevant NWI clauses

52. The Parties will provide for indigenous access to water resources, in accordance with relevant Commonwealth, State and Territory legislation, through planning processes that ensure:
- i) inclusion of indigenous representation in water planning wherever possible; and
  - ii) water plans will incorporate indigenous social, spiritual and customary objectives and strategies for achieving these objectives wherever they can be developed.
53. Water planning processes will take account of the possible existence of native title rights to water in the catchment or aquifer area. The Parties note that plans may need to allocate water to native title holders following the recognition of native title rights in water under the Commonwealth *Native Title Act 1993*.
54. Water allocated to native title holders for traditional cultural purposes will be accounted for.

Indigenous participation in water planning is provided for in all jurisdictions. However, with the exception of New South Wales, no jurisdictions have an explicit requirement for Indigenous participation in planning.

There are some examples of state governments working closely with Indigenous communities and researchers to identify cultural assets and determine watering requirements, including a specific provision enabling the preservation of environmental assets on land purchased on behalf of the Nari Nari Tribal Council on the Murrumbidgee River in New South Wales, and identification of significant cultural assets for the Karajarri community through the draft Le Grange aquifer plan in Western Australia (Jackson et al 2009).

In Queensland, under the *Cape York Peninsula Heritage Act 2007*, a wild river declaration or water resource plan in the Cape York Peninsula Region must provide for a reserve of water for the purpose of helping Indigenous communities in the area achieve their economic and social aspirations. The Archer Basin, Lockhart Basin and Stewart Basin wild river declarations apply within the Cape York Peninsula Region and an Indigenous reserve of water has been made available in each of these wild river areas. Under the *Water Resource (Mitchell) Plan 2007* and the *Water Resource (Gulf) Plan 2007*, an Indigenous reserve of water has been made available for those parts of the plan areas that are within the Cape York Peninsula Region.

South Australia has developed and published the manual *Engaging South Australian Aboriginal Communities in NRM* for use by all NRM officers; in developing water plans, all regional NRM boards engage with Indigenous groups. In Victoria, development of the sustainable water strategies has included specific processes to engage and consult with the Indigenous community. There is no evidence to suggest that any consultation with Indigenous people has occurred in any of the water plans developed in Tasmania; however, the *Generic principles for water management planning* (Water Resources Policy #2005/1) have been amended to incorporate cultural and heritage objectives.

While consultation may occur, a deeper assessment of Indigenous water values and needs in water plans is typically not undertaken. Indigenous knowledge is currently underutilised in water resource assessments, and little guidance is given to water planners and managers seeking to meet the objectives relating to Indigenous access and involvement. It is common to see agencies rely on Indigenous representatives on plan development committees for Indigenous needs and values assessment. While important, such representative consultation does not necessarily provide the detailed input needed to underpin the specification of Indigenous requirements in water plans.

Indigenous people are becoming increasingly aware of the NWI and are rapidly developing the capacity to participate fully in water planning processes. Their interests embrace social, spiritual and customary objectives and, increasingly, economic objectives. Policies and practices for access to water resources and engagement are being developed by Indigenous organisations such as Murray Lower Darling Indigenous Nations and the North Australian Indigenous Land and Sea Management Alliance Indigenous Water Policy Group. In New South Wales, the Natural Resources Advisory Council has recently developed an Aboriginal Natural Resource Agreements Kit to help incorporate Indigenous interests into natural resource management outcomes. The Commission would encourage all jurisdictions to consider similar policies and practices and to consider policy and procedural proposals as they emerge from the current Indigenous water planning working groups.

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#### ■ Finding 1.6

It is rare for Indigenous water requirements to be explicitly included in water plans, and most jurisdictions are not yet engaging Indigenous people effectively in water planning processes. The Commission notes that Indigenous groups are, at their own initiative, currently developing the capacity to participate more fully in water planning processes.

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#### ■ Recommendation 1.4

The Commission recommends that all jurisdictions develop and publish processes for effective engagement of Indigenous people in water planning. Parties should ensure that all new water plans (including statutory reviews of existing water plans) provide for Indigenous access to water resources by at least incorporating Indigenous social, spiritual and customary objectives and strategies for achieving those objectives. Jurisdictional processes should also make clear how Indigenous groups can pursue their legitimate economic objectives.

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#### 1.3.2.4 Inclusion of interception

Interception relates to a number of land-use change activities, such as farm dams and bores, large-scale plantation forestry and interception of overland flow, which have potential to intercept significant volumes of surface and/or ground water now and in the future. The NWI parties recognised that, if these activities are not subject to some form of planning and regulation, they present a risk to the future integrity of water access entitlements and the achievement of environmental objectives for water systems.

The NWI requires that states have taken into account significant interception activities in water systems that are fully allocated, overallocated or approaching full allocation by 2011.

As found in the 2007 Biennial Assessment, South Australia is still the only jurisdiction that has in place a process for regulating the water interception impacts of commercial forestry plantations. At this stage, the process only covers the lower south-east of South Australia. This process is provided through regulations under the South Australian *Natural Resource Management Act 2004*. South Australia has recently established a statewide policy framework and introduced a Bill to establish a statewide approach to regulating the impacts of commercial forests on water resources (DWLBC 2009).

New South Wales has drafted a policy for floodplain harvesting that will require all floodplain harvesting activities to be licensed, and subjected to volume limits. Furthermore, no new licences will be issued to existing licence holders. This approach aims to increase flows into rivers during periods of significant rainfall.

In Queensland, overland flow take is limited by law under the *Water Act 2000* and finalised water resource plans. The *Water Act 2000* requires water resource plans to manage interception of overland flow water if there is a risk that taking overland flow water in the area may significantly impact on the plan's outcomes. Queensland is currently implementing a process for converting overland flow authorisations to water access entitlements.

Tasmania reports that it has made progress in addressing interception. Interception by dams is regulated under the *Water Management Act 1999*, which requires permits for dam works and related water allocations to be appropriately assessed. Tasmania reports that it is developing a groundwater management framework that will enhance control of interception by bores. Tasmania has developed and tested the Water Availability and Forest Landuse planning tool to assess potential impacts of plantation forest water interception. The Tasmanian Sustainable Yields project is currently assessing the water yield of Tasmania's development catchments, and will provide an initial risk assessment of plantation forest water interception.

In Western Australia, interception is accounted for when determining the water balance. While this achieves part of the intent of the NWI, Western Australia does not yet have legislation in place that allows regulation of interception.

Jurisdictions have varying policies and regulations for the taking of water to off-stream farm dams. New South Wales has a policy of requiring that all farm dams that capture more than 10% of the average annual runoff must be licensed and include an entitlement. In South Australia, the taking of water in this manner requires a licence (except for stock and domestic purposes, although stock and domestic dams greater than 5 ML (megalitres) in the Western Mount Lofty Ranges will also be subject to licensing). Licences normally have conditions specifying extraction rates, threshold flow rates and metering obligations. These conditions are usually contained in the relevant water allocation plan. Metering of all licensed water use is a statewide policy. In the Northern Territory, constraints to capture of overland flow are defined in the Northern Territory *Water Act*. Specific entitlement-setting processes for water intercepted by off-stream farm dams in stressed water systems have not yet been developed in Queensland.

The potential impacts of unlicensed activities (such as farm dams, stock and domestic groundwater use, and commercial plantations), and regulatory processes for addressing them, are currently being considered in the preparation of Victoria's Northern and Western sustainable water strategies.

In summary, only limited progress has been made by most jurisdictions in addressing NWI water interception commitments. Key areas still to be addressed are how to identify potential activities that could intercept significant surface and/or groundwater in particular systems; how to determine their water use thresholds; and how best to incorporate appropriate management responses for incorporating activities into water access entitlement systems where interception is significant in stressed water systems.

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#### ■ Finding 1.7

Across most jurisdictions, progress continues to be slow in identifying and addressing significant interception of surface and groundwater. There is no evidence that parties, other than South Australia, have formally identified significant interception activities in water systems or articulated policy responses that will enable full implementation of their NWI commitments to deal with water interception.

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#### ■ Recommendation 1.5

To reduce the potential for further erosion of security of existing water access entitlements, the Commission recommends that significant and potentially significant water interception activities be immediately identified and quantified, and a process for addressing them clarified within the next six months. This will enable jurisdictions to meet their commitment to include any proposals for additional water interception activities above an agreed threshold size into existing water access entitlement regimes by no later than 2011.

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### 1.3.2.5 Setting measurable objectives

The establishment of objectives is essential in planning to achieve the desired outcomes for water systems. An informed assessment of the success of a plan against its objectives can only be achieved by ensuring that those objectives are measurable, with corresponding measurable performance indicators and all assumptions linking indicators to objectives clearly documented.

Such rigorous measurement and assessment against objectives are prerequisites for improved adaptive management.

The Commission found that management objectives in water plans are often too general to be able to be measured and assessed to determine the success of the plan, and often generic to plans (for example, 'protect and where possible improve health of rivers'). Furthermore, most plans provide very limited or no explanation on how the 'best available' information was used to determine the objectives. Hence, the objectives become less relevant to the specified water resource in the plan, and therefore more difficult to assess (Hamstead et al 2008; plans assessed in Table 3).

However, there are examples of good practice in aligning water management actions to water plan objectives:

- + Queensland's resource operations plans specifically align the plans' resource operations rules to each of the general and ecological outcomes of the companion water resource plans. This approach clearly sets out the basis for measuring the achievement of the plans' outcomes.
- + Tasmania's water management plans explicitly outline how the plans' actions will achieve the plans' objectives, including detailed descriptions of the water regime that best gives effect to the environmental and other objectives of the plans, and an assessment of the ability of that water regime to achieve the objectives.
- + Water sharing plans in New South Wales set out performance indicators that will be used to determine the performance of a plan against its objectives, and detail the methods for assessing the indicators.

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#### ■ Finding 1.8

Management objectives in water plans are often too general to be able to be measured and assessed to determine the success of the plan. Furthermore, plans provide very limited or no explanation of how the 'best available' information was used to determine the objectives, or what assumptions were made.

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#### ■ Recommendation 1.6

The Commission considers that all water plan objectives need to be specific and measurable, and plans should incorporate monitoring arrangements specifically designed to measure performance against each objective, which in turn will enable improved adaptive management.

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### 1.3.2.6 Establishing water operational rules

Water plans must set out operating rules and arrangements to meet management objectives.<sup>8</sup>

All water plans include consumptive and non-consumptive water operations rules. For example, the Northern Territory's *Alice Springs Water Resource Strategy 2006–2015* (NRETA 2007) uses percentages to determine non-consumptive water use: 95% of the surface water resource is for environmental and cultural use and 5% for domestic and stock use.

The rules for access, use and trading from the consumptive pool are usually explicitly and comprehensively described in plans and, if not, are referenced to the relevant legislation and policy documentation.

The identification and description of water provided for the environment and other public benefits are typically not explicitly set out in plans. Such water is the residual after the consumptive pool is determined. However, water implicitly provided for environmental and other public benefit purposes can usually be identified through the water management rules detailed in the plans. Detailed rules for minimum flows and water levels and/or storage release volumes and rates, designed to protect against environmental degradation and achieve the ecological objectives of the plans, are in place in all surface water plans. Daily flow limits, diversion rostering and/or cease-to-pump conditions are commonly used approaches. In groundwater plans, water levels and salinity thresholds are commonly in place to provide resource sustainability and protect the ecosystems that depend on groundwater discharge.

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#### ■ Finding 1.9

The Commission considers that, in general, rules for consumptive and non-consumptive water provisions are sufficiently well defined in water plans. However, rules do not always deal adequately with interception (refer to Finding 1.7), nor periods of exceptionally low inflows (refer to Finding 1.10).

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<sup>8</sup> NWI Schedule E, clause 37(i): 'secure ecological outcomes by describing the environmental and other public benefit outcomes for water systems and defining the appropriate water management arrangements to achieve those outcomes'.

### 1.3.2.7 Robustness of water plans to changes in water availability

Drought conditions over the past six years have seen jurisdictions suspend or limit water planning provisions to protect water supplies deemed essential for consumptive purposes. Examples include the current suspension of a number of New South Wales water sharing plans (for the Lachlan, Macquarie, Murray and Murrumbidgee regulated rivers) due to record minimum system inflows, and temporary qualification of rights (temporary changes to legal entitlements to water) in numerous regulated and unregulated systems across Victoria since 2007, including systems covered by the Central Region Sustainable Water Strategy.

In these and other cases, in responding to drought, governments and system operators have had to make decisions to manage available water including changing the operating patterns to minimise the risk of system losses, and reducing the deliverability of water to various parts of their irrigation systems or at various times of the year (for example, shortening the irrigation season).

The Commission recognises the unprecedented pressures placed on some water systems during recent periods of record low rainfall and inflows. Understandably, these pressures have led to extraordinary suspensions or limits being put in place in some New South Wales and Victorian systems. However, the Commission considers that these actions seriously undermine public confidence in water plans. This highlights the need for all plans to be sufficiently robust to cope with a broader range of inflow and storage scenarios. Plans and associated operating rules should fully define how water will be allocated to various types of users and the environment under the full range of inflow conditions (including sequences of dry years), and how systems will be operated in times of extremely low water availability. This information is essential in providing water users with certainty and the ability to make informed decisions about how to best adapt to changing circumstances. It also improves confidence in approaches to water management.

The Commission also suggests that plans should include specific provisions defining the circumstances under which plans would be suspended or qualified. Plans should also make transparent the decision-making processes which would then be followed. Currently, these are opaque. Arrangements for the reinstatement of the plans or plan provisions should also be defined as far as possible. These provisions would go a long way towards improving public confidence in the integrity of water plans and water planning processes—especially in an era of challenging climate change.

There is some evidence of this occurring (for example, in New South Wales, recent amendments to the *Water Management Act 2000* limit the life of suspensions, and require that suspensions be gazetted and made public), but it is the Commission's view that much more needs to be done in this area.

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#### ■ Finding 1.10

The difficult recent seasonal conditions have revealed that many water plans have not adequately defined how systems will be operated during unanticipated sequences of low inflows.

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#### ■ Recommendation 1.7

The Commission recommends that jurisdictions and national agencies should further invest (taking account of work already underway through the COAG work program) in best practice guidelines, streamlined processes and training to improve the quality, the effectiveness of the processes, and the resilience and community acceptance of water plans.

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#### ■ Recommendation 1.8

The Commission recommends that all existing and new plans be tested to ensure that they clearly define how water will be allocated to various categories of users and the environment under the full range of inflow conditions (including sequences of dry years), and to ensure that plans adequately specify how systems will be operated in times of extremely low water availability. This should include publicly defining the exceptional circumstances in which a plan would be suspended or qualified, the processes and principles then to be followed, and the arrangements for reinstatement of plans when conditions improve.

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### 1.3.3 Monitoring and reporting on water plans

#### Background: Terminology and relevant National Water Initiative clauses

NWI clause 40 states that 'In the implementation of water plans, the Parties will, consistent with the nature and intensity of resource use: (i) monitor the performance of water plan objectives, outcomes and water management arrangements; (ii) factor in knowledge improvements as provided for in the plans; and (iii) provide regular public reports. The reporting will be designed to help water users and governments to manage risk, and be timed to give early indications of possible changes to the consumptive pool.'

The NWI approach to water planning is based on adaptive management. Once plans have defined objectives and tools to achieve those objectives, it is essential to monitor performance against objectives using clearly defined and relevant indicators, and to report to water users and the community on the achievement of objectives. When objectives are not achieved, the management approach needs to be adjusted ('adapted') accordingly.

Monitoring enables assessment of whether performance indicators are being achieved. Periodic review of water plans is an essential part of adaptive management, providing an opportunity to evaluate the extent to which the objectives have been achieved, whether operational rules are appropriate for meeting objectives, and the appropriateness of the objectives in the light of new information. Public reporting of the results of monitoring and review processes is important in providing transparency and accountability. This process then links to the risk assignment framework (see Chapter 9), which defines how any changes to the available water resource are to be shared.

#### 1.3.3.1 Monitoring

The Commission's review has found that the monitoring processes described or referenced to in water plans are generally oversimplified, with limited explanation of the specific monitoring requirements (for example, identification of performance indicators and when and how often they are to be measured) (Hamstead et al 2008; plans assessed in Table 3). Hence, it is often not clear how monitoring will assist water planners in assessing the achievement of the plan's management objectives.

However, Queensland's water resource plans and resource operations plans include detailed monitoring processes that have been designed to determine whether the plans are effective in achieving their objectives. All resource operations plans include detailed natural ecosystem monitoring provisions outlining the steps to gather scientific information (for example, on fish, aquatic vegetation and water quality), analyse the trends, determine whether objectives specified in the water resource plan are being achieved, and provide annual public reports on the findings. Queensland's statewide environmental flows monitoring program is designed to collect and provide this information for all water resource plan areas.

The Commission recognises that water monitoring arrangements, particularly for ecosystem health, are often set outside water plans. The majority of states are putting in place systematic statewide efforts to measure ongoing river health. For example, Victoria has ongoing and systematic monitoring and reporting arrangements for river health using the index of stream condition. New South Wales collects information on major river systems under its Integrated Monitoring of Environmental Flows Program (DWE 2009). The results from the program will inform the review of water sharing plans by the Natural Resources Commission. New South Wales has also recently provided progress reports on the implementation of the water sharing plans, and contributed information to the Sustainable Rivers Audit. Further effort is needed in demonstrating how these statewide programs will determine whether a specific water plan's objectives are being achieved.

While such efforts to improve systematic monitoring arrangements are encouraging, there needs to be clearer and more detailed explanation in individual water plans of the specific monitoring arrangements that have been designed to determine whether a plan is effective in achieving its objectives. These arrangements should include reference to systematic statewide monitoring processes where they exist.

Monitoring arrangements will of course only be truly effective if adequately resourced and appropriately skilled. Resource and technical capacity constraints continue to inhibit fully effective monitoring arrangements across jurisdictions.

### ■ Finding 1.11

Water monitoring arrangements across jurisdictions are improving, with a number of jurisdictions implementing comprehensive statewide monitoring programs. However, water plans generally lack detailed description of their specific monitoring arrangements, and lack clarity about how plan-specific and statewide monitoring arrangements can each contribute to assessing achievement of the plans' objectives.

#### 1.3.3.2 Reporting

Reporting on the implementation of water plan rules varies considerably across Australia (Table 5), from comprehensive and detailed public reporting of actions, to situations where reporting on the implementation of water plan rules is nonexistent.

Queensland provides an example of the former. Queensland undertakes an annual assessment of the effectiveness of its water resource plans. Where the objectives are not being met, relevant provisions within the plan can be amended to improve the plan's effectiveness. Specific details of any noncompliance with resource operations plans (which implement the water resource plans) are also detailed in the annual report. The Commission considers these arrangements to be a good example of adaptive management.

While New South Wales collects information on regulated water systems under its Integrated Monitoring of Environmental Flows Program, it does not appear that this information is publicly reported, and it is unclear how the information is used if the provisions of the plan are found not to be delivering the planned outcomes. In the Commission's view, New South Wales' future arrangements for independent reporting by the Natural Resources Commission will set a benchmark for independent reporting arrangements in other jurisdictions.

As detailed in Table 5, not all jurisdictions provide regular reports of the implementation of individual water plans. In some cases, reports are incorporated into a management agency's annual report.

**Table 5: Summary of water plan reporting**

Jurisdiction	Type of report	Information reported
ACT	<i>ACT Water Report</i> (annual)	Summarises water resource management actions for the territory.
NSW	Departmental annual report	General reporting on implementation of water sharing plan rules, with limited information on specific plans. The Natural Resources Commission will review water sharing plans between 5 and 10 years from plan commencement. The first tranche of reviews is currently underway. The progress reports provide a brief assessment of key implementation activities under a number of water sharing plans (i.e. regulated, unregulated and aquifer).
	Natural Resources Commission Review	
	Regular progress reports	
NT	Departmental annual report	Very general information on implementation of water resource strategies.
Qld	<i>Water Resource Plans Annual Report</i> (for certain catchments under the <i>Water Act 2000</i> )	Summarises implementation of water resource plans and assesses the effectiveness in achieving the plan objectives. Report advises any changes to the plans and provides information on entitlements, use, trade, operations, environmental management, pricing and monitoring activities for the reporting year.
SA	Annual reports by Natural Resource Management Boards	Annual reports provide a general update on progress with water allocation plan development or implementation.
	Five-year reviews of water allocation plans	Under the <i>Natural Resources Management Act 2004</i> , reviews must be undertaken at least once during each five-year period from the date of adoption, and can be undertaken at any time. Reviews must consider the entire plan and usually include recommendations about elements of plans that should be amended in order to better manage the resource.
Tas.	Departmental annual report	General reporting on implementation of water management plan rules.

Jurisdiction	Type of report	Information reported
Vic.	Monthly water reports	Monthly reports and the annual <i>Water Account</i> include a summary of actions taken under bulk entitlement and water plan provisions.
	Annual <i>Water Account</i>	
	Departmental annual report	Progress of implementation of sustainable water strategies is to be provided in the departmental annual report.
WA	Departmental annual report	Limited reporting on water allocation plan development; no information on implementation of plan rules.
	Annual evaluation reports	All plans include requirements for public annual reporting of achievements against objectives, and annual reporting of plan implementation actions.
Commonwealth	Bureau of Meteorology <i>National Water Account</i>	A pilot <i>National Water Account</i> will be published by December 2009, and a first comprehensive <i>National Water Account</i> will be published by December 2010.

#### ■ Finding 1.12

The quality and transparency of processes for reporting on the outcomes of water plans are inadequate in many jurisdictions. Ideally, such reports should be prepared at arm's length, clearly show how the plans' objectives are being achieved, discuss areas of success and failure and recommend any changes to the provisions of the plans (within the bounds of the plans' review provisions).

### 1.3.4 The development of the new Murray–Darling Basin Plan

Experiences to date demonstrate that water planning is extremely challenging and that resilient outcomes of water planning processes that are science and evidence based and accepted by the community take a lot of time, effort and resources. In the MDB, the forthcoming Basin Plan will be critical in setting the scene for decades to come. The scope of the Basin Plan is spelt out in detail in the *Water Act 2007*. Section 21 of the *Water Act* describes the general basis on which the plan is to be developed, including how it is to take into account the best available scientific knowledge and socio-economic analysis. Section 22 describes the content of the plan.

During the biennial assessment process, it has become clear to the Commission that there are extremely high, perhaps unrealistic, expectations for the new Basin Plan (see Box 3), and that stakeholders have concerns about the lack of progress and clarity about the scope of the plan, in areas including:

- + The extent to which the new Basin Plan, particularly the new basin-wide sustainable diversion limit, will engage the community and stakeholders to identify objectives and understand trade-offs.
- + Notwithstanding the guidance provided by relevant sections of the *Water Act*, whether the plan will be driven by scientific and environmental advice independent of social and economic considerations, or be a less rigorous administrative process of streamlining existing arrangements.
 

If it is the former, the concern expressed to the Commission is whether the timetable is sufficient to allow adequate consultation and stakeholder involvement to ensure that the resultant plan and the processes and decisions are transparent and well understood.

If it is the latter, the concern expressed is whether the plan will meet the community's high expectations and whether it will be broadly accepted, noting that if broad acceptance is not obtained, then the decades of lack of agreement associated with the extent of overallocation and overuse in the basin will continue.
- + What impact any changes to the sustainable diversion limit will have on existing entitlements, and how the risks associated with any reductions are to be shared, both in the initial establishment of the plan and in subsequent review processes (see Chapter 9 on risk assignment).
- + How the costs associated with preparing and managing the new Basin Plan will be recovered (see Chapter 8 on cost recovery for water planning and management activities).

A number of stakeholders have also expressed concerns regarding the lack of clarity in the scope and implications of the new Basin Plan. The MDBA's *Concept Statement for the Plan* released in May 2009 has helped address these concerns by clarifying the relevant requirements of the *Water Act*, and providing guidance on the timetable and consultation arrangements to be used in developing the plan. The MDBA is also developing a series of fact sheets and issues papers to promote understanding of the plan. The Commission encourages the MDBA to consider releasing further such clarifying papers and statements as the authority settles the nature, scope and process for the plan.

The Commission recognises that the MDBA is developing strategies to engage the community in the preparation of the Basin Plan. The MDBA is developing a detailed stakeholder engagement strategy, and a Basin Consultative Committee has been established to advise the MDBA on (among other issues) community engagement. When completed in mid-2010, the draft Basin Plan will be released for public and stakeholder comment in accordance with the *Water Act* (sections 43 and 43A).

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#### ■ Finding 1.13

Considering the magnitude of the task ahead, the Commission observes that the MDBA has had a disappointingly slow start, with an intergovernmental delay in appointing authority members and growing pressure on timelines to complete the development of the Basin Plan. Effective community consultation is crucial to the basin planning process. There is a risk that the pressure on timelines may affect the quality of that consultation. The Commission supports the MDBA's work to develop strategies to engage the community in the preparation of the Basin Plan.

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#### ■ Recommendation 1.9

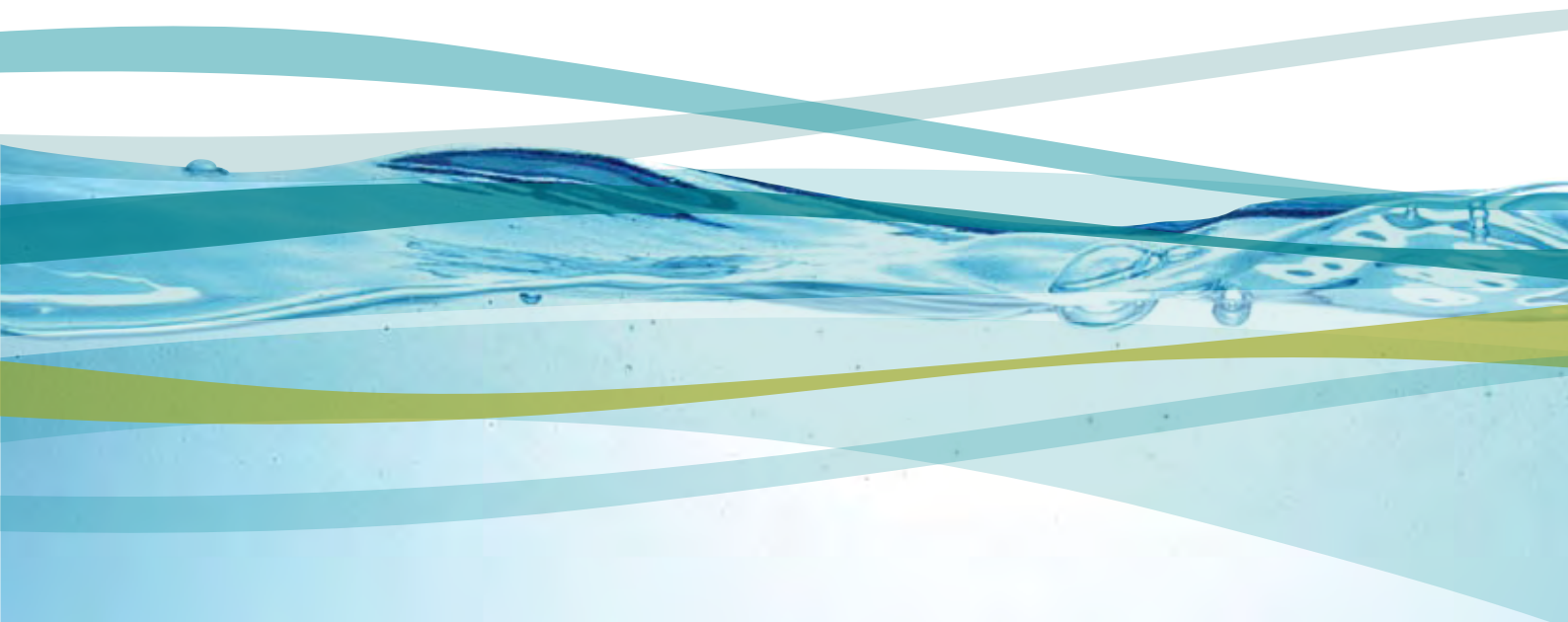
The Commission recommends that the MDBA further clarify the intended planning processes and ground rules for the development of the new Basin Plan in consultation with affected parties, to engage stakeholders in what the new plan will involve, to better manage expectations, provide more certainty, and facilitate a more cooperative approach with the MDB jurisdictions. In particular, the Commission recommends greater public consultation, progressive release of background and issues papers and, where possible, interim, progressive guidance from the MDBA on specific environmental, economic and social objectives or outcomes likely to be targeted in the plan.

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#### ■ Recommendation 1.10

To account for delays in progress to date and new developments, the Commission recommends that NWI parties revise and resubmit, within six months for accreditation by the Commission, their jurisdictional plans for implementation of their NWI commitments.

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# 2

## Understanding surface and groundwater connectivity

## 2.1 Overview

The NWI aims to ensure the economic and environmental sustainability of groundwater and surface water. To achieve this, the connectivity between surface water and groundwater must be taken into account.

To date, the connections between surface water and groundwater have not always been recognised in water planning, management and use. Failure to manage connected surface and groundwater resources jointly has meant that water allocation decisions on one resource have affected the security of the connected resource.

Under the NWI, parties have agreed to recognise the connectivity between surface and groundwater resources and to manage connected systems as a single resource (NWI clause 23(x)).

**To mitigate the risks to the water resource, the Commission considers that unless and until it can be demonstrated otherwise, surface water and groundwater resources should be assumed to be connected, and water planning and management of the resources should be conjunctive. This is the reverse of the current situation.**

Such integrated water management should also include compatible charging regimes for groundwater and surface water, to prevent market distortions and inequities among water users.

It is anticipated that when NWI clause 23(x) has been achieved:

1. There will be a clear, evidence-based understanding of the **extent and significance of the connectivity** between surface water and groundwater resources.
2. Risks to connected resources will be **identified and managed** to mitigate the identified risk.
3. **Effective integrated planning, management and licensing arrangements** will be in place, in proportion to the degree of connectivity.
4. Integrated **monitoring, accounting, compliance and enforcement** arrangements will have been rolled out.
5. **Strong technical capacity will have been developed** to support integrated surface water – groundwater management.

The Commission considers that good progress is being made in each of the areas outlined above, but that there remains much to do to complete the identification and integrated management of connected surface water and groundwater resources across Australia.

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### Finding 2.1

The Commission finds that all jurisdictions have commenced assessments of connectivity, as required under the NWI. The Commission appreciates that each jurisdiction takes a different approach to assessment and management of its water resources, in line with its assessment of management needs. However, applying different thresholds of significance, and hence differing thresholds that trigger integrated management, risks undermining confidence in water planning and entitlements, particularly in areas where entitlements can be traded across borders.

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### Finding 2.2

All jurisdictions have now passed legislation, or in the case of Western Australia implemented planning processes, that recognise the potential connectivity of surface and groundwater resources and provide for their conjunctive planning and management.

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### Finding 2.3

Where plans have been developed, Queensland, New South Wales, South Australia, the Australian Capital Territory and the Northern Territory account for the potential connectivity of surface water and groundwater resources in the determination of the sustainable extraction limits. Other jurisdictions have commenced the development of plans that will set out integrated management arrangements.

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### Finding 2.4

All jurisdictions have made some progress in developing integrated management arrangements for some connected systems. However, the continuing slow progress in rolling out the enabling water plans, and failure to adequately address overallocation in some systems, are inhibiting widespread adoption of integrated surface water and groundwater management.

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### Recommendation 2.1

The Commission recommends that unless otherwise established, it should be assumed that all surface and groundwater systems are connected and that the eventual impact of groundwater pumping on surface water flow may be as high as 100%. This is the reverse of current practice.

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<b>Finding 2.5</b>	The quality of data on Australia's groundwater resources is particularly poor, and more resources need to be devoted to improving it. The quality of metering and monitoring of groundwater extractions is variable. The National Groundwater Action Plan is helping to improve the quality of data on groundwater resources.
<b>Recommendation 2.2</b>	<p>The Commission considers that ultimately all surface and groundwater extractions, including for stock and domestic purposes, should be licensed and metered or otherwise measured. However, the Commission also recognises the practical constraints to universal metering of groundwater extractions. The Commission therefore proposes that a risk-based approach be adopted, in which the following three criteria are given particular weight in determining metering priorities among different water systems as universal metering is rolled out:</p> <ol style="list-style-type: none"> <li>1) the level of water use in the system, with priority for systems at or approaching full allocation</li> <li>2) in the case of systems which are not at or approaching full allocation, the cost-effectiveness of metering investments (including benefits implicit in the acquisition of better water use data)</li> <li>3) the potential contribution of further metering to public confidence about compliance and the general quality of management of the given water system.</li> </ol> <p>Refer also to the Commission's Recommendation 3.5.</p>
<b>Recommendation 2.3</b>	The Commission recommends that, in helping redress the lack and quality of groundwater data available to support integrated management, it is important that the Bureau of Meteorology's emerging national water data and accounting systems treat surface water and groundwater data in an integrated fashion. The National Water Accounting Standards currently under development (Chapter 3) need to incorporate accounting for connected surface and groundwater systems from the outset.
<b>Finding 2.6</b>	There is currently a critical need for increased national expertise in groundwater assessment and management, and especially skills in assessment and management of connected systems. Progress is being made in this area through initiatives such as the National Centre for Groundwater Research and Training and the National Groundwater Action Plan.

## 2.2 Context for this assessment

Surface water resources have received more attention than groundwater resources in the development of water management arrangements, largely due to the higher levels of development of surface water resources. The lack of recognition of connectivity between surface water and groundwater resources is now a significant factor undermining confidence in the security of water access entitlements and water provided for the environment. An area of particular concern is the Murray–Darling Basin, where groundwater extractions have increased dramatically following the 1995 cap on surface water diversions. The Murray–Darling Basin Plan to be developed under the *Water Act 2007* will set a new sustainable diversion limit on the quantities of surface water and groundwater that may be taken from basin water resources.

The planning, management and accounting provisions of the NWI apply equally to groundwater and surface water resources. For example:

- + Addressing the overallocation and overuse of water resources, including groundwater, is the highest order priority, and is the crucial first step before effective water planning can be put in place.
- + The identification and assessment of the water needs of groundwater-dependent ecosystems need to be brought into the planning and allocation process, just as for surface water-dependent ecosystems.
- + Standardised rigorous water accounting applies no less to groundwater than to surface water.
- + Water management authorities should recover the cost of groundwater planning and management, just as they should for surface water resources.

Each of these matters is addressed substantively in other chapters of this assessment. This chapter focuses specifically on progress in identifying and integrating the management of connected surface water and groundwater resources.



The *Australian water resources 2005* report (NWC 2007a) found that 61 surface water management units and 121 groundwater management units had a draft or final management plan in place. Of these, 22% of the surface water plans gave some consideration to groundwater, while of the groundwater management plans, 65% referred to local surface water resources.

The 2007 Biennial Assessment (NWC 2007b) and 2008 Update (NWC 2008) found that there had been limited recognition in water plans of the connectivity between surface water and groundwater resources. Although jurisdictions usually had arrangements in place to manage groundwater, those arrangements did not amount to sophisticated, integrated management. The Commission concluded that significantly more effort was needed to build knowledge of groundwater resources and the capacity to manage them.

The National Water Commission's \$82 million National Groundwater Action Plan, which commenced in January 2008, is designed to address the serious knowledge and resource impediments that are hindering better management of Australia's groundwater resources, and to accelerate the implementation of the National Water Initiative. Better knowledge of groundwater – surface water connectivity is one of the thematic investment areas under the plan, and studies have now commenced across all jurisdictions.

At its March 2008 meeting, COAG commissioned the development of a comprehensive new water reform work program to address overallocation and improve environmental outcomes. This work program is seeking to, among other things, prioritise implementation of NWI commitments in relation to groundwater planning and management (WGCCW 2008).

In November 2008, Senator the Hon. Penny Wong, Minister for Climate Change and Water, released the report from the Murray–Darling Basin Sustainable Yields study (CSIRO 2008). The study concluded that, at current rates of development, by 2030 one-quarter of current groundwater use will be sourced directly from streamflow, equivalent to about 4% of current surface water diversions in the basin. The impact of connectivity, combined with declining water availability due to climate change, will significantly affect the security of water resources for consumptive and non-consumptive uses.

Based on this and other evidence, the Commission continues to see better joint management of connected surface and groundwater resources as an urgent reform priority.

## 2.3 The Commission's assessment and findings

### 2.3.1 Identifying the extent and significance of connectivity

#### **Background: Terminology and relevant National Water Initiative clauses**

Under the NWI, jurisdictions have accepted that 'there are significant knowledge and capacity building needs for [the Agreement's] ongoing implementation, including ... interaction between surface and groundwater components of the water cycle' (NWI clause 98).

A major impediment to the integrated management of surface water and groundwater at present is the relatively limited understanding of physical and temporal characteristics of specific groundwater resources and their connections to surface water.

Recognition and understanding of the nature of connectivity between surface water and groundwater resources is the crucial first step in preventing overuse and/or overallocation of the shared resource. Adopting appropriate management arrangements is dependent on sound appreciation of the location of the shared resource, the time over which impacts of connectivity occur, and the degree and significance of the connectivity.

Different approaches to assessing connectivity have been employed across Australia.

New South Wales, Queensland and South Australia have undertaken assessments of surface and groundwater connectivity.

Victoria, Western Australia and Tasmania have assessment processes in train. The Australian Capital Territory considers its surface water and groundwater systems to be fully connected. The Northern Territory recognises and is accounting for connectivity in its water allocation planning processes.

Queensland takes a risk management approach, using an assessment of the impacts of groundwater extraction on surface water flows.

In New South Wales, the physical extent of connectivity has been assessed in all groundwater plan areas (the Great Artesian Basin is the only plan area in which New South Wales considers there to be no connectivity).

All prescribed water resources in South Australia have been assessed for connectivity. For the majority of these resources, extraction has been assessed to be from confined aquifers, with little or no connectivity to surface water resources.

It is clear that jurisdictions each take different approaches to attributing the significance of connectivity. For example, significant connectivity is reported in the south-east of South Australia, while directly across the border in Victoria, moderate connectivity is found (NWC 2007a). New South Wales has found connectivity worthy of some form of management for all its groundwater resources (except the Great Artesian Basin), while Victoria reports that six water management areas have already been assessed as having low connectivity, and expects to find only two or three areas of significant connectivity.

The nature of connectivity can be complex. Although such geological complexity is by no means limited to Western Australia, Western Australia has initiated a review of the definition of 'interconnectivity', to take into account that aquifers can be layered over each other. The different separating layers range in permeability and therefore connectedness, and each individual layer changes over a geographical area to be more or less permeable in different locations. Western Australia has developed a number of large groundwater models, and some of its research in this area is world-leading. The significant expense of investigating and developing complex numerical modelling of deep and multilayered groundwater systems is being recognised through a review of potential cost-recovery methodologies.

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#### ■ Finding 2.1

The Commission finds that all jurisdictions have at least commenced assessments of connectivity, as required under the NWI. The Commission appreciates that each jurisdiction takes a different approach to assessment and management of its water resources, in line with its assessment of management needs. However, applying different thresholds of significance, and hence differing thresholds that trigger integrated management, risks undermining confidence in water planning and entitlements, particularly in areas where entitlements can be traded across borders.

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Further details of the status of assessment of connectivity in each jurisdiction are provided in Section 2.3.2 and Table 6.

### 2.3.2 Integrated planning and management arrangements

#### Background: Terminology and relevant National Water Initiative clauses

Under the NWI, jurisdictions have committed to 'establish effective and efficient management and institutional arrangements to ensure the achievement of the environmental and other public benefit outcomes, including: ... common arrangements in the case of significantly inter-connected groundwater and surface water systems' (NWI clause 79(i)(c)); and to 'identify by end 2005 situations where close interaction between groundwater aquifers and streamflow exist and implement by 2008 systems to integrate the accounting of groundwater and surface water use' (NWI clause 83).

Groundwater and surface water planning underpinned by the best available science should seek to recognise connectivity, and the subsequent management actions should be designed to optimise productive, environmental and public benefit outcomes for the shared resource. To protect the integrity of integrated plans into the future, the accounting of groundwater and surface water use should also be integrated.

The integration of surface and groundwater management is evolving, particularly in areas where groundwater extraction has already manifested itself as a major risk to the shared resource. Since the 2007 Biennial Assessment, some jurisdictions have developed water management plans—the primary mechanism for setting out integrated management arrangements—that provide for the management of surface and groundwater as a single resource.

The majority of jurisdictions recognise in their legislation or water management planning policy the potential for connectivity between surface and groundwater systems. However, the issue is frequently complicated by the fact that boundaries of water plans and groundwater management units are not congruent.

In its review of water-related legislation, the Commission found that the potential for connectivity between surface and groundwater resources is explicitly recognised in statute in Queensland, South Australia, Tasmania and Victoria. Water management plans that recognise the potential for connectivity have been developed in the Australian Capital Territory, New South Wales and the Northern Territory.

However, with the exception of the Commonwealth, no jurisdictions have an enforceable, explicit legislative requirement for the integrated management of connected systems.

**Table 6: Legislative provisions for the recognition and integrated management of surface water — groundwater connectivity**

Jurisdiction	Recognition of connectivity between surface water and groundwater	Integrated management mechanisms for surface water and groundwater
<b>ACT</b>	Surface and groundwater are defined in the <i>Water Resources Act 2007</i> but their connectivity is not explicitly recognised.	The <i>Water Resources Act 2007</i> allows for integrated management of groundwater and surface water. The ACT reports that all surface and groundwater resources are considered to be a single resource and are managed accordingly.
<b>NSW</b>	Surface and groundwater are defined in the <i>Water Management Act 2000</i> but their connectivity is not explicitly recognised.	The <i>Water Management Act 2000</i> provides for integrated management of surface and groundwater but does not require it. Its provisions on water planning and implementation apply to both surface and groundwater, and allow for plans to be developed incorporating both.
<b>NT</b>	Surface and groundwater are defined in the <i>Water Act</i> but their connectivity is not explicitly recognised	The <i>Water Act</i> provides for integrated management of surface and groundwater, but does not require it.
<b>Qld</b>	Surface and groundwater are defined in the <i>Water Act 2000</i> and their connectivity is explicitly recognised. A water resource plan for any area must regulate subartesian water if there is a risk that taking, or interfering with, subartesian water in the area may significantly impact on the plan's outcomes.	The <i>Water Act 2000</i> provides for the integrated management of surface and groundwater but does not require it. The Act allows for two plans to be in place for an area where one plan relates to artesian water. In drafting a plan relating to surface water, consideration must be given to the potential effects of the plan on water 'not covered by the plan', which could include subartesian and/or artesian water.
<b>SA</b>	Surface and groundwater are defined in the <i>Natural Resources Management Act 2004</i> and their connectivity is explicitly recognised.	The <i>Natural Resources Management Act 2004</i> provides for integrated management of surface and groundwater but does not require it.
<b>Tas.</b>	Surface and groundwater are defined in the <i>Water Management Act 1999</i> and their connectivity is explicitly recognised.	The <i>Water Management Act 1999</i> provides for water plans to cover a watercourse or watercourses, a lake, one or more groundwater resources or any combination of these, whether the water resources are joined naturally or artificially.
<b>Vic.</b>	Surface and groundwater are defined in the <i>Water Act 1999</i> and their connectivity is explicitly recognised.	The <i>Water Act 1999</i> provides for an integrated approach to management of surface and groundwater. Under the Act, a management plan may relate to groundwater resources, surface water resources or both, in the relevant water supply protection area.
<b>WA<sup>9</sup></b>	Surface and groundwater are defined in the <i>Rights in Water and Irrigation Act 1914</i> but their connectivity is not explicitly recognised.	Integrated management of surface and groundwater is not considered in the <i>Rights in Water and Irrigation Act 1914</i> . However, planning processes do take into account connectivity, and provide for integrated management.
<b>Commonwealth</b>	Surface and groundwater connectivity is explicitly recognised in the <i>Water Act 2007</i> .	Integrated management of entitlements must occur in connected systems.

9 Western Australia is currently drafting new water management legislation.

## ■ Finding 2.2

All jurisdictions have now passed legislation, or in the case of Western Australia implemented planning processes, that recognise the potential connectivity of surface and groundwater resources and provide for their conjunctive planning and management.

Jurisdictions' progress in identifying and managing connected surface water and groundwater resources is subject to assessment under NRMCC performance indicator 10.1 (see Box 6). The indicator is designed to reveal actions taken by the jurisdictions to identify areas of connectivity between surface and groundwater resources and whether water plans have subsequently been developed providing for integrated management of the connected systems. Jurisdictions' responses to this indicator are summarised in Table 7.

### **Box 6: NRMCC Indicator 10.1—Performance indicator for assessment and integrated management of connected surface and groundwater**

Proportion and spatial area within water plans:

- a) with no assessment of connectivity between surface and groundwater systems;
- b) that are assessed and have no connectivity between surface and groundwater systems;
- c) that identify interconnected surface and groundwater systems but do not have integrated management; or
- d) have integrated management for interconnected surface and groundwater systems.



Windmill pumping groundwater for stock in Australia

**Table 7: Reporting on Natural Resource Management Ministerial Council performance indicator for connectivity**

Jurisdiction	Indicator	Response
<b>ACT</b>	a) No assessment	All resources assessed
	b) Assessment, no connectivity	NA
	c) Connectivity, no integrated management	NA
	d) Connectivity, integrated management	Integrated management for all resources
<b>NSW</b>	a) No assessment	Connectivity assessed in all groundwater plan areas
	b) Assessment, no connectivity	Great Artesian Basin
	c) Connectivity, no integrated management	None—where connectivity assessed as high, integrated management is in place
	d) Connectivity, integrated management	Where connectivity is high, integrated plans will be developed. Where lower connectivity is assessed, separate surface water and groundwater plans are put in place, but provision is made in each plan to address connectivity
<b>NT</b>	a) No assessment	The completed plans in the territory have been fully assessed for connectivity. All current plans being developed include an assessment of connectivity.
	b) Assessment, no connectivity	
	c) Connectivity, no integrated management	
	d) Connectivity, integrated management	
<b>Qld</b>	a) No assessment	Statewide assessment of impacts of groundwater extraction on surface water flows completed
	b) Assessment, no connectivity	No advice
	c) Connectivity, no integrated management	Identified high-risk systems are dealt with through explicit integrated management. For other systems, integrated management is implicit, as modelling and assessments undertaken to develop plans account for connectivity.
	d) Connectivity, integrated management	
<b>SA</b>	a) No assessment	All 20 prescribed areas assessed
	b) Assessment, no connectivity	No connectivity in 11 prescribed areas
	c) Connectivity, no integrated management	Surface and groundwater have low levels of connectivity in five prescribed areas, and are managed separately
	d) Connectivity, integrated management	Four prescribed areas are subject to integrated management—base flow estimates for catchments considered when determining groundwater sustainable yield.

Jurisdiction	Indicator	Response
<b>Tas.</b>	a) No assessment	No assessments—investigations of connectivity at key sites within the state; development of a policy framework for integrated management of surface water and groundwater has recently commenced
	b) Assessment, no connectivity	
	c) Connectivity, no integrated management	
	d) Connectivity, integrated management	
<b>Vic.</b>	a) No assessment	Statewide assessment of connectivity underway. Expect two or three systems with a high degree of connectivity
	b) Assessment, no connectivity	
	c) Connectivity, no integrated management	Six management plans in place with assessment of low connectivity
	d) Connectivity, integrated management	One draft integrated management plan being developed (Upper Ovens)
<b>WA</b>	a) No assessment	No assessment data available. Planning for surface and groundwater systems is undertaken separately. However, planning processes do take into account connectivity between surface water and groundwater. Where planning for surface water and groundwater in an area is concurrent, then connectivity is considered and provisions will be put in place recognising that the system is connected.
	b) Assessment, no connectivity	
	c) Connectivity, no integrated management	
	d) Connectivity, integrated management	

The Commission considers that, by concentrating on the areas within water plans, the NRMCC indicators may not identify areas outside water plans with significant connectivity, or the actual implementation of integrated management arrangements. There may be significant local impacts on water users and the environment due to extraction in connected systems, which are not accounted for if the region does not have an active management plan. The usefulness of the indicator will increase as plans are implemented.

In jurisdictions where substantive integrated management has been occurring, it is common to find a management response hierarchy that sets out a systematic risk-based approach to dealing with different degrees of connectivity and different levels of resource development.

Queensland and New South Wales provide examples where integrated surface and groundwater plans are being developed.

In New South Wales, there are currently 45 water sharing plans gazetted or under development, and an intention to develop a further eight water sharing plans where surface and groundwater management will be combined. In the areas to be covered by macro water sharing plans, specific rules will be developed to deal with connectivity, such as those for the Hunter unregulated rivers and alluvials systems (Box 7). As integrated management in New South Wales is implemented through the water sharing plans, the Commission considers it urgent that current plans be reviewed and new plans be commenced and completed as a matter of priority, particularly in areas where connectivity is posing a high level of risk to the resource. New South Wales has indicated to the Commission that it considers the level of connectivity between rivers and the deep aquifers of major inland groundwater alluvial systems in New South Wales to be relatively limited.

#### **Box 7: Integrated surface water – groundwater management—New South Wales Draft Hunter Unregulated Rivers and Alluvials Water Sharing Plan**

##### **Connectivity between groundwater and surface water has been established**

Based on an assessment of aquifer types and their connectivity, the decision was made to include the up-river alluvial aquifers with the Hunter Valley unregulated rivers in a single water sharing plan. The boundary between upstream and coastal alluvial aquifers has been pragmatically defined as the tidal limit.

The plan notes that all alluvial aquifers upstream of the tidal limit are significantly connected, while some subcatchments are highly connected with substantial alluvial aquifers, and others are less connected.

##### **Joint management of connected water sources is required**

- + Boundaries for application of river water rules to aquifer extraction are determined on a pragmatic basis rather than through detailed physical surveys and assessments.
- + All river and alluvial aquifer extraction is to be managed to a single long-term extraction limit.
- + The taking of water from alluvial aquifers that adjoin unregulated rivers will be governed by daily river flows.
- + Seasonal allocations of water from alluvial aquifers that adjoin regulated rivers will be linked to seasonal extraction allocations from the rivers.
- + Opportunity for conversion of licences between surface and groundwater is provided.
- + Opportunity for trade of groundwater licences subject to the same constraints as surface water licences in the same subcatchment is provided.

Queensland legislation provides for immediate intervention (such as a moratorium) where the impact of connectivity is seriously impacting on the resource. More commonly, connectivity is managed through the water planning process.

In developing water resource plans in Queensland, the impact of existing groundwater development is incorporated into the hydrological model for the water system as a whole. As the level of existing resource development is 'in-built' in the plan, it follows that regulating the further development of groundwater resources acts as a de facto means of managing the connected resource. However, such an approach is only appropriate for reasonably stable systems, where seasonal variations in groundwater extraction do not impact on streamflow.

There remain a number of areas in Queensland with significant groundwater extractions, including the Condamine alluvium and Lockyer Valley, where the development of integrated water resource plans is only now commencing. Connectivity is less significant in the Condamine alluvium, where the prime issue is overallocation of the groundwater resource. Connectivity is a significant concern in the Lockyer Valley. Furthermore, the complex issue of potential conjunctive use of recycled water in the Lockyer Valley is yet to be settled.

South Australia has developed sound management principles for integrated management (Box 8). However, water allocation planning in South Australia needs to be completed before integrated management of connected resources can be put fully into operation.

#### **Box 8: Integrated surface water – groundwater management—Management principles for connected systems, South Australia**

South Australia has in place principles for management of connected surface and groundwater systems.

- + Groundwater and surface water plans in physically and/or economically connected systems can be dealt with either through individual plans managed in an integrated way or through developing one integrated plan.
- + Planning, management and reporting boundaries are to be based on those for the dominant resource.
- + In high-risk areas, and until better processes become available, the relationship between groundwater extraction and surface water flow should be estimated by a panel of experts using best available information.
- + Where entitlements are to be issued or traded in a connected system, their impact on both elements of the resource must be taken into account on the basis of the determined relationship.
- + The work of [a nominated] expert group is to be supported by developing and utilising appropriate catchment models.
- + The relationship between groundwater extraction and surface water flow is to be refined at plan review, taking into account any new information or assessment techniques.



In Western Australia, as described earlier in this chapter, the nature of connectivity is complex. Single plans can apply to multiple layers of aquifer systems, to several kilometres in depth. Water plans need to address the connectivity between aquifer systems and through this manage the impact on surface expressions of groundwater, including wetlands and lakes as well as river systems. The plans need to manage the water users of the different aquifer layers and their potential impact on each other, and the cumulative effect of abstraction from all aquifers in an area on the water-dependent values at the surface.

Victoria and Tasmania are still in the process of identifying connectivity. An integrated plan for the Upper Ovens system is currently under development in Victoria. Tasmania has commenced development of the Wesley Vale Water Management Plan, which relates to a key groundwater usage area and will consider both surface and groundwater resources. The Northern Territory reports that it recognises and is accounting for connectivity in all water allocation planning processes.

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### ■ Finding 2.3

Where plans have been developed, Queensland, New South Wales, South Australia, the Australian Capital Territory and the Northern Territory account for the potential connectivity of surface water and groundwater resources in the determination of the sustainable extraction limits. Other jurisdictions have commenced the development of plans that will set out integrated management arrangements.

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In line with the Commonwealth *Water Act 2007*, the Murray–Darling Basin Authority is currently preparing a basin-wide plan for the Murray–Darling Basin. It is intended that the Basin Plan, due to commence in 2011, will set out environmentally sustainable limits on the quantities of surface water and groundwater that may be taken from basin water resources (excluding the Great Artesian Basin, which is not defined as part of Basin water resources under the *Water Act*, and is managed through a separate process). While the provisions of the *Water Act 2007* are consistent with the NWI Agreement, it is too soon to assess the extent to which the Basin Plan meets this requirement. However, the Commission is encouraged that the Basin Plan offers a historic opportunity to require basin jurisdictions to accelerate and harmonise their treatment of groundwater and surface water connectivity in individual basin water plans.

Until then, while progress is being made in integrating the management of connected water resources, the continuing slow progress in developing water plans generally (Chapter 1), and addressing overallocation (Chapter 5), are inhibiting the broad application of integrated management.

The Commission considers that all jurisdictions need to immediately return overallocated and/or overused groundwater systems to sustainable levels of extraction as the essential precursor to effective integrated management of connected resources. Priority should also be given to completing water plans in areas that have a high level of connectivity to ensure that the impacts of extraction on other water users and the environment are effectively managed.

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### ■ Finding 2.4

All jurisdictions have made some progress in developing integrated management arrangements for some connected systems. However, the continuing slow progress in rolling out the enabling water plans, and failure to adequately address overallocation in some systems, are inhibiting widespread adoption of integrated surface water and groundwater management.

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### ■ Recommendation 2.1

The Commission recommends that unless otherwise established, it should be assumed that all surface and groundwater systems are connected and that the eventual impact of groundwater pumping on surface water flow may be as high as 100%. This is the reverse of current practice.

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## 2.3.3 Capacity and resources to identify and manage connected resources

### Background: Terminology and relevant National Water Initiative clauses

Under the NWI, jurisdictions have accepted that 'there are significant knowledge and capacity building needs for [the Agreement's] ongoing implementation, including ... interaction between surface and groundwater components of the water cycle' (NWI clause 98).

A major impediment to the integrated management of surface water and groundwater at present is the relatively limited understanding of physical and temporal characteristics of specific groundwater resources and their connections to surface water.

#### 2.3.3.1 Quality of data

It has been acknowledged that the quality of data on Australia's groundwater resources is poor in relation to data on surface water (which itself needs improvement), and action to improve this knowledge needs to be given priority and adequately resourced (National Groundwater Committee 2004, NWC 2006). This is a key first step to the development of genuinely effective integrated management.

The Commission is concerned that the data deficiency problem arises in part because of variable levels of licensing, metering and monitoring of groundwater extractions, compared to surface water extractions. While the Commission acknowledges the extensive metering of groundwater use and the substantial network of observation and monitoring wells in South Australia, and efforts by Western Australia to manage groundwater resources, further overall progress still needs to be made. In highly connected systems, deficiencies in licensing and metering are of particular concern, as unregulated and unmonitored groundwater extractions are essentially extracting surface water, with no accounting for connectivity.

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#### ■ Finding 2.5

The quality of data on Australia's groundwater resources is particularly poor, and more resources need to be devoted to improving it. The quality of metering and monitoring of groundwater extractions is variable. The National Groundwater Action Plan is helping to improve the quality of data on groundwater resources.

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#### ■ Recommendation 2.2

The Commission considers that ultimately all surface and groundwater extractions, including for stock and domestic purposes, should be licensed and metered or otherwise measured. However, the Commission also recognises the practical constraints to universal metering of groundwater extractions. The Commission therefore proposes that a risk-based approach be adopted, in which the following three criteria are given particular weight in determining metering priorities among different water systems as universal metering is rolled out:

- 1) the level of water use in the system with priority for systems at or approaching full allocation
- 2) in the case of systems which are not at or approaching full allocation, the cost-effectiveness of metering investments (including benefits implicit in the acquisition of better water use data)
- 3) the potential contribution of further metering to public confidence about compliance and the general quality of management of the given water system.

Refer also to the Commission's Recommendation 3.5.

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#### ■ Recommendation 2.3

The Commission recommends that, in helping redress the lack and quality of groundwater data available to support integrated management, it is important that the Bureau of Meteorology's emerging national water data and accounting systems treat surface water and groundwater data in an integrated fashion. The National Water Accounting Standards currently under development (Chapter 3) need to incorporate accounting for connected surface and groundwater systems from the outset.

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### 2.3.3.2 Technical capacity

A lack of technical capacity and dedicated resourcing continues to delay progress towards integrated management of connected water resources. There is currently a critical need for increased national expertise in groundwater assessment and management, and especially skills in assessment and management of connected systems (Evans et al 2006, NRMSC 2002, Cullen 2006).

This need is currently being addressed, to some extent, through the establishment of the new National Centre for Groundwater Research and Training (funded jointly by the Commission and the Australian Research Council) aimed at increasing and appropriately skilling groundwater scientists and managers. This initiative will help build the national skill base over the medium term.

Other programs are also helping to enhance technical capacity for groundwater management. For example, Queensland has been funded by the Bureau of Meteorology under the Modernisation and Extension of Hydrologic Monitoring Systems Program to develop modern and standard procedures for technical staff in groundwater assessment. These and other programs will continue to support further integrated management of connected surface and groundwater resources.

The National Groundwater Action Plan (see Box 9) includes the National Groundwater Assessment Initiative, components of which are helping to improve understanding and management of groundwater resources.

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#### ■ Finding 2.6

There is currently a critical need for increased national expertise in groundwater assessment and management, and especially skills in assessment and management of connected systems. Progress is being made in this area through initiatives such as the National Centre for Groundwater Research and Training and the National Groundwater Action Plan.

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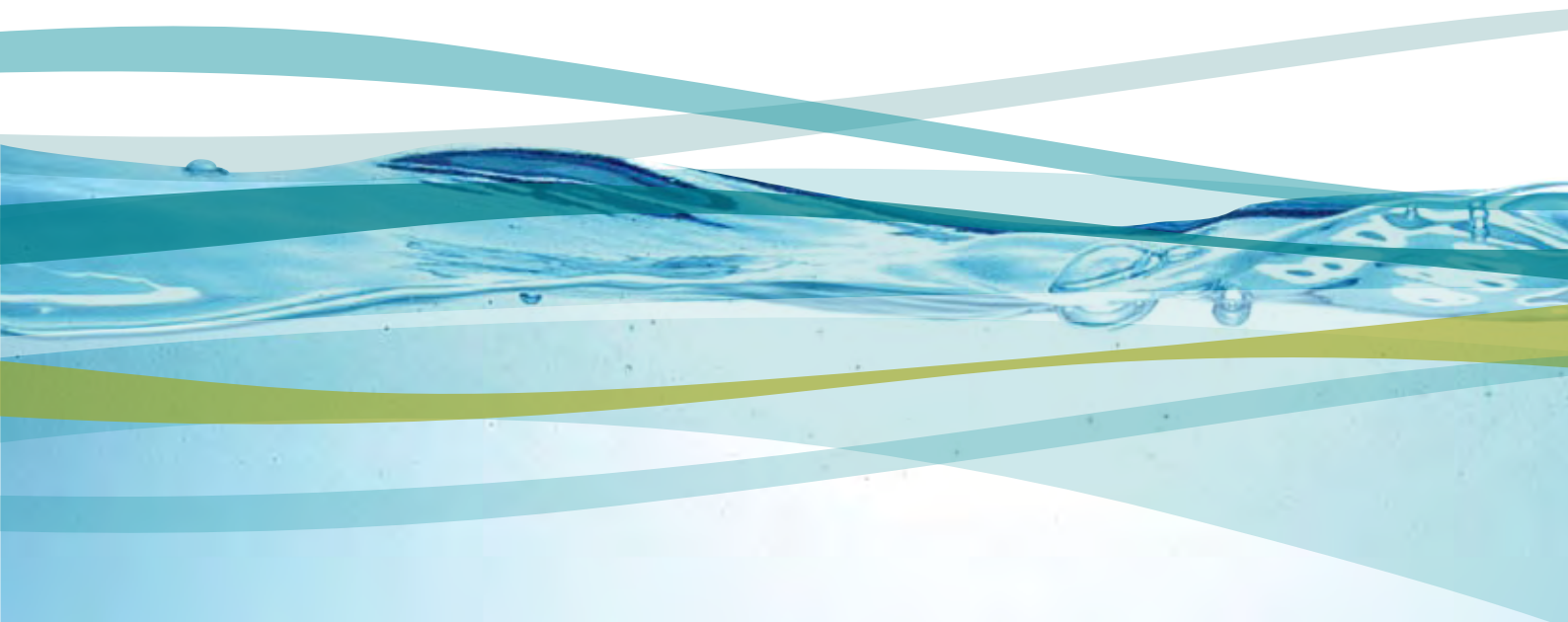
#### Box 9: National Groundwater Action Plan

The comprehensive \$82 million *National Groundwater Action Plan* was initiated by the National Water Commission in 2007. The plan aims to improve knowledge and understanding of groundwater. It includes the following components:

- i) The National Groundwater Assessment Initiative. This \$50 million initiative is the centrepiece of the action plan. It funds hydrogeological investigations to help overcome critical groundwater knowledge gaps.
- ii) National Centre for Groundwater Research and Training. This \$30 million joint venture between the National Water Commission and the Australian Research Council will build capacity in groundwater knowledge and tackle the shortage of skilled groundwater scientists and managers in Australia. The centre will train postgraduate and postdoctoral scientists in advanced hydrogeological and related technologies.
- iii) Knowledge and Capacity Building. This \$2 million component is delivering principles, guidelines and good practice examples that can be used by groundwater managers, users and water planners to improve understanding and sustainable management of groundwater resources.

To support the plan, the National Water Commission has established the Groundwater Technical Advisory Committee to advise on groundwater direction setting and investment strategies. The panel is predominantly skills-based and includes high-level Australian groundwater experts, representation from groundwater managers, the Chair of the National Groundwater Working Group and the Chair of Australian Chapter of the International Association of Hydrogeologists.





# 3

## Water accounting and water data

## 3.1 Overview

Water accounting provides information on the amount of water being delivered, traded, extracted for consumptive use, and managed for environmental and other public benefit outcomes. This helps water policymakers, planners and managers make sensible decisions about how to use water, and supports public and investor confidence. Just as financial accounting is essential for managing businesses, standard water accounting practice is needed to manage our water resources.

This chapter describes progress in the development and implementation of water accounting across Australia. It broadly assesses progress against the seventh NWI objective, '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' (NWI clause 23(vii)), while also recognising recent developments since the NWI, in particular under the Commonwealth *Water Act 2007*.

It is envisaged that, when implemented, an effective water accounting system will:

1. measure, and report on, **how much water is extracted, used, traded, and recovered and managed for the environment**, across all Australian jurisdictions
2. inform **effective planning and management** of water, and **support public and investor confidence** in the allocation of water and the amount of water being delivered, traded, extracted, and managed for the environment
3. be **well understood, readily available and widely accepted**.

In the Commission's view, some progress is being made in each of the areas outlined above, but scope remains to improve comprehensive water accounting and accelerate its implementation.

<b>Finding 3.1</b>	Progress continues to be made in developing a national framework and standards for water accounting, which are on track to be delivered in 2010.
<b>Recommendation 3.1</b>	To facilitate timely rollout of the standards, jurisdictions should now give attention to how they will proceed with implementation of the standards, drawing lessons from the water accounting pilot projects.
<b>Finding 3.2</b>	The quality of data and arrangements for data sharing and exchange remain impediments to effective and coordinated water accounting, particularly with respect to the compilation of state and regional data into a national account. Data exchange between agencies and jurisdictions remains difficult, due to the absence of technical standards and administrative protocols for the access, transfer and aggregation of data.
<b>Finding 3.3</b>	With the legislative empowerment and funding of the BoM under the <i>Water Act 2007</i> , the first vital steps are being taken towards a nationally recognised institutional 'home' for Australia's water data and accounting effort. However, the Commission notes that the BoM's role under the <i>Water Act</i> is focused on the issuing of standards, the compiling of water accounts, and the publishing of the <i>National Water Account</i> . There is no defined role for the BoM in advancing the implementation of all aspects of water accounting across all jurisdictions, which remain responsible for many water accounting activities. It is therefore essential that the BoM and the jurisdictions continue to work closely together.
<b>Recommendation 3.2</b>	The Commission strongly supports work by the BoM to develop more effective and coordinated frameworks for water data and accounting. It will be important that the BoM takes an expansive view of its role and also seeks to establish itself as a proactive national centre of cutting-edge expertise, education, innovation, outreach and value adding in water data and accounting.

<b>Finding 3.4</b>	The Commission notes that standards for environmental water accounting are being addressed through the National Water Accounting Development Project. While noting progress in New South Wales, Victoria and the Murray–Darling Basin, the Commission finds that only limited progress has been made in developing the environmental water registers required by the NWI.
<b>Recommendation 3.3</b>	The Commission considers it essential that water accounting standards adequately address environmental water accounting. The Commission urges a refocusing of effort to ensure that registers report on environmental water, particularly given the importance of registers in underpinning community confidence in environmental water recovery investments. Such registers need national consistency and public accessibility, and should be properly nested within the national water accounting system as a whole.
<b>Finding 3.5</b>	While the recent finalisation of the pattern approvals standards for non-urban application meters is an important step, considerable work remains to develop nationally standardised approaches to meter installation and testing, and to implement the standards.
<b>Finding 3.6</b>	While the development of metering implementation plans is progressing well, resource constraints will have a major impact on the jurisdictions' abilities to deliver expanded and accurate metering in accordance with the plans.
<b>Recommendation 3.4</b>	The Commission urges the early completion of all outstanding jurisdictional metering implementation plans, with a view to a step function improvement in accuracy, coverage and national consistency of metering, including a deliberate coordinated national movement away from Dethridge meters to more accurate meters with higher management and accounting functionality. To help address resourcing constraints to metering implementation, the Commission recommends the development of a new, nationally consistent metering cost sharing formula.
<b>Recommendation 3.5</b>	The Commission recommends that governments commit to a shared ultimate national goal of universal licensing and metering of all surface and groundwater extractions, including for stock and domestic purposes. Refer to Recommendation 2.2.
<b>Finding 3.7</b>	The Commission finds that compliance and enforcement activities to ensure that users do not extract more than their allocated volumes of water vary considerably across Australia, and that adoption of national principles to guide compliance and enforcement efforts may disseminate best practice and build community confidence, especially across state borders.
<b>Recommendation 3.6</b>	The Commission recommends further exploration of the extent of noncompliance, and the potential for greater coherence and coordination of water enforcement across jurisdictions by means of national principles to guide compliance and enforcement efforts and to improve cross-border consistency. The Commission notes that work will be undertaken in this area under the COAG work program.



## 3.2 Context for this assessment

The Commission's 2007 Biennial Assessment (NWC 2007) and 2008 Update (NWC 2008) assessed progress with water accounting. These previous assessments found that, overall, a good start had been made in delivering NWI water accounting objectives. Benchmarking activities as required by the NWI had been completed. Work on other aspects of water accounting, including on sharing water data, national water accounts, environmental water accounts and national water accounting standards, was underway. Work to develop and implement metering standards was also in progress.

Key priorities for future action included:

- + Rolling out national accounting and metering standards, and involving jurisdictions increasingly in that process. Jurisdictions needed to prepare implementation plans for metering standards. A stocktake of metering standards was to be completed in February 2008.
- + Issuing guidance and other more formal instruments to inform agencies' plans and investments with respect to water accounting, and providing notice of the Bureau of Meteorology's future directions in water data.
- + Improving monitoring and compliance, to underpin investments in improved water accounting, measuring and monitoring.

At its meeting in March 2008, the COAG Working Group on Climate Change and Water agreed on a forward work program focusing on four priority areas, one of which is Water Information and Capacity Building. Since then, work has concentrated on accelerating development and adoption of a framework for national water accounting, and developing the National Water Account (WGCCW 2008).

*The Water Act 2007*, as amended by the *Water Amendment Act 2008*, resulted in some changes to responsibilities for a number of aspects of water management, including water accounting. Relevant provisions of the Act include:

- + Section 32, which stipulates that the Murray–Darling Basin Authority must identify and account for held environmental water in the Murray–Darling Basin.
- + Section 71, which describes responsibilities of basin jurisdictions for reporting on quantities of water available, permitted to be taken, and taken; water allocations; water trading; and compliance.
- + Section 120, which confers water accounting and reporting functions on the Bureau of Meteorology (BoM). These include collecting, holding, managing, interpreting and disseminating water information; providing regular reports on the status of water resources and patterns of usage of those resources; compiling and maintaining water accounts; and issuing National Water Information Standards.
- + Sections 122–129, which provide further details of how the BoM shall publish water accounts and water information, and gather the information to support its reports.

One immediate practical outcome of the new legislation is that the BoM has set up a new Water Division, responsible for implementing its new powers relating to water information and accounting. The Water Accounting Development Committee Office, which supports the Water Accounting Development Committee, now the Water Accounting Standards Board, has been transferred to the BoM (see Box 10). The BoM expects to publish a methods pilot for the National Water Account by December 2009, and its first comprehensive National Water Account by December 2010.

### Box 10: The Water Accounting Development Committee / Water Accounting Standards Board

The Water Accounting Development Committee (WADC) was established in February 2007 to further develop and coordinate national water accounting and, in particular, to manage and undertake the National Water Accounting Development Project. Membership of the committee included water and accounting experts from industry, academia, environmental groups and government. The committee provided advice and recommendations on the development of water accounting in Australia to the National Water Initiative Committee and through it to the Natural Resource Management Ministerial Council. It was supported by the Water Accounting Development Committee Office (WADCO), which provided policy, technical and administrative support. The functions of WADCO, which was originally attached to the former Murray–Darling Basin Commission, were transferred to the BoM in November 2008.

With the endorsement of the COAG Water Sub-Group, the Water Accounting Standards Board (WASB) was established on 20 April 2009 by the BoM as a successor to the WADC.

Membership of WADC has been reduced to a core group which constitutes the initial membership of the WASB, at least until the completion of the first National Water Account at the end of 2010. The WASB continues to be supported by a small dedicated office staffed by and located within the BoM.

## 3.3 The Commission's assessment and findings

### 3.3.1 National water accounting standards

#### **Background: Terminology and relevant National Water Initiative clauses**

The NWI states that 'recognising that robust water accounting will protect the integrity of the access entitlement system, the Parties agree to develop and implement by 2006: (i) accounting system standards, particularly where jurisdictions share the resources of river systems and where water markets are operating; (ii) standardised reporting formats to enable ready comparison of water use, compliance against entitlements and trading information ...' (NWI clause 82).

The Water Accounting Development Committee Office, now part of the BoM, has overseen continued progress in developing a national framework and standards for the preparation and presentation of water accounting reports. While the original NWI commitment for water accounting standards (implementation by 2006) has long passed, progress is on track to meet the 2010 timeframes noted in the 2007 Biennial Assessment.

A Water Accounting Conceptual Framework (WACF) has been prepared to underpin the development of Australian Water Accounting Standards which guide the preparation of general purpose water accounting reports, and was released in June 2009 (WASB 2009). The WACF establishes the nature and scope of water accounting, along with consistent terminology and a set of common premises for the recognition and quantification of the elements of water accounting reports. The WACF will be used primarily by those developing standards, but will also assist people preparing reports in resolving issues on which a standard is silent.

The WACF underpins the Preliminary Australian Water Accounting Standard, which is the preliminary version of an Australian Water Accounting Standard. It is being used to guide the production of the methods pilot for the National Water Account due to be completed by the end of 2009, and other pilot water accounting projects. Drawing on the outcomes of those projects and on feedback received, it is expected that an exposure draft of Australian Water Accounting Standard will be released for public comment in early 2010.

Six pilot projects have been established to produce demonstration water accounts and inform further development of the Australian Water Accounting Standard. The pilot projects are in Queensland (Pioneer Valley), New South Wales (regulated Murrumbidgee water source), Victoria (Goulburn–Broken), South Australia (Lower River Murray), Western Australia (Carabooda and Lower Gascoyne River) and the Murray–Darling Basin (River Murray Shared Water Resources). Box 11 has further details.

### Box 11: Water accounting pilot projects

In New South Wales, a pilot water account has been developed for the regulated Murrumbidgee water source using the Quickbooks accounting package, tailored for application to water accounting. Alternative reporting formats, building on the Murrumbidgee pilot account application, are currently being developed. It is intended that the pilot project will also incorporate Australian Capital Territory data. A draft report has been completed.

The Queensland pilot project (Pioneer Valley) is well underway. A Phase 1 report has been completed detailing a chart of accounts, water transactions, sources of data, general purpose water accounting reports, and implementation issues. Following the Phase 1 report, the *Water Account (2007–08)* for the Pioneer Valley was published in the Minister's annual report on water resource plans in Queensland.

South Australia has completed a draft pilot water account study for the River Murray Prescribed Watercourse, which has included development of draft general purpose water accounting report templates. This report is now undergoing revision and will guide development of water reporting requirements for other reporting regions in South Australia.

The Victorian pilot project (Goulburn–Broken) is utilising the financial module in the Victorian Water Register to develop a water accounting system. Work to identify water events, develop accounting transactions and complete preliminary designs of accounting reports was completed during 2008. Work is underway to configure the system, develop the chart of accounts, set up journals and build the reports. The project is on schedule for completion by mid-2009.

The Western Australian pilot project is complete, with accounts, notes and disclosures developed to 30 June 2008. Results of project have been shared with the Water Accounting Development Committee and with other jurisdictions. Western Australia is also reviewing other jurisdictions' pilot projects to identify areas for further development of pilot accounts.

The Murray–Darling Basin Commission (now the Murray–Darling Basin Authority) developed a pilot water account for the River Murray Shared Water Resources for the year ended 30 June 2008. This was tested on a general ledger package, confirming that double entry accounting can be applied to water accounting. In addition, a set of environmental accounts for the River Murray, including South Australia, was prepared for the year ended 30 June 2008. These draft accounts were shared with other pilot water accounting project teams.

Since the establishment of the COAG Working Group on Climate Change and Water in early 2008, work has been underway to accelerate development and testing of national water accounting standards. The Commission supports this foundation work on standards but encourages all parties not to lose sight of other issues central to the success of water accounting, particularly capacity building and communication.

Once the standards are finalised, jurisdictions will need to give priority attention to their implementation. It is intended that the lessons learned through the pilot projects and participation in the Methods Pilot for the National Water Account will facilitate timely implementation. Jurisdictions have already started to consider how the standards might be implemented. For example, Queensland is looking to develop an implementation plan for water accounting as part of its application for BoM funding under the Modernisation and Extension of Hydrologic Monitoring Systems Program. New South Wales is working closely with the BoM to test standards using the Murrumbidgee pilot accounts, including their adequacy and translation into components of the National Water Account.

### Box 12: NRMCC indicator 7.1

NRMCC indicator 7.1 seeks to measure the 'percentage of total water and proportion of water systems accounted for, audited and reconciled in accordance with the agreed accounting system standards ...'

At this stage, given that no standards have been finalised, it is not possible to report against this indicator. As standards are supposed to be completed by March 2010, it should be possible for the 2011 Biennial Assessment to report against the indicator.

### ■ Finding 3.1

Progress continues to be made in developing a national framework and standards for water accounting, which are on track to be delivered in 2010.

### ■ Recommendation 3.1

To facilitate timely rollout of the standards, jurisdictions should now give attention to how they will proceed with implementation of the standards, drawing lessons from the water accounting pilot projects.

### 3.3.2 Water data sharing

While national water accounting standards are progressing, better standards need to be developed for the collection, maintenance and analysis of data. Currently, the quality of data and data sharing remains an impediment to effective and coordinated water accounting. Data exchange between agencies and jurisdictions has been difficult, due to the absence of standards and protocols for the access, transfer and aggregation of data (SKM 2008b). Given this situation, the Commission has advocated, and continues to advocate, continued improvement to arrangements for sharing of water data.

In accordance with Part 7 of the *Water Act 2007*, the BoM has assumed a range of new responsibilities with respect to water information. The BoM is working closely with water data owners to coordinate and implement its new responsibilities, which include issuing national water information standards, collecting and publishing water information, and advising on matters relating to water information. Under the Water Regulations 2008, prescribed organisations are required to provide specified water information to the BoM.

To provide water information to users, the BoM is developing the new Australian Water Resources Information System (AWRIS). AWRIS will deliver water-related data, dashboards, information, tools and reports to users engaged in policy development, planning, operations, public enquiry, education and research. It is anticipated that phase 1 of AWRIS will be completed by the end of 2009; the overall project will be developed over a 10-year period. The BoM is also helping to build the quality of data and arrangements for data sharing through investments in the Modernisation and Extension of Hydrologic Monitoring Systems Program.

The Commission supports the new role and powers of the BoM. The Commission considers that it is important that the BoM becomes more than a data service delivery agency and encourages it to provide assertive leadership to resolve as soon as possible the many longstanding challenges to water data collection, sharing, maintenance and dissemination. In a similar vein, the BoM may also be able to provide intellectual leadership to ensure that water regulators, managers and users across Australia make the most of the improved water data and water accounting resources which the BoM will be bringing on line in the future. In its outreach activities, the BoM should draw attention to opportunities as they emerge.

Arrangements for sharing of water data need to consider the many scales at which data is collected, including for jurisdictions (for example, in Victoria, state water accounts are published annually), regions (in south-east Queensland, a regional WaterHub has been developed as the central repository, analysis and reporting tool for water production and supply data for planning, monitoring and accounting) and urban areas. In their public submissions, Sydney Water and Rio Tinto remark that a single reporting framework is desirable, but that efforts need to be made to ensure that reporting frameworks do not impose unnecessary costs, duplicate existing processes or increase the regulatory burden.

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#### ■ Finding 3.2

The quality of data and arrangements for data sharing and exchange remain impediments to effective and coordinated water accounting, particularly with respect to the compilation of state and regional data into a national account. Data exchange between agencies and jurisdictions remains difficult, due to the absence of technical standards and administrative protocols for the access, transfer and aggregation of data.

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#### ■ Finding 3.3

With the legislative empowerment and funding of the BoM under the *Water Act 2007*, the first vital steps are being taken towards a nationally recognised institutional 'home' for Australia's water data and accounting effort. However, the Commission notes that the BoM's role under the Water Act is focused on the issuing of standards, the compiling of water accounts, and the publishing of the *National Water Account*. There is no defined role for the BoM in advancing the implementation of all aspects of water accounting across all jurisdictions, which remain responsible for many water accounting activities. It is therefore essential that the BoM and the jurisdictions continue to work closely together.

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#### ■ Recommendation 3.2

The Commission strongly supports work by the BoM to develop more effective and coordinated frameworks for water data and accounting. It will be important that the BoM takes an expansive view of its role and also seeks to establish itself as a proactive national centre of cutting-edge expertise, education, innovation, outreach and value adding in water data and accounting.

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### 3.3.3 Environmental water accounting

#### Background: Terminology and relevant National Water Initiative clauses

The NWI states that 'parties agree to develop by mid 2005 and apply by mid 2006: i) a compatible register of new and existing environmental water (consistent with paragraph 35) showing all relevant details of source, location, volume, security, use, environmental outcomes sought and type; and ii) annual reporting arrangements to include reporting on the environmental water rules, whether or not they were activated in a particular year, the extent to which rules were implemented and the overall effectiveness of the use of resources in the context of the environmental and other public benefit outcomes sought and achieved' (NWI clauses 84–85).

Community expectations for water provisions to achieve environmental and other public outcomes are high. Investment in water recovery for the environment is at unprecedented levels. Clear and accurate disclosure and accounting of water recovered and managed for the environment underpins public confidence in environmental water management regimes. However, the Commission considers that progress with environmental water accounting, including registers which report on environmental water, remains slow. The Commission is concerned that this slow progress risks jeopardising public support for vitally important environmental buyback programs.

New South Wales is currently developing the Adaptive Environmental Water Register (funded by the National Water Commission's Raising National Water Standards Program). The project will make publicly available the details of adaptive environmental licences<sup>10</sup>, including volumes, locations, intended environmental use and any allocation trading. It is expected that management plan and/or licence conditions designed to protect environmental flows will also be disclosed through the register. The project is due to be completed in mid-2009. New South Wales is also actively attempting to develop environmental accounting components in its Murrumbidgee pilot project (see Box 11).

In Victoria, environmental water that is held as a water share, bulk entitlement or environmental entitlement in declared systems must be accounted for through the Victorian Water Register. The register records details of source, location, security, reliability and use of the entitlements. Environmental water that is provided as rules-based water is reported in the annual Victorian Water Accounts. Catchment management authorities report annually on the outcomes achieved from the use of environmental entitlements.

The Murray–Darling Basin Authority has produced an environmental water account for the Murray system which has been provided to the National Water Accounting Development project. The MDBA is also continuing to progress design of a basin-wide set of environmental water accounts which will be released at the same time as the *National Water Account*.

Development of the national water accounting standards will enable improved disclosures in environmental water accounting.

The Preliminary Australian Water Accounting Standard recognises environmental water provision, and requires that disclosure notes on environmental objectives and rules and environmental water be made available against these objectives and rules. This will build on the information provided through water title registers, which will describe the extent of legal entitlements to water. Note that alternative arrangements will need to be made to report on non-entitlements-based environmental water—water that is typically provided implicitly though limits on consumptive diversion and use, rather than as an entitled volume.

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#### ■ Finding 3.4

The Commission notes that standards for environmental water accounting are being addressed through the National Water Accounting Development Project. While noting progress in New South Wales, Victoria and the Murray–Darling Basin, the Commission finds that only limited progress has been made in developing the environmental water registers required by the NWI.

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#### ■ Recommendation 3.3

The Commission considers it essential that water accounting standards adequately address environmental water accounting. The Commission urges a refocusing of effort to ensure that registers report on environmental water, particularly given the importance of registers in underpinning community confidence in environmental water recovery investments. Such registers need national consistency and public accessibility, and should be properly nested within the national water accounting system as a whole.

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<sup>10</sup> Adaptive environmental water licences provide water to the environment in addition to that provided under water sharing plans, but with greater flexibility. Adaptive environmental water will be predominantly used for the environment. However, it is possible that the allocation water may be traded to other water users in circumstances when it is judged that the water is not needed by the environment. Similarly, environmental water managers may purchase water for the environment when opportunities emerge.

### 3.3.4 Metering standards

#### Background: Terminology and relevant National Water Initiative clauses

The NWI requires that 'metering should be undertaken on a consistent basis ... i) for categories of water entitlements identified in a water planning process as requiring metering; ii) where water access entitlements are traded; iii) in an area where there are disputes over the sharing of available water; iv) where new entitlements are issued; or v) where there is community demand ...' (NWI clause 87).

The NWI also states that 'recognising that information available from metering needs to be practical, credible and reliable, the Parties agree to develop by 2006 and apply by 2007: i) a national meter specification; ii) national meter standards specifying the installation of meters in conjunction with the meter specification; and iii) national standards for ancillary data collection systems associated with meters' (NWI clause 88).

Water accounting will only be as good as the data it uses. Inadequate coverage and poor quality of measurement undermine confidence in water management and markets, and hinder the improvement of water planning into the future.

Establishing and applying national standards for measurement and metering—including knowing the degree of accuracy of each measurement system—will be a crucial step in developing nationally compatible water accounting systems.

#### Box 13: The Metering Expert Group and the National Measurement Institute

The Metering Expert Group was established in 2006. The group comprises representatives from state and territory water resource management agencies and water service providers, the Australian Government, the National Measurement Institute, Irrigation Australia, Standards Australia and other industry representatives with expertise in water metering.

The Metering Expert Group is responsible for the coordination of the development of water meter specifications, and water meter installation standards, as outlined in the NWI. The group has initiated a series of projects that are essential for the successful implementation of national non-urban water meter standards.

The National Measurement Institute (NMI) is responsible for Australia's national infrastructure in physical, chemical, biological and legal measurements. Under the *National Measurement Act 1960*, the NMI is responsible for coordinating Australia's national measurement system, and for establishing, maintaining and realising Australia's units and standards of measurement. As such, it has been developing relevant pattern approval standards for meters for non-urban applications (standards for domestic urban applications are already in place).

The development of national metering standards<sup>11</sup> has progressed with the publication of the National Measurement Institute Pattern Approvals (standards NMI 10 and NMI 11) in 2008.

In developing those standards, it became apparent that technical knowledge gaps remain that will need to be addressed. Work such as the metering reports recently published by the Cooperative Research Centre for Irrigation Futures for the Metering Expert Group (Cape et al 2008), funded by the Commission, are important contributions to the development of this technical metering knowledge.

A recent stocktake of non-urban water metering systems, funded by the Commonwealth Department of the Environment, Water, Heritage and the Arts (SKM 2008a), found that:

- + more work was needed to verify and improve field data and information associated with the description of measurement characteristics for non-urban extraction points
- + the proposed national metering standards and associated compliance policies needed to be better communicated to jurisdictions
- + there was a need to improve the quality of information held about equipment and facilities used to measure water extractions
- + current metering programs suffered from inconsistencies in terminology between jurisdictions, and coordination needed to be improved.

<sup>11</sup> Specifies the metrological performance of devices used for the metering of water that is provided for non-urban applications and the uniform test procedures for the laboratory and in-service verification of those devices.

In December 2008, the Metering Expert Group released the draft National Framework for Non-Urban Water Metering (MEG 2008). The purpose of the framework is to provide a nationally consistent framework for non-urban meters which will enable jurisdictions to implement national metering standards. The policy is intended to deliver the primary objective agreed by governments: that national metering standards should provide acceptable levels of confidence that performance is within maximum permissible limits of error of  $\pm 5\%$ .

For its part, the Commission strongly supports the  $\pm 5\%$  limits. The Commission considers that this single regulatory change will do a great deal to improve the integrity of entitlements, the effectiveness of water plans, the quality of water data, and public confidence in water allocation systems.

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### ■ Finding 3.5

While the recent finalisation of the pattern approvals standards for non-urban application meters and the draft framework for non-urban water metering are important steps, considerable work remains to develop nationally standardised approaches to meter installation and testing, and to implement the standards.

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## 3.3.5 Metering implementation plans

To support the rollout of metering standards and expanded metering activity, NWI parties are developing the National Framework for Non-urban Water Metering, which will set out the foundations for water metering on a nationally consistent basis, primarily through a metering assurance framework. The draft national framework has been agreed to by the NWI parties, and progress is being made in implementing it following the finalisation of a regulatory impact statement.

The national framework is reliant upon the parties also developing individual metering implementation plans. Most of those plans are nearing completion.

### Box 14: Progress in developing metering implementation plans

New South Wales is currently revising its draft metering implementation plan, following the recent Australian Government announcement that it will be providing assistance to New South Wales for the installation of meters at selected sites. This has resulted in significant change to previous arrangements under which water users were responsible for the installation, operation and maintenance of meters. Issues that need to be addressed include whether private irrigation corporations will be required to conform to national water meter standards for their internal meters (in particular, Dethridge meters), and whether the government should become the asset holder for meters, as is the case in other jurisdictions and the major urban centres.

Queensland has prepared a draft implementation plan. The Queensland Government has advised that current resource constraints, relating to funding dependencies, are likely to constrain the plan's outcomes and proposed timeframes. The implementation plan is expected to be available in July 2009, subject to policy review outcomes.

South Australia has completed its metering implementation plan. However, there is currently no funding available to implement the plan.

Tasmania expects to complete its implementation plan by mid-2009.

Victoria expects to finalise its metering implementation plan by mid-2009. It is currently commissioning an economic assessment to support development of the plan. Victoria has the largest meter fleet of any jurisdiction, with approximately 51,000 non-urban water meters. Compliance with the national metering standards will require significant investment to meet both capital upgrade and ongoing operational costs. In the absence of new funding for upgrading Victorian meters to meet new standards, Victoria will use the economic assessment to prioritise implementation and maximise cost effectiveness.

Western Australia and the Northern Territory have finalised their implementation plans.

In some jurisdictions, as discussed in Box 14, resourcing constraints are likely to affect the way in which the plans are implemented. In its public submission, the Queensland Farmers' Federation draws attention to the costs arising from metering standards, particularly those associated with the conversion of meters.



The development of metering plans and standards will only guarantee that effective metering will be put in place when standards and minimum metering requirements are required under statute. Only South Australia has legislative provisions that require metering to be implemented. In other jurisdictions, legislation facilitates metering, but does not currently require it.

The Commission urges the early completion of all outstanding jurisdictional metering implementation plans. It notes that plans without sufficient resources will be ineffective in a vital area of reform. It urges that the current historic opportunity be taken to make a step function improvement in the accuracy, coverage and national consistency of metering, including a deliberate coordinated national movement away from Dethridge meters to more accurate meters with higher management and accounting functionality.

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#### ■ Finding 3.6

While the development of metering implementation plans is progressing well, resource constraints will have a major impact on the jurisdictions' abilities to deliver expanded and accurate metering in accordance with the plans.

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#### ■ Recommendation 3.4

The Commission urges the early completion of all outstanding jurisdictional metering implementation plans, with a view to a step function improvement in accuracy, coverage and national consistency of metering, including a deliberate coordinated national movement away from Dethridge meters to more accurate meters with higher management and accounting functionality. To help address resourcing constraints to metering implementation, the Commission recommends the development of a new, nationally consistent metering cost sharing formula.

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Notwithstanding progress towards metering implementation plans, as noted in Chapter 2 the Commission considers that Australian governments should adopt an ultimate objective of universal licensing and metering of all surface and groundwater extractions, including for stock and domestic purposes. The Commission recognises that this is a far-reaching recommendation which raises important cost and cost-effectiveness questions. (The Commission has proposed criteria for dealing with these in Chapter 2.) However, in the Commission's view, best practice water management will not be achievable without eventually making it a requirement that all water extractions be identified and permitted (licensed) and measured (metered). In the exceptional cases where metering simply cannot be justified, transparent estimations of water use subject to public scrutiny could be an alternative to metering.

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#### ■ Recommendation 3.5

The Commission recommends that governments commit to a shared ultimate national goal of universal licensing and metering of all surface and groundwater extractions, including for stock and domestic purposes. Refer to Recommendation 2.2.

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### 3.3.6 Compliance

Compliance and enforcement of water allocation and use are crucial to effective water accounting. However, evidence suggests that a small minority of users may exceed their allocations, tamper with meters or flows, or install illegal structures and diversions. Such actions undermine the water security of legitimate water entitlements and frustrate users. Given the critical state of some water systems, effective and comprehensive compliance is more essential than ever.

Currently, state and territory water agencies and rural water providers form the front line for rural water enforcement, with varying arrangements and compliance thresholds between jurisdictions. In New South Wales, Queensland and South Australia, water enforcement occurs at the state level. In Victoria, rural water providers are responsible for enforcement.

While most jurisdictions have boosted their water-enforcement efforts in recent years, metering of extractions can be subject to error or interference. There is limited monitoring or surveillance of informal extractions (via river off-takes, surface dams and channels, bores and wells) made outside the regulated rivers and metered diversion channels. As a result, community confidence about the integrity of extractions, especially from unregulated (in the engineering sense) systems, is declining. This is of concern to the Commission. Monitoring and compliance were also identified as concerns by the COAG Working Group on Climate Change and Water in March 2008 (WGCCW 2008). As a result, the development of a national risk-based compliance and enforcement framework was approved by COAG in November 2008.

There appears to be no recent or major review of state water enforcement practices and their overall effectiveness. Nationally consistent and comparable water enforcement principles and codes could help reduce perceptions of cross-border inequities and underpin confidence in water management and information. There is scope to upgrade water enforcement to respond to the new demands implied by water market supervision.

Knowledge gaps remain in the measurement of irregular extractions, especially in unregulated systems; the development of basic compliance information; sharing of best practice in water enforcement and research into the indicators or precursors of water theft (Stephen Saunders Consulting 2009).

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■ **Finding 3.7**

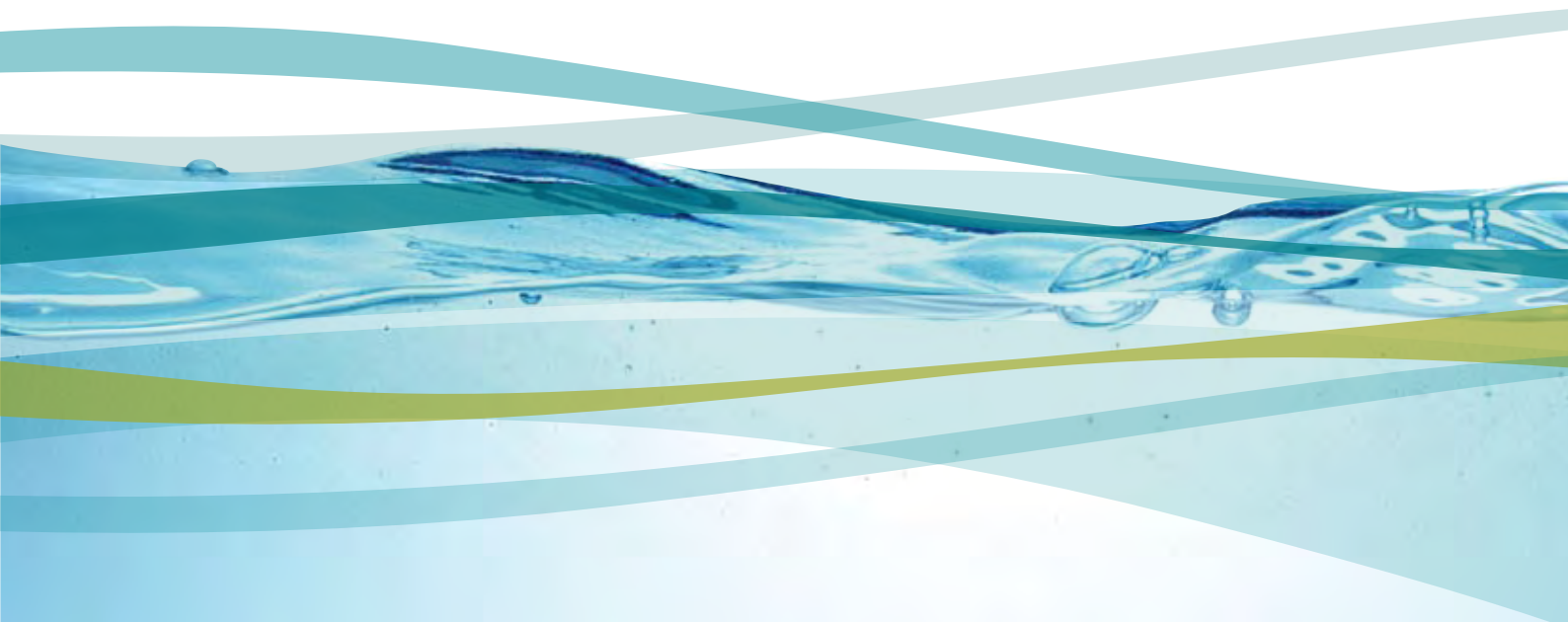
The Commission finds that compliance and enforcement activities to ensure that users do not extract more than their allocated volumes of water vary considerably across Australia, and that adoption of national principles to guide compliance and enforcement efforts may disseminate best practice and build community confidence, especially across state borders.

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■ **Recommendation 3.6**

The Commission recommends further exploration of the extent of noncompliance, and the potential for greater coherence and coordination of water enforcement across jurisdictions by means of national principles to guide compliance and enforcement efforts and to improve cross-border consistency. The Commission notes that work will be undertaken in this area under the COAG work program.

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# 4

## Environmental water

## 4.1 Overview

Water-dependent ecosystems exist within waterways, wetlands, floodplains, riparian areas, estuaries and springs and can be supplied by both surface flows and groundwater. The term 'environmental water' encompasses sources of supply and delivery of water to sustain the health of water-dependent ecosystems.

Environmental water often has multiple use values, contributing to recreational and other public benefit outcomes in addition to ecological and river health outcomes. Environmental and consumptive uses may also be complementary in some circumstances. For example, environmental flows can act as dilution flows, providing benefits to irrigators. Similarly, water stored and delivered for consumptive use may contribute to environmental outcomes.

Without adequate water at the required time, water-dependent ecosystems lose their capacity to provide for environmental and other public benefit outcomes (NWI clause 23(iii)). In some cases, the losses may be irreversible; in others, they may be difficult, costly or take a long time to reverse.

It is anticipated that when NWI clause 23(iii) has been achieved:

1. Water plans will **clearly specify high conservation values and achievable environmental outcomes** and will be the basis upon which systems can be confidently managed to protect and enhance water-dependent values.
2. Environmental water will be **clearly defined and delivered through a mix of entitlements-based and non-entitlements (rules) based mechanisms**.
3. Additional **water will be recovered from entitlement holders and through improvements in system efficiency** where necessary to meet short-term environmental needs and address overallocation and overuse in the longer term (see Chapter 5 on addressing overallocation and overuse).
4. **Environmental water managers will be established and have the necessary authority and resources** to provide sufficient water at the right time and place to achieve identified outcomes, including across state and territory boundaries where relevant.
5. There will be **monitoring, periodic review and public reporting** of the achievement of environmental and other public benefit outcomes, and the adequacy of water provision and management arrangements in achieving those outcomes.
6. Information obtained from monitoring and review will be used to reconsider objectives and mechanisms in an **adaptive management** approach.

In the Commission's view, there has been progress in each of the six areas outlined above. However, there is much more work to be done, and the pace of reform has generally been too slow to ensure the adequate protection of many water-dependent ecosystems.

In particular, the prolonged drought and potential impacts of climate change across southern Australia and the MDB have led to a quantum leap in the magnitude of the challenges facing environmental water managers. In many water systems, the environment is disproportionately affected in times of low water availability. Environmental managers are now having to prioritise environmental assets and target watering to those assets. This is occurring under extremely challenging circumstances, while significant scrutiny of the ecological effectiveness of environmental watering is underpinning the need for good science and transparency in decision-making processes.

Chapter 5, which addresses overallocation and overuse, provides more detail on the major reforms in the MDB aimed at improving environmental outcomes, including programs to purchase water entitlements from willing sellers. Chapter 1, on water planning, considers the development of the new Basin Plan, and Chapter 10 considers the adjustment issues associated with water purchase programs and water recovery through investments in irrigation system efficiency improvements.

<b>Finding 4.1</b>	The Commission finds that, while there has been an increase in the use of scientifically reviewed and holistic methods to determine environmental water requirements, some jurisdictions still do not use methods that are holistic, well documented, or independently peer reviewed. This is likely to detract from the quality of assessments and reduce public confidence in the results.
<b>Finding 4.2</b>	There has been an improvement in the availability of scientific tools and information to provide an evidence basis for establishing environmental water requirements in water plans. It will be important that such tools are now adopted and applied routinely in water planning.
<b>Finding 4.3</b>	Despite statutory recognition of environmental water in all jurisdictions, the Commission remains concerned about the security of environmental water access entitlements and rules-based environmental water, particularly in conditions of intense or prolonged drought. There have been cases in which ad hoc decisions have reduced the security of environmental flows.
<b>Recommendation 4.1</b>	The Commission recommends that all jurisdictions put in place systematic and transparent processes to determine environmental water outcomes and requirements. All water plans should clearly specify environmental outcomes, and fully define environmental watering protocols and operational activities to meet these outcomes under the full range of inflow scenarios, including those that may arise as a result of climate change. In the MDB, the Commission notes that the <i>Water Act 2007</i> requires that the MDBA, from the outset, incorporate into its environmental watering plan systematic and transparent processes to identify environmental outcomes and prioritise water to meet those outcomes under the full range of inflow scenarios.
<b>Recommendation 4.2</b>	The Commission recommends that all decisions to reduce the security of environmental water in exceptional circumstances such as intense or prolonged drought should be made transparent, including the decision-making process and the decision-making evidence and reasoning.
<b>Finding 4.4</b>	The Commission strongly supports continued buybacks, including major purchases, as a strategic approach to improving environmental outcomes and adjusting to the new sustainable diversion limits that will be developed under the new Murray–Darling Basin Plan. The Commission does not support the use, by states, of barriers to water trade to attempt to constrain environmental purchases and desirable adjustment.
<b>Recommendation 4.3</b>	The Commission considers that the relationship between buybacks, providing for environmental assets, and the transition to new sustainable diversion limits in the MDB is not well understood. Ongoing communication could continue to improve the transparency of these reforms, so building community understanding and support and enabling more informed decision making by entitlement holders. For example, the Commission recommends that the Murray–Darling Basin Authority progressively issue guidance on the way that specific environmental assets identified by the Authority or committed to by governments are likely to be managed and the objectives that are being sought, locally and across the MDB.
<b>Finding 4.5</b>	The role of environmental water managers is generally not adequately defined and resourced. They lack recognition, influence and authority, and their role and legitimacy in the implementation and operation of water plans are often unclear. Often, they carry out other responsibilities alongside their role as environmental water manager. This can blur their accountability.
<b>Recommendation 4.4</b>	The Commission recommends that governments publicly identify environmental water holders and environmental water managers within their jurisdictions and clearly specify their authority, responsibilities and accountabilities. Where accountabilities are blurred, they should be clarified.
<b>Finding 4.6</b>	There is potential for confusion and inefficiencies to arise due to a lack of communication and alignment between Commonwealth, state, and local programs aimed at environmental improvement, with respect to both environmental water and catchment health initiatives.

<b>Recommendation 4.5</b>	The Commission recommends that greater consideration be given to improving alignment and integration of programs for recovery and management of environmental water. This alignment and integration should be pursued across jurisdictions, geographical scales, and across land and water management, to identify and capture synergies and optimise outcomes.
<b>Finding 4.7</b>	Environmental water managers require specific environmental objectives within water plans to guide water delivery and support monitoring, evaluation and adaptive management.
<b>Finding 4.8</b>	There is no transparent, accessible and accountable mechanism for registration of entitlements-based and non-entitlements-based water being delivered for environmental outcomes. It is therefore not possible to assess the level of compliance with environmental entitlements and rules and the risks associated with non-compliance.
<b>Recommendation 4.6</b>	Consistent with the NWI, the Commission recommends the development of nationally consistent registration of environmental water across Australia, showing all relevant details of entitlements-based and non-entitlements-based environmental water and outcomes, as well as annual public reporting of the existence, delivery and outcomes of environmental water.
<b>Finding 4.9</b>	The majority of water plans lack detailed monitoring, evaluation and reporting protocols linked to the delivery of environmental water and the intended outcomes.
<b>Recommendation 4.7</b>	The Commission recommends that entitlements and rules-based mechanisms designed to achieve environmental water objectives in water plans be accompanied by detailed monitoring and evaluation protocols addressing both outputs (flows/volumes delivered) and environmental outcomes. The protocols should be based on science, resourced adequately, implemented fully, and reviewed independently. There should be close linkages between monitoring and adaptive management to ensure that environmental outcomes are achieved with a high level of confidence, and to ensure the cost-effectiveness of water made available to the environment.
<b>Finding 4.10</b>	Due to the complexity of ecosystems dependent on surface and groundwater resources, improved scientific research and practical application of best available knowledge are required to better understand and explain the links between environmental water delivery and ecosystem health.
<b>Recommendation 4.8</b>	The Commission recommends that jurisdictions collaborate in the development of a national water science strategy to provide a framework for better identifying, specifying and prioritising environmental assets, and for understanding the links between environmental water delivery and ecosystem health. As a minimum, the strategy should embrace national water research objectives and priorities; resource allocation guidance and funding responsibilities; agreed key result areas; clarification of the respective roles and responsibilities of science players; collaborative opportunities; and dissemination, adoption and innovation pathways. Such a strategy, with a specific focus on the science underpinning environmental water management, would complement ongoing work by COAG to develop a more general strategy to build knowledge and research capacity to support water reform.

## 4.2 Context for this assessment

The Commission's 2007 Biennial Assessment (NWC 2007a) and subsequent 2008 Update (NWC 2008) assessed progress in implementing the elements specified in NWI clause 24. Those previous assessments found the following:

- + While all states had moved to make statutory provision for water to meet environmental and public benefit outcomes, there was still room for improvement in identifying, quantifying and incorporating environmental outcomes into water plans. Western Australia and Tasmania were in the process of reviewing relevant legislation.
- + All jurisdictions had management and institutional arrangements in place to achieve environmental management outcomes; in some cases these strengthened existing institutions, and in other cases, new authorities had been formed. A number of arrangements were in place to recover water; however, entities charged with achieving environmental outcomes lacked clear accountability, authority and resources. Furthermore, despite institutional arrangements being in place, outcomes had not yet been achieved, and this was causing community concern.
- + Desired environmental outcomes were inadequately specified, and there was a need for greater use of science to define environmental outcomes. Furthermore, the trade-offs between environmental and consumptive uses were not transparent.
- + The Commonwealth *Water Act 2007* had established a Commonwealth Environmental Water Holder to manage the water entitlements the Commonwealth is currently acquiring under two programs: the \$3.1 billion Restoring the Balance in the Murray–Darling Basin program and the \$5.8 billion Sustainable Rural Water Use and Infrastructure program.
- + Limited progress had been made with environmental water accounting; this needed to be addressed through development of the National Water Accounting Standards.

The Commonwealth Environmental Water Holder has been established and manages water entitlements to protect and restore the environmental assets within the Murray–Darling Basin. The Commonwealth Environmental Water Holder can also hold water entitlements outside the basin. Under the *Water Act 2007*, the Murray–Darling Basin Authority will develop a Basin Plan which provides sufficient environmental water to protect key environmental assets.

Since early 2008, the COAG Working Group on Climate Change and Water has focused on four priority areas, including achieving environmental outcomes (WGCCW 2008). The Agreement on Murray–Darling Basin Reforms, agreed by COAG in July 2008, includes commitments to ensure complementary management of environmental water across jurisdictions.

Since 2007, a range of initiatives have contributed to work in the area of environmental water. For example, through the Raising National Water Standards Program, the National Water Commission has invested in a number of projects aimed at achieving more effective understanding, planning and management of environmental water. These include:

- + *Water allocation planning in Australia—Current practices and lessons learned* (Hamstead et al 2008), a report that reviewed a sample of water plans from all jurisdictions and identified lessons learned during the planning process (see Chapter 1).
- + *Improving environmental sustainability in water planning* (Hamstead 2009), a report that clarifies issues involved in the interpretation and implementation of the NWI key concepts, makes recommendations for a national approach to environmental sustainability of water planning, and identifies critical scientific knowledge gaps.
- + a series of reports, contracted by the Commission, by CSIRO through the Water for a Healthy Country Flagship, that assess current and future water availability in the MDB (see CSIRO 2008; this work forms part of the Sustainable Yields Project and is the largest, basin-scale hydrologic assessment anywhere in the world; the basin was divided into 18 regions and detailed assessments were made in each region).

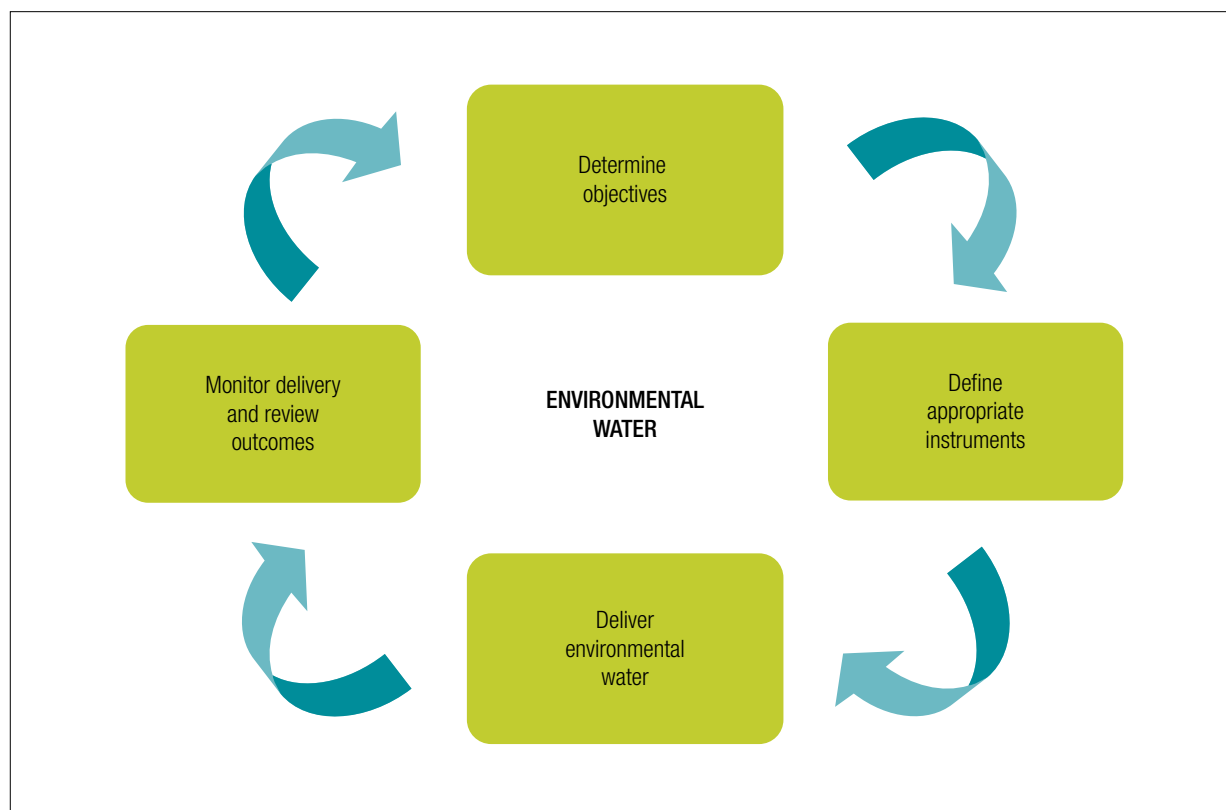
Jurisdictions are also working together to develop a national framework for the identification and classification of high conservation value aquatic ecosystems (HCVAE), including rivers, wetlands, groundwater and coastal estuarine ecosystems. The framework aims to assist jurisdictions in meeting their NWI commitment (NWI clause 23(x)) to identify and manage HCVAE within their water planning frameworks.



## 4.3 The Commission's assessment and findings

The Commission's assessment in this chapter is based on an adaptive management approach to environmental water, as shown in Figure 3.

**Figure 3: The adaptive management of environmental water requirements and delivery**



### 4.3.1 Determining environmental objectives

#### **Background: Terminology and relevant NWI clauses**

Environmental water requirements should be directly linked to the protection of water-dependent assets and ecosystems.

The requirements should be defined using documented scientific protocols. NWI clause 36 states 'that settling the trade-offs between competing outcomes for water systems will involve judgements informed by best available science'.

NWI-consistent water planning requires clear and measurable environmental objectives to be defined. The objectives must be underpinned by best available scientific information about key environmental assets and ecosystem functions, and their associated water requirements.

Table 8 provides a description of the current methods used across each jurisdiction. It shows that the methods used to determine these objectives and associated environmental water requirements vary from jurisdiction to jurisdiction. It also assesses whether the methods are holistic and peer reviewed. A holistic approach takes account of different components of the flow regime, including magnitude, frequency, timing, duration, rate of change and predictability of flow events, and the sequencing of such conditions (Arthington et al 2006). Peer review is important in helping to ensure that the methods incorporate best scientific practice. Requiring a holistic and peer-reviewed approach is expected to improve both the quality of analysis and public confidence in the results.

**Table 8: Current jurisdictional methods for defining environmental water requirements**

Jurisdiction	Comment	Holistic	Peer reviewed
<b>ACT</b>	A holistic modelling method is used to establish the ACT's statutory Environmental Flow Guidelines. The approach aims to consider the complete river ecosystem, including catchment, channels, storages, riparian zone, groundwater and wetlands, to maintain natural seasonality and variability of flows. The method identifies the essential features of the flow regime, including the natural variability, seasonal variation, floods and intermittent dry periods. The influence of the flow components on the ecosystem components is identified (Ogden et al 2004).	Yes	No
<b>NSW</b>	<p>Methods to establish environmental water requirements for the first round of NSW water sharing plans were documented in the draft water sharing plan that was publicly exhibited. However, they were not included in the gazetted statutory plan.</p> <p>Subsequent to the first round of water sharing plans, a new macro-planning method was introduced, which relies on a desktop review of the environmental assets in the planning area and the risk that they face. This assessment is then subjected to local and Indigenous review and amendment in order to determine the environmental water requirements (Bowmer et al 2007).</p>	Yes	Yes
<b>NT</b>	The Northern Territory applies a rules-based approach to the provision of environmental water. Allocations are determined based on the principle that at least 80% of flows in any part of a river will be allocated to the environment. This method is not context sensitive and does not represent best practice, but takes a conservative approach in the absence of alternatives.	Yes	No
<b>Qld</b>	The benchmarking methodology used in Queensland is designed to link information on alterations of natural flow regimes with the geomorphological and ecological consequences of flow regime change by evaluating the condition of a range of river reaches subject to various degrees of flow regulation and water resource development (Arthington and Pusey 2003).	Yes	Yes
<b>SA</b>	Individual water allocation plans, prepared by the relevant natural resources management board, set out the methods for assessing the environmental water needs of the resource being managed.	No	No
<b>Tas.</b>	Environmental water requirements are defined using the recently developed Tasmanian Environmental Flows Framework. The framework is a holistic method that aims to link the biological components and physical heterogeneity present within a river to specific flow events, and to link the flow events to specific environmental flow objectives (Graham 2009).	Yes	Yes

<b>Vic.</b>	Environmental flow requirements are determined using the Victorian FLOWS methodology (DNRE 2002). The FLOWS methodology establishes a series of environmental objectives for each river reach as the basis for developing the final environmental flow recommendations. The water requirements of the environmental asset are linked to particular flow components, which include low and high flows for summer and winter, freshes and cease-to-flow. A technical panel determines the objectives and flow components required in each reach of the river. The panel also determines the volume, timing, duration and frequency that are associated with each flow component (SKM 2009).	Yes	Yes
<b>WA</b>	Environmental water requirements are determined based on the Environmental Water Provisions Policy for Western Australia 2000. The level of environmental water assessment varies from case to case. The policy outlines the steps for establishment of environmental water requirements, which include identifying the ecological values supported by the system and the components of the system that support those values, and then determines water requirements for sensitive parts of the ecosystem that preserve ecological values.	No	Yes

As shown in Table 8, Victoria's FLOWS methodology, New South Wales's macro-planning method and Queensland's benchmarking methodology are examples of holistic methods that have been peer reviewed scientifically. The New South Wales macro-planning method has been independently reviewed, while Victoria's FLOWS methodology is well documented (see DNRE 2002) and was found to be scientifically rigorous in a recent review commissioned by Melbourne Water Corporation (Turner et al 2008). The Tasmanian method has been introduced since the 2007 Biennial Assessment. The New South Wales macro-planning method was introduced in 2004 after the majority of water sharing plans were developed.

The Commission considers that significant improvements have been made in these methods and expects that plans developed in the future will be more likely to identify clear and appropriate environmental objectives. It is likely that the absence of these more robust methods has contributed to inadequate specification of environmental objectives and flow requirements in the past, and that this has exacerbated the debate about overallocation and overuse across the country. For example, Hamstead et al (2008, page xii) stated that:

*Connell (2007) argues that the reality of water planning in Australia has been that the debate has really been about how much water can be spared from current use rather than how much is needed for sustainability. Certainly this is what we observed in several of the case studies ...*

*Development of guidelines for the practical and transparent application of the principles of ecologically sustainable development, particularly the precautionary principle, in water planning are needed. The principles of ecologically sustainable development have been agreed to by all governments. Adherence to it is impaired by lack of understanding by planners and policy makers of what it means and how it applies at the practical level of water plan development. There is also a need for clearer and more easily understood ecological risk assessments, which make it apparent where there is a real risk of severe or irreversible environmental damage.*

The Commission supports this conclusion and argues that the processes for establishing environmental objectives across jurisdictions require significant strengthening. In many cases, the Australian community has a general sense of the water-dependent environmental assets that it values (for example, the Coorong and Lower Lakes), but the processes for identifying them are not sufficiently systematic. Processes for prioritising the range of environmental assets are even less systematic. Least systematic of all are the processes for defining the specific and local environmental outcomes to be managed for.

Assets that are listed under the Ramsar Convention, such as the Macquarie Marshes, carry cross-jurisdictional obligations. In this regard, the Commission is supportive of the opportunities provided by the new Basin Plan to more systematically identify environmental assets, identify the management outcomes to be sought, and set transparent objectives across jurisdictions.



Wetland near Wagga Wagga, New South Wales

Photo courtesy of Judy Hagan

In defining environmental water requirements, the Commission recognises that the quantity of environmental water is only one of the determinants of health for aquatic ecosystems. Environmental water requirements should be considered in the context of, and be complementary to, integrated catchment management objectives in NRM plans.

The Commission notes that the MDBA's Basin Plan, due to commence in 2011, will be a strategic plan for the integrated and sustainable management of water resources in the Murray–Darling Basin. The Basin Plan will include an environmental watering plan to optimise environmental outcomes for the basin. The Commission sees this as a major opportunity to lift the quality and rigour of environmental water management across the basin.

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#### ■ Finding 4.1

The Commission finds that, while there has been an increase in the use of scientifically reviewed and holistic methods to determine environmental water requirements, some jurisdictions still do not use methods that are holistic, well documented, or independently peer reviewed. This is likely to detract from the quality of assessments and reduce public confidence in the results.

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The Commission's assessment of water plans (see Chapter 1 on water planning) found that the presentation of 'best available' information in many water plans is often focused on the physical condition of the water resource, with limited description of the ecological condition. While further work is needed to improve the understanding of the relationship between environmental water delivery and the health of assets, some progress is being made in this area (see Box 15).

## **Box 15: Examples of progress in improving ecological assessment based on best available information**

### **Ecological modeller (E-mod)**

The key aim of E-mod, developed by eWater CRC, is to provide a comprehensive predictive tool for assessing potential environmental health of the Murray–Darling Basin for future management and climate scenarios. E-mod is an extension of the River Analysis Package within the eWater CRC's Catchment Modelling Toolkit.

E-mod will allow users to link flow/stage to ecological endpoints via a variety of ecological response models, and it offers the ability to analyse the ecological values provided by a range of flow scenarios. The intention is that the ecological response models can be stored in E-mod, along with metadata such as where the relationship was derived from (expert opinion, published study etc.), and that scientific understanding will improve over time.

### **Ecological Outcomes from Flow Regimes project**

Funded under the Commission's Raising National Water Standards Program, this project aims to complement expert scientific opinion by providing a solid, evidence-based underpinning to ecological responses to changes in river flows. Phase 1 of the project collated datasets that might provide statistically valid ecological-flow relationships within the Murray–Darling Basin. In the next phase of the project, the datasets will be analysed to determine the quantitative relationships between ecological system responses and flow regimes. This will be used to provide credible scientific backing to the provision of environmental flows in water plans.

### **Victorian Environmental Flows Monitoring and Assessment Program**

The Department of Sustainability and Environment initiated the Victorian Environmental Flows Monitoring and Assessment Program (VEFMAP) to evaluate the ecosystem responses to environmental flows in eight regulated rivers that are to receive enhancements to their flow regime. VEFMAP uses a conceptual model approach to detect ecosystem responses and is accompanied by targeted monitoring and assessment plans for each river.

### **Sustainable Rivers Audit (SRA)**

The Sustainable Rivers Audit (SRA) is an initiative of the former Murray–Darling Basin Commission (now the MDBA) designed to evaluate the ecological health of the rivers in the Murray–Darling Basin. The audit uses ecological health indicators related to fish populations, macroinvertebrate communities and hydrology to monitor the current status and potential trends in river health in the basin. The audit aims to provide a complete picture of broad-scale river health issues and trends in the basin.

### **Murray Flow Assessment Tool**

The Murray Flow Assessment Tool is a decision support system that relates river flow to potential habitat condition for river and floodplain environments. It uses ecological models to assess habitat condition based on modelled daily river flows. There are five ecological models: floodplain vegetation, wetland vegetation, waterbirds, native fish and algal growth.

### **Environmental Flow Assessment Program**

The Environmental Flow Assessment Program, used in Queensland, aims to confirm the critical water requirements of ecological assets, build scientific knowledge to underpin water management decisions, determine whether current flow management strategies are providing critical water requirements, determine the risk to ecological assets, and evaluate whether ecological outcomes in a water resources plan are likely to be met under current flow management strategies.

### **Macquarie Marshes ecosystem response model—Waterbird breeding**

Research by the New South Wales National Parks and Wildlife Service aims to investigate the effect of three different water flow management options on waterbird breeding colonies in the Macquarie Marshes Nature Reserve (Kingsford and Auld 2005).

## ■ Finding 4.2

There has been an improvement in the availability of scientific tools and information to provide an evidence basis for establishing environmental water requirements in water plans. It will be important that such tools are now adopted and applied routinely in water planning.

### 4.3.2 Instruments to provide secure environmental water

#### Background: Terminology and relevant NWI clauses

35. Water that is provided by the states and territories to meet agreed environmental and other public benefit outcomes as defined within relevant water plans (paragraphs 36 to 40 refer) is to:
- be given statutory recognition and have at least the same degree of security as water access entitlements for consumptive use and be fully accounted for;
  - be defined as the water management arrangements required to meet the outcomes sought, including water provided on a rules basis or held as a water access entitlement; and
  - if held as a water access entitlement, may be made available to be traded (where physically possible) on the temporary market, when not required to meet the environmental and other public benefit outcomes sought and provided such trading is not in conflict with those outcomes.

Once an environmental water outcome has been clearly defined, it must be 'secured'. Securing water for the environment involves moving from science-based recommendations to developing statutory instruments that provide for environmental and other public benefit outcomes in surface and groundwater systems. Statutory status for environmental water is a feature of the NWI that is admired internationally. The two main instruments used across the nation are:

- + environmental water access entitlements
- + rules-based environmental water.

Water recovery mechanisms (such as water purchases and investments in water savings) are tools being used by governments to secure environmental water entitlements, whereas rules-based environmental water is generally provided for under water plans.

#### 4.3.2.1 Secure legislative basis for environmental water

Consistent with previous assessment findings, all jurisdictions continue to make statutory provision for environmental water. The legislative framework in three jurisdictions (New South Wales, Victoria and Tasmania) provides explicitly for both entitlement-based<sup>12</sup> and rules-based<sup>13</sup> environmental water and in South Australia, licences can be established for environmental purposes.<sup>14</sup> Other jurisdictions provide for rules-based environmental water only. Each jurisdiction's primary water resource legislation generally requires water planning processes to address the use of water for environmental purposes.

Under the NWI, environmental water is required to have at least the same degree of security as water access entitlements for consumptive use. Table 9 provides information from the jurisdictions in relation to the security of environmental water.

<sup>12</sup> Entitlement-based environmental water is water that is held as a water access entitlement that is committed for environmental purposes.

<sup>13</sup> Rules-based environmental water is generally provided through limits and rules on extractions of surface and groundwater for consumptive use.

<sup>14</sup> There is no explicit provision for environmental water access entitlements in the *Natural Resources Management Act*; however, allocations may be used for different purposes (irrigation, industrial, town water, environmental), as indicated on the licence.

**Table 9: Security of environmental water**

Jurisdiction <sup>a</sup>	Does environmental water have at least the same security as consumptive water?
<b>ACT</b>	The ACT applies a rules-based approach to environmental water. Environmental water is protected through environmental flow regimes under legislation.
<b>NSW</b>	In operating a system, access licences for environmental purposes have the same security as access licences for consumptive purposes. Where licensed environmental water has been purchased from consumptive use, the security of supply remains the same as under the consumptive licence from which it was purchased. Where environmental water takes the form of rules-based water, the security may be higher than or at the same level as consumptive water, depending on the rules. For example, minimum flows have a higher level of security than consumptive water.
<b>NT</b>	The territory has no legislation to allow for entitlement-based environmental water, but rules-based environmental water is provided equal status through water plans. Environmental and cultural assets are provided for as a priority, and totally unregulated water systems mean that there is no requirement or ability to issue entitlements as such.
<b>Qld</b>	Queensland has no legislation to allow for entitlement-based environmental water, but rules-based environmental water has equal status and statutory recognition under the <i>Water Act 2000</i> . While the legislation does not expressly provide for entitlement-based environmental water, it does not prohibit parties holding entitlements for environmental purposes.
<b>SA</b>	The provision of water for the environment is recognised under the <i>Natural Resources Management Act 2004</i> . Environmental water licences have the same level of security as other water licences under the Act.
<b>Tas.</b>	Under Part 6 of the <i>Water Management Act</i> , it is possible to license a specific ‘allocation’ for the environment—for example, if in the form of a take for a wetland or a release from a dam for environmental purposes. To date, no specific allocations have been registered in this manner. Given that no allocations have been issued, water for the environment is managed using a rules-based approach through water management planning or specific licence conditions.
<b>Vic.</b>	Statutory environmental entitlements have the same legal security as any other bulk entitlement to water.
<b>WA</b>	No equivalent statutory security on environmental water.

- a Under the Commonwealth Restoring the Balance in the Murray–Darling Basin water purchasing program, all entitlements purchased by the Commonwealth retain the same security as the underlying entitlement, and therefore deliver exactly the same security.



More generally, Table 10 summarises recent actions that have been undertaken to achieve environmental and other public benefit outcomes defined in water planning.

**Table 10: NRMCC performance indicator 3.2: Extent to which actions have been implemented to achieve environmental and other public benefit outcomes defined in water planning frameworks (for 2004–05)**

Jurisdiction	Comment
ACT	Environmental flow guidelines aim to take into account environmental and public benefit outcomes. Under the water resources legislation, environmental and other public benefit outcomes are defined and ensured in ACT water planning.
NSW	Forty-five water sharing plans have been gazetted. They include environmental objectives and employ a range of mechanisms to provide for environmental allocations, including the provision of minimum flows.
NT	The two plans declared are both related to groundwater use and are located in the arid zone of the territory. Both plans have been assessed as having unconnected surface and groundwater systems. Environmental flows have been specifically provided for in the most recent plan, yet to be declared, in the wet–dry region. It is intended that this procedure will be followed for all other plans in the region.
Qld	Environmental flows are represented in a water resource plan through ecological outcomes achieved through rules-based management of the flow regime.  Water resource plans have been finalised for 20 out of 23 plan areas. In the two-year reporting period, three new water resource plans were finalised, as were two amendments to plans.
SA	South Australia is continuing to work towards targets T3.9 and T3.10 as specified in <i>South Australia's Strategic Plan</i> released in January 2007, through water planning processes (NRM planning and water allocation planning) and through the South Australian River Murray Environmental Manager.
Tas.	One water management plan describes minimum flows only. Four other water management plans completed in 2005–06 and an additional five plans currently in draft form that have holistic environmental flow objectives.
Vic.	The <i>Water (Resource Management) Act 2005</i> established the Environmental Water Reserve for all surface and groundwater systems. Since 2005, a number of statutory environmental entitlements have been created in regulated and unregulated systems.
WA	Current water plans give consideration to environmental and public benefit matters but are not legally binding on water users or the Minister for Water. The legislative reform process will provide for legally binding water management plans.

#### 4.3.2.2 Rules-based and entitlement-based environmental water

As noted above, jurisdictions use a mix of entitlement-based and rules-based environmental water. New South Wales and Victoria have legislation to enable water access entitlements for environmental purposes. South Australian legislation provides for licences to be established for environmental purposes. Although not specifically stipulated, Western Australian legislation implicitly allows for entitlements for environmental purposes. The Australian Capital Territory, the Northern Territory, Queensland and Tasmania have adopted rules-based approaches to providing environmental water (Lawlab 2009).

In principle, entitlement- and rules-based environmental water can be equally effective in securely delivering environmental outcomes. However, it is critical that both mechanisms are fully specified and implemented and monitored transparently. The shift to institutionalise the development of environmental water managers and environmental entitlements in some jurisdictions has been linked to efforts to improve the robustness and transparency of environmental management decisions and their effective implementation.

#### 4.3.2.3 The impact of drought on environmental water

The Commission's concerns about the inadequate security of environmental water in practice are highlighted in the response to drought conditions over the past six years in south-eastern Australia. As shown in Table 11, which draws on information provided by jurisdictions, provision of environmental water in some water plans has been delayed or cancelled.

**Table 11: Impact of drought on security of environmental water provisions**

Jurisdiction	Comment
ACT	The ACT Government has not had to revoke, suspend or change the security of statutory water entitlements since the end of 2006.
NSW	While some water sharing plans have been suspended, environmental water provisions remain. However, in the Murrumbidgee Valley, water in the environmental account was borrowed to meet critical human needs. This will be repaid, and in the meantime environmental releases are continuing to be made on a needs basis.
NT	Environmental water provisions are catered for as the second highest priority, behind public water supply.
Qld	Following the initialisation of a water resource plan, any decisions made by the Chief Executive Officer must be within the provisions of the plan. Plans provide for 'critical water supply arrangements', which can be invoked to limit take in exceptional circumstances. If changes are made, there may be compensation payable, but there have been no such decisions to date.
SA	Special water sharing arrangements have been in place since June 2007. These arrangements have reduced the entitlements of South Australia to the level required to meet critical human needs and water quality objectives.
Tas.	Lakes Sorell and Crescent provide an example of how Tasmania has dealt with drought conditions. Releases of water from these lakes were stopped to meet the environmental requirements set out in the water management plans for the lakes. Through the planning process, environmental water was sustained through a period of prolonged drought.
Vic.	In 2007–08, due to the prolonged dry conditions, the Minister for Water qualified rights in the Loddon, Goulburn, Broken, Campaspe, Murray, Werribee, Melbourne and Ballarat water supply systems; the Campaspe, Spring Hill and Deutgam water supply protection areas; and a number of smaller unregulated water supply systems, to enable the supply of water for essential human, stock and domestic and industrial needs. Similar drought conditions continued in 2008–09, when the Minister again qualified rights in a similar number of water supply systems to enable the supply of water for essential needs. A number of qualifications in these water supply systems are currently under review to avoid unnecessary continuation.
WA	Not applicable, as statutory plans are yet to be put in place (see Chapter 1).

The Commission is concerned that, with few exceptions, the delay or cancellation of environmental water provisions has not been based on an assessment of the risks to environmental assets; instead, the decisions have been driven by a perceived overriding need for consumptive water. Furthermore, the Commission is concerned that such decisions are typically not made through a transparent process in which the costs, risks and benefits can be weighed (see case study in Box 16).

#### **Box 16: Securing environmental water on the Yarra River, Victoria—A case study**

The Yarra River flows from the protected catchments to the east of Melbourne through rural and urban landscape to the Melbourne CBD. The river supports Melbourne's consumptive water supply, irrigation communities, and several iconic and listed species, such as Macquarie perch, Australian grayling, river blackfish and platypus.

In 2005, an environmental flows assessment recommended a range of flows required to meet agreed ecological objectives for the Yarra River. Subsequent modelling work showed that an additional 17 GL was required to provide those flows in an average year. The 2006 Victorian Central Region Sustainable Water Strategy allocated 17 GL for the environment in addition to existing passing flow requirements. In October 2006, the 17 GL commitment from the sustainable water strategy was secured as a bulk entitlement of very high security water. Other bulk entitlements granted to Melbourne's three retail water authorities contain minimum environmental flow provisions at a number of locations within the Yarra catchment, in line with the recommendations in the 2005 environmental flows study.

In early 2007, in response to a significant decline in water available for consumptive supply, the Minister for Water declared a water shortage for Melbourne and deferred the provision of the environmental entitlement and the improved minimum flow provisions until Melbourne returned to Stage 1 water restrictions. In November 2007, following continued low inflows, the Minister further reduced the environmental flow requirements in the Yarra River to allow the provision of up to an additional 10 GL/year of water to consumptive use. These new operating rules are to be in place until Melbourne returns to Stage 2 restriction levels.

When considering options to reduce environmental flows to assist in meeting critical human needs, Victoria undertakes environmental risk assessments and develops risk mitigation plans. In the case of the Yarra, reductions in environmental flows were accompanied by emergency management plans, which included triggers for emergency releases of water to mitigate environmental risks.

The qualification of environmental water rights in Victoria (an example of which is described in Box 16) was raised in a number of public submissions. The main issues raised were that the decision-making processes are not open to public scrutiny and that the first public notification occurs after the Minister has approved the qualification. One submission points out that the Victorian *Water Accounts 2006–07* report on the delivery of environmental water reveals many examples of qualifications of rights occurring before Stage 4 water restrictions had been introduced and breaches of bulk entitlements.

In its submission, Environment Victoria expressed concern about the vulnerability of Victoria's Environmental Water Reserve due to general water shortages and reduced inflows, which Environment Victoria notes is evidenced in the draft Northern Region Sustainable Water Strategy. It also notes a number of examples of environmental flows being deferred and redistributed for consumptive use at the discretion of Victoria's Minister for Water during recent water shortages.

While the Commission shares these concerns about evident lack of security of environmental water, the Commission notes that there have been examples in which environmental watering has occurred during drought conditions despite considerable pressure from consumptive users. For example, in 2007–08 the Victorian Minister for the Environment ordered the release of 664 ML of environmental water from the Victorian River Murray bulk entitlement in Round Lakes (518 ML) and Cardross Basin 1 (146 ML) to save the Murray hardyhead from extinction. New South Wales has released 25 GL of environmental water for the Lowbidgee wetlands to support threatened species such as the southern bell frog.

In March 2009, the Minister for Climate Change and Water announced the first use of water from the Commonwealth's environmental water holdings. The sites that received water are in South Australia (Chowilla Floodplain, Paiwalla Wetland between Mannum and Murray Bridge, Rocky Gully, and Carpark Lagoons on the Katarapko floodplain). Further releases of environmental water have been announced in 2009 in New South Wales, Victoria and South Australia. Most of the water for these subsequent releases was sourced from allocations against entitlements held by Toorale Station, which was purchased by the New South Wales Government in late 2008 with funding assistance from the Commonwealth (DEWHA 2009a). The Commission applauds these examples of firm political resolve.

The Commonwealth *Water Act 2007* requires the Murray–Darling Basin Authority to identify and account for held environmental water in the Murray–Darling Basin for each financial year. Jurisdictions have begun to report to COAG on progress with environmental water recovery in the basin. The first report was made available in November 2008 and it will be updated on a six-monthly basis.

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### ■ Finding 4.3

Despite statutory recognition of environmental water in all jurisdictions, the Commission remains concerned about the security of environmental water access entitlements and rules-based environmental water, particularly in conditions of intense or prolonged drought. There have been cases in which ad hoc decisions have reduced the security of environmental flows.

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### ■ Recommendation 4.1

The Commission recommends that all jurisdictions put in place systematic and transparent processes to determine environmental water outcomes and requirements. All water plans should clearly specify environmental outcomes, and fully define environmental watering protocols and operational activities to meet these outcomes under the full range of inflow scenarios, including those that may arise as a result of climate change. In the MDB, the Commission notes that the *Water Act 2007* requires that the MDBA, from the outset, incorporate into its environmental watering plan systematic and transparent processes to identify environmental outcomes and prioritise water to meet those outcomes under the full range of inflow scenarios.

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### ■ Recommendation 4.2

The Commission recommends that all decisions to reduce the security of environmental water in exceptional circumstances such as intense or prolonged drought should be made transparent, including the decision-making process and the decision-making evidence and reasoning.

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#### 4.3.2.4 Environmental water recovery initiatives

In addition to securing water for the environment through statutory means linked to water plans, states and the Commonwealth have implemented a range of water recovery initiatives in recent times. These include purchases of water access entitlements from willing sellers and the funding of irrigation infrastructure projects that increase irrigation system efficiency (that is, provide water savings). Clause 79(ii) of the NWI provides a series of principles for determining the most effective and efficient mix of water recovery measures.

Water recovery for the environment has been most commonly used in the MDB due to a combination of factors, including:

- + the impacts of drought on environmental assets in the basin (for example, river red gums and the Lower Lakes / Coorong / River Mouth)
- + lack of community acceptance of the adequacy of pre-existing environmental watering regimes
- + further scientific research and investigation.

Major government-sponsored programs actively recovering water in the Murray–Darling Basin include:

- + the Commonwealth's \$3.1 billion *Restoring the Balance in the Murray–Darling Basin* water entitlement purchasing program and \$5.8 billion *Sustainable Rural Water Use and Infrastructure* program under the *Water for the Future* program.
- + *Northern Victorian Irrigation Renewal Project*—an investment of over \$2 billion into modernisation of the Goulburn–Murray Irrigation District, expected to recover approximately 425 GL of water annually that is currently lost to the system; Stage 1 (\$1 billion) is expected to secure long-term savings of up to 225 GL annually, including an entitlement of 75 GL to the environment; Stage 2 (\$1 billion) is expected to deliver further savings of 200 GL annually, including an entitlement of 100 GL to the environment. The Commonwealth Government has committed \$1 billion for Stage 2 through the *Sustainable Rural Water Use and Infrastructure* program under the *Water for the Future* program.
- + *Living Murray Initiative First Step* (\$700 million)—a partnership between the Commonwealth (\$400 million) and the states (\$300 million) aimed at recovering an annual average of 500 GL by 30 June 2009 (involving a mix of water purchases and irrigation upgrades).
- + *Water for Rivers* (\$425 million)—a joint initiative between the Commonwealth (\$125 million), New South Wales (\$150 million) and Victoria (\$150 million) to recover 282 GL (70 GL for the River Murray and 212 GL for the Snowy River) for environmental flows. The entitlement is recovered within the MDB and is applied one-third the River Murray and two-thirds to the Snowy River (outside the MDB)
- + *NSW Rivers Environment Restoration Program*, incorporating NSW Riverbank—a \$176.7 million program jointly funded by the New South Wales (\$105 million) and Commonwealth (\$71.7 million) governments, of which \$147.37 million is available for water purchase and the costs associated with the management and use of water licences.
- + *Wetlands Recovery Program*—a \$26.8 million joint New South Wales – Commonwealth government program to address the impacts of drought and land and water management practices on the Macquarie Marshes and Gwydir Wetlands.

To help address the need to monitor the progress of environmental water recovery, COAG has established a report on progress of environmental water recovery in the Murray–Darling Basin, which is updated every six months.<sup>15</sup>

The October 2008 report (COAG 2008) showed that the Commonwealth and the Murray–Darling Basin jurisdictions collectively recovered water entitlements averaging 177 GL per annum over a four-year period to 2008, at an average cost of nearly \$295 million per annum (or \$1,180 million over the four years).

By 30 June 2009, the Australian Government had secured the purchase of 446 GL worth of entitlements at a cost of approximately \$663 million. A further \$3.76 billion has been announced for Basin state priority irrigation projects. The level of water savings will be determined as states finalise the project details.

### **Water purchases for the environment**

Since the 2007 Biennial Assessment, the Commonwealth has taken responsibility for managing water planning for the Murray–Darling Basin through the MDBA. The Commonwealth is now participating in the water market on behalf of the environment as well as for other government and public benefit purposes. The Commission endorses this approach. The increase in environmental water purchase programs, particularly the Australian Government's \$3.1 billion Restoring the Balance in the Murray–Darling Basin program, is a major positive policy change in environmental water management.

The Commonwealth has published information on its water purchasing program, including a purchasing decision framework based on environmental need, capacity to deliver, and cost of entitlements. The Commonwealth also reports on purchasing outcomes and environmental water delivered (DEWHA 2009b). The Commission supports such efforts to improve transparency.

However, in light of persistent feedback from affected communities indicating a lack of understanding of the program and its objective, the Commission encourages further dissemination and communication activities to improve stakeholder understanding. For example, some stakeholders' submissions to the biennial assessment raised a number of concerns about government water recovery programs. These included perceptions that:

- + multiple programs in the same region may fail to coordinate with each other
- + government programs may 'bid up' the price of water out of the reach of irrigators, and at the expense of other governments
- + buyback programs lack transparent priorities to guide their purchases (particularly in the MDB in advance of the Basin Plan)
- + the timeframe over which the various water recovery programs will be operating is apparently open-ended.
- + social and community impacts are not being taken into account sufficiently in government water purchasing decisions
- + third-party impacts are being imposed
- + if multiple government water purchase programs are coordinated, this could potentially lead to collusion.

Further detail on the Commonwealth's approach to strategic purchasing, stakeholder engagement and communication of the buyback program is found in Chapter 10. For its part, the Commission's view is that buybacks assist irrigators to adjust to new conditions by compensating them financially for their water entitlements, which would not be the case under an uncompensated reduction of entitlements to address overallocation and overuse at the end of a water plan. It is therefore critical that the buyback program proceed in a timely and effective manner.

The Commission notes that buybacks are less directly helpful in managing the indirect economic and social impacts on non-entitlement holders (suppliers, local businesses, the broader community) in irrigation-dependent communities. However, it is also critical to recognise that water policy is not the only cause of adjustment pressure in these communities—market factors and drought are arguably more important in many areas (see further discussion on adjustment in Chapter 10).

The Commission believes that the Commonwealth should continue to provide clear information about the buyback program and its relationship with the new Murray–Darling Basin Plan and other policy instruments. These efforts should be aimed at improving understanding in the community, maintaining and improving public support, and enabling informed adjustment decisions by water entitlement holders. The Commission acknowledges the establishment of the Water Recovery and Environmental Use Stakeholder Reference Panel in June 2009 (by the Commonwealth Minister for Climate Change and Water) and strongly supports the endeavours of this new Panel in furthering these objectives.

<sup>15</sup> See [www.coag.gov.au/coag\\_meeting\\_outcomes/2008-11-29/docs/20081129\\_water\\_recovery\\_mdb.pdf](http://www.coag.gov.au/coag_meeting_outcomes/2008-11-29/docs/20081129_water_recovery_mdb.pdf)

## Implications for water recovery through planning processes

Prior to the funding of the water recovery initiatives described above, planning processes were the main mechanism for addressing overallocation and overuse. For example, Western Australia has a number of formal and informal practices to recover water, including negotiated reductions in consumptive use. Similarly, South Australia has successfully negotiated pathways to address overallocation and overuse over time, without purchasing entitlements. Planning-based processes still play an important role in recovering water. The Commission considers it important that high-profile, large-scale water purchasing programs are not perceived as the *only* way of addressing overallocation or overuse, and that the role of planning-based processes continues to be recognised.

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### ■ Finding 4.4

The Commission strongly supports continued buybacks, including major purchases, as a strategic approach to improving environmental outcomes and adjusting to the new sustainable diversion limits that will be developed under the new Murray–Darling Basin Plan. The Commission does not support the use, by states, of barriers to water trade to attempt to constrain environmental purchases and desirable adjustment.

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### ■ Recommendation 4.3

The Commission considers that the relationship between buybacks, providing for environmental assets, and the transition to new sustainable diversion limits in the MDB is not well understood. Ongoing communication could continue to improve the transparency of these reforms, so building community understanding and support and enabling more informed decision making by entitlement holders. For example, the Commission recommends that the Murray–Darling Basin Authority progressively issue guidance on the way that specific environmental assets identified by the Authority or committed to by governments are likely to be managed and the objectives that are being sought, locally and across the MDB.

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#### 4.3.2.5 Environmental water managers

##### **Background: Terminology and relevant NWI clauses**

NWI clause 78(ii) states that achieving NWI outcomes required the parties to establish and equip ‘environmental water managers with the necessary authority and resources to provide sufficient water at the right times and places to achieve the environmental and other public benefit outcomes, including across states/territory boundaries where relevant’.

The NWI requires that environmental water managers be in place for the delivery of environmental water. Environmental water managers are responsible for flexible and adaptive management of environmental water to maximise the achievement of environmental and public benefit outcomes. All NWI parties, including the Commonwealth, have established environmental water managers (Table 12).

**Table 12: Establishment of environmental water managers (NWI clause 79(i)(a))**

Jurisdiction	Organisation responsible for environmental water management	Environmental water managers
<b>ACT</b>	Environment Protection Authority (Department of the Environment, Climate Change, Energy and Water)	The Environment Protection Authority is the environmental water manager.
<b>NSW</b>	Department of Environment and Climate Change for allocated environmental water; i.e. adaptive environmental water (licensed) and environmental water allocations (held in dams)	Allocated environmental water is managed by the department, under authority of either the Minister for Water or the Minister for Climate Change and the Environment, depending on legal ownership of environmental water. Other environmental rules are implemented in accordance with rules in water sharing plans, managed by the Department of Water and Energy.
<b>NT</b>	Department of Natural Resources, Environment, the Arts and Sport (Controller of Water Resources)	Environmental water is managed internally within the department.
<b>Qld</b>	Department of Environment and Resource Management	The Chief Executive is responsible for implementing the statutory requirements of an approved water resource plan and sets licence conditions for water service providers that specify environmental watering requirements, which are audited for compliance.
<b>SA</b>	Natural resource management boards	Project officer involved in a water allocation plan acts as environmental water manager.
<b>Tas.</b>	Department of Primary Industries and Water	Environmental water is managed internally within the department.
<b>Vic.</b>	Department of Sustainability and Environment	Environmental entitlements are held by the Minister for Environment and may be managed either by catchment management authorities (regional Victoria) or Melbourne Water (metropolitan Victoria).
<b>WA</b>	Department of Water	The Minister has maintained the role of environmental water manager rather than devolving the task to other organisations.
<b>Commonwealth</b>	Department of the Environment, Water, Heritage and the Arts (DEWHA)	An officer within DEWHA holds the position of Commonwealth Environmental Water Holder. The Commonwealth Environmental Water Holder manages water acquired by the Commonwealth, primarily through two major water recovery programs (Restoring the Balance in the Murray–Darling Basin and Sustainable Rural Water Use and Infrastructure).

It can be seen that the identity of environmental water managers is often unclear. In the Commission's view, this detracts from accountability. Different portfolios and different agencies play roles in different jurisdictions. To date, no clear best practice governance arrangements for environmental water managers have emerged across the jurisdictions. The Commission considers that there is considerable scope for reform in these areas.

The Commission notes that Victoria's draft Northern Region Sustainable Water Strategy includes a proposal to establish a Victorian Environmental Water Holder. At this stage, it is proposed that the environmental water holder would be established as an independent statutory body responsible for holding, allocating, managing and trading environmental water. Further details on the timeframe for establishment of the Environmental Water Holder will be available upon release of the Northern Sustainable Water Strategy.



In recent work for the Commission, SKM (2009) considered how environmental water governance arrangements could be strengthened in the light of the 2007 Biennial Assessment findings, which were critical of the quality of environmental water management in Australia. The paper found that a number of specific areas directly related to the operation of environmental water managers require improvement, including:

- + the legitimacy of environmental water and the role of the environmental water manager
- + the accountability of environmental water managers in delivering environmental water outcomes
- + the resourcing of environmental water managers.

Most jurisdictions have insufficient financial and human resources to achieve efficient and effective delivery of environmental water objectives and outcomes. The Commission notes that Victoria has implemented an environmental levy on water corporations (5% of urban customers' and 2% of rural customers' water bills) that is specifically used to fund improvements to sustainable water management, including large-scale river restoration and environmental water reserve management.

Examples exist of progress in this area. For example, in addition to water sharing plans (which establish rules for sharing water between environmental needs and water users), New South Wales has separate plans for managing the delivery of environmental account and licensed environmental water in the major regulated systems where adaptive (licensed) environmental water is held. The Department of Environment and Climate Change prepares annual watering plans that report on, among other things, the previous year's achievements with environmental water, the current condition of ecological assets, the volumes of environmental water held in accounts and watering priorities for the coming year under possible climatic scenarios. In 2008–09, New South Wales issued annual watering plans for the Macquarie, Murrumbidgee, Gwydir, Lachlan and Murray rivers. In addition, New South Wales has a framework document, *Managing environmental water to improve river and wetland health in NSW*, which sets out the roles of relevant government agencies, and describes management approaches used in relation to environmental water.

Recent reductions in environmental water, or in some cases qualification of entitlements due to severe water shortages, create additional operational complexity for environmental water managers. Under such circumstances, they are often forced to take a 'triage' approach and focus on maintaining high-value assets and refuges. In Victoria, catchment management authorities have reported difficulties in employing appropriately trained staff for this often complex role. In its public submission, Environment Victoria notes its view that Victoria's catchment management authorities are commonly under-resourced to perform their environmental water manager role adequately.

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#### ■ Finding 4.5

The role of environmental water managers is generally not adequately defined and resourced. They lack recognition, influence and authority, and their role and legitimacy in the implementation and operation of water plans are often unclear. Often, they carry out other responsibilities alongside their role as environmental water managers. This can blur their accountability.

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#### ■ Recommendation 4.4

The Commission recommends that governments publicly identify environmental water holders and environmental water managers within their jurisdictions and clearly specify their authority, responsibilities and accountabilities. Where accountabilities are blurred, they should be clarified.

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#### ■ Finding 4.6

There is potential for confusion and inefficiencies to arise due to a lack of communication and alignment between Commonwealth, state, and local programs aimed at environmental improvement, with respect to both environmental water and catchment health initiatives.

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#### ■ Recommendation 4.5

The Commission recommends that greater consideration be given to improving alignment and integration of programs for recovery and management of environmental water. This alignment and integration should be pursued across jurisdictions, geographical scales, and across land and water management, to identify and capture synergies and optimise outcomes.

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The provision for environmental water delivery in water plans is generally poor. Chapter 1 (Water planning) discusses this in more detail, and states that the management objectives in water plans are often still too general to be able to be effectively measured and assessed to determine the success of the plan. Plans often lack clear objectives tied to specific outcomes for the delivery of environmental water. Clear objectives underpin monitoring, evaluation and the flexible and adaptive management of water systems.

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#### ■ Finding 4.7

Environmental water managers require specific environmental objectives within water plans to guide water delivery and support monitoring, evaluation and adaptive management.

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### 4.3.3 Monitoring, reporting and review

#### Background: Terminology and relevant NWI clauses

The NWI states that 'Establishing and equipping accountable environmental water managers with the necessary authority and resources to provide sufficient water at the right times and places to achieve the environmental and other public benefit outcomes, including across State/Territory boundaries where relevant.' (NWI clause 78(ii))

Environmental water delivery should be in accordance with specific targets (assets and ecosystems) within plans. 'Water planning by States and Territories will provide for ... secure ecological outcomes by describing the environmental and other public benefit outcomes for water systems and defining the appropriate water management arrangements to achieve these outcomes.' (NWI clause 37(i))

This will be done by 'identifying the desired outcomes with as much specificity as possible' (NWI clause 78(i))

Once clear objectives and instruments are in place, adaptive environmental water management requires ongoing monitoring of the delivery of environmental water (outputs) and periodic monitoring and evaluation of environmental outcomes. Being able to assess whether objectives are being met is essential in the water plan review process (see Chapter 1), which also links to the implementation of any risk assignment framework (see Chapter 9).

#### 4.3.3.1 Monitoring the delivery of environmental water

The NWI (clauses 84, 85) is very specific about the development (by mid-2005) and the application (by mid-2006) of a register of new and existing environmental water, showing all relevant details of source, location, environmental outcomes sought, type, volume, security and use. However, while there is information generally available on the volume of water recovered (and being recovered for the environment through various government programs), and more information is now available on water entitlements held for the environment, the Commission has not been able to determine the extent of environmental water rights in each jurisdiction (both as entitlements and by virtue of rules) and the extent to which environmental water is being delivered.

At a jurisdictional, cross-jurisdictional (for example, MDB) or national level there are no consolidated, transparent, accessible and accountable mechanisms for registration and reporting of entitlements and non-entitlements-based water being delivered for environmental outcomes. Partly in response, the Commission has funded the development of an adaptive environmental water register for New South Wales. The aim of this is to make the details of environmental water publicly available, including volumes, locations and intended environmental use. The Commission hopes that the New South Wales project will assist other jurisdictions to develop similar systems.

The Commonwealth Environmental Water Holder is required to maintain an up-to-date record of the Australian Government's environmental water holdings. Details of the holdings are available on the website of the Department of the Environment, Water, Heritage and the Arts.

In the Commission's view there is a critical need to establish mechanisms to register delivery of environmental water in each system. As a minimum, this should include information on:

- + the water required (determined through a scientific process) to sustain environmental assets
- + water that has been secured for the environment
- + water that has been delivered for targeted environmental outcomes.

Commonwealth and state water recovery programs are resulting in increased volumes of water available to the environment, particularly in the MDB. In the light of ongoing water shortages, there is justifiable interest in the cost-effectiveness of the delivery of increasing volumes of water to stressed systems. The establishment of a national or MDB-wide mechanism for registering entitlements-based and non-entitlements-based environmental water would greatly improve transparency and reporting in response to such scrutiny.

#### ■ Finding 4.8

There is no transparent, accessible and accountable mechanism for registration of entitlements-based and non-entitlements-based water being delivered for environmental outcomes. It is therefore not possible to assess the level of compliance with environmental entitlements and rules and the risks associated with non-compliance.

#### ■ Recommendation 4.6

Consistent with the NWI, the Commission recommends the development of nationally consistent registration of environmental water across Australia, showing all relevant details of entitlements-based and non-entitlements-based environmental water and outcomes, as well as annual public reporting of the existence, delivery and outcomes of environmental water.

### 4.3.3.2 Monitoring and review of the outcomes of environmental water delivery

#### Background: Terminology and relevant NWI clauses

The NWI states that 'In the implementation of water plans, the Parties will, consistent with the nature and intensity of resource use ... monitor the performance of water plan objectives, outcomes and water management arrangements' (NWI clause 40(i)).

Severe water scarcity across Australia has highlighted the critical importance of water resource monitoring in effective water resource management. In particular, monitoring the outcomes from environmental water delivery is necessary to make sound management decisions and to improve technical rigour over time. This involves moving beyond monitoring the timing and volume of water delivered, to monitoring the environmental outcomes that this water supports. Table 13 summarises current approaches to monitoring, evaluating and reporting on environmental water, drawing on information provided by each jurisdiction.

**Table 13: Current approaches to monitoring, evaluation and reporting in each jurisdiction**

Jurisdiction	Comment
ACT	Environmental Flows Monitoring and Assessment Framework, outlined in the ACT's statutory Environmental Flow Guidelines 2006. The ACT <i>Water Report</i> annually reports on environmental water allocations and provisions.
NSW	Integrated Monitoring of Environmental Flows (IMEF) program for specific rivers, which provides scientific information needed to review and inform water sharing plans. Managed by the Department of Water and Energy (DWE), it has been applied to six rivers.
NT	The Northern Territory <i>State of the Environment Report</i> includes water resources. Monitoring appears to be focused on the improvement of flow monitoring instrumentation.
Qld	Water resource plans describe monitoring and reporting arrangements. Water resource plans are to incorporate the Environmental Flow Assessment Program. The Minister reports annually on the implementation of each plan, including the results of monitoring and the achievement of ecological goals.
SA	Water allocation plans describe monitoring and evaluation arrangements to assess the achievement of environmental water provisions. The Integrated Monitoring Framework for Environmental Flows and Salinity in South Australia is currently in preparation.
Tas.	Water management plans describe monitoring and reporting arrangements.
Vic.	Victorian Environmental Flow Monitoring and Assessment Program evaluation is likely to be undertaken in late 2009 by the eWater CRC and reported through the Department of Sustainability and Environment.
WA	Monitoring and reporting programs are designed and included in each plan. These programs measure success against key objectives (such as water levels in wetlands) and identify triggers for adaptive management activities. An annual evaluation report reports on success of the plan.

Based on the information provided, there appears to be little consistency in the monitoring programs between states. Furthermore, the NWC

Waterlines paper *Water allocation planning in Australia—Current practices and lessons learned* (Hamstead et al 2008) found a general deficiency in monitoring, evaluation and reporting on water plan implementation and outcomes across all jurisdictions.

Hamstead et al found that the monitoring processes described or referenced in water plans were generally oversimplified, with limited explanation of the specific monitoring approach or arrangements (for example, identification of performance indicators and when and how often they are to be measured). It is commonly only for specific sites that a rigorous monitoring program can be found, often for high-profile sites in each state. An example of a program currently operating on the Snowy River to assess the effectiveness of environmental water releases is provided in Box 17.

#### **Box 17: Monitoring the effectiveness of environmental water releases on the Snowy River—A case study**

The New South Wales Department of Water and Energy has established the Snowy River Flow Response Monitoring and Modelling Program to assess the changes in river conditions that could be attributed to the release of environmental flows. Monitoring began in 2000 and has continued during the release of the first (in 2002) and subsequent flows of water for the environment (DWE 2009). Four key river attributes are measured to determine the change in the health of the river. These include river flow, physical habitat, water quality, vegetation, water bugs and fish. Other studies have also been undertaken to assist in the interpretation of the results from the main monitoring and modelling program and assist in the analysis and development of future environmental water allocations.

The monitoring for the Snowy River Recovery project has a rigorous design framework, a comprehensive set of before-flow data, a long-term and ongoing monitoring program, and a set of unambiguous hypotheses for the abiotic and biotic processes. The effects of the environmental releases for the first three years (up to 2005) have been analysed and reported (SSC 2008).

Drawing upon the information also presented in Table 13, some specific problems with monitoring and evaluation include the following:

- + There is a lack of statewide approaches to targeted environmental flow monitoring. Such approaches have been developed only in New South Wales and, more recently, Victoria.
- + Where statewide approaches exist (in New South Wales and Victoria), they do not yet have extensive application. Approaches are commonly focused on major regulated river systems. New South Wales has plans to apply environmental monitoring to unregulated river systems during 2009.
- + There is a lack of consistency between states in the monitoring programs. No two states use consistent experimental design, sampling methods or data analyses.
- + It is often unclear which agency is responsible for monitoring, how it influences adaptive management and how third parties can scrutinise the effectiveness of plans in delivering environmental water outcomes.
- + Monitoring and evaluation are rarely discussed in environmental flow recommendation reports. This reduces the focus of objectives and recommendations to those changes to river condition that can be explicitly monitored and measured.
- + Limited available evidence within Australia of the effectiveness of environmental flows and ecological response to environmental flow regimes. The lack of consistent data to inform NRMCC performance indicator 3.3 supports this finding (see Table 14).

**Table 14: NRM performance indicator 3.3: Improved resource condition outcomes**

Jurisdiction	Comment
ACT	There are significantly improved environmental outcomes in the regulated part of the ACT's Cotter system. In those areas where there is no form of water regulation, environmental flows are in place, but their effectiveness is weakened because of the persistent drought.
NSW	NSW has a range of programs to monitor resource conditions through NRM targets, catchment action plan targets, the Sustainable Rivers Audit, and water sharing plan monitoring. Water sharing plans provide for monitoring of ecological outcomes, such as responses of waterbirds, fish and vegetation, the amount of land wetted, and volumes of water. The plans also include performance indicators specifically for monitoring changes in the ecological condition of the water source and dependent ecosystems, for example, by the Integrated Monitoring of Environmental Flows program, which tests a number of hypotheses to indicate how elements of river ecology respond to different aspects of the flow regime (including environmental flow requirements, irrigation flows, floods and wetland connectivity).
NT	The Northern Territory has reported that this indicator is not applicable, as resource condition in planning areas has not been adversely affected.
Qld	Monitoring programs are in place to enable reporting on improved resource condition. Annual water resource plan reports provide information on the extent to which the outcomes of each plan are being achieved. Environmental Flow Assessment Program reporting also informs monitoring of plan outcomes. Resource condition is reported through the Stream and Estuary Assessment Program.
SA	Data is collected as part of the South Australian Environmental Protection Authority's ambient monitoring program, in accordance with its legislative obligation to assess the condition of major environmental resources.
Tas.	No new data is available for comparison to Tasmania's previous reporting against this indicator. Tasmania is currently completing the development of a new methodology to assess riverine condition. With statewide application, the method will use data from Tasmania's Conservation of Freshwater Ecosystem Values framework benchmark. The reporting interval between assessments is expected to be five years.
Vic.	The <i>Victorian River Health Program report card</i> identifies the progress of Victoria's River Health Program towards achieving targets in the Victorian River Health Strategy (2002). The 2005 report card showed that all 2005 targets had been met.
WA	At this stage the key indicator to measure the extent of implementation of specific actions is the extent to which licensing is managed to the new allocation limits set through water allocation plans. Once a draft plan is released, licensing is managed to the new allocation limits. Hence, for all management areas with draft plans released since 2006, the key action to achieve the environmental and other public benefit outcomes has been implemented.

The Commission also draws attention to the lack of clarity in regard to the responsible authority for reporting of environmental outputs (flow releases) and outcomes (ecological health improvements). An exception is the New South Wales Monitoring and Evaluation Reporting framework, which includes State of the Catchment report cards produced by the catchment management authorities. The New South Wales Government has also suggested that the Sustainable Rivers Audit can inform assessments of river health condition, but it is unlikely that the specific benefits of environmental flows will be identified through this approach. In Victoria, the Victorian water accounts report on water use in each basin, including environmental entitlements and compliance with rules-based water, and Catchment Management Authorities and Melbourne Water report annually on environmental water use and ecological outcomes. The Victorian River Health Program report card describes progress towards achieving targets in the Victorian River Health Strategy.

#### ■ Finding 4.9

The majority of water plans lack detailed monitoring, evaluation and reporting protocols linked to the delivery of environmental water and the intended outcomes.

Monitoring and review of outcomes is a means to an end—better future environmental water management, via adaptive management. The Commission encourages review of processes to ensure that monitoring the successes and failures of environmental flows has real consequences for practical water management in a continuous improvement cycle.

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#### ■ Recommendation 4.7

The Commission recommends that entitlements and rules-based mechanisms designed to achieve environmental water objectives in water plans be accompanied by detailed monitoring and evaluation protocols addressing both outputs (flows/volumes delivered) and environmental outcomes. The protocols should be based on science, resourced adequately, implemented fully, and reviewed independently. There should be close linkages between monitoring and adaptive management to ensure that environmental outcomes are achieved with a high level of confidence, and to ensure the cost-effectiveness of water made available to the environment.

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### 4.3.4 Strengthening the science

Knowledge of water-dependent ecosystems is patchy, even in well-researched and well-managed water resource areas (SKM 2009). The Commission considers that, across Australia, much remains to be done to improve the identification, specification and prioritisation of environmental assets. Future decisions about allocating water to the environment over competing demands (such as irrigation) will rely on evidence that demonstrates the benefits or otherwise of those water allocations. To increase the rigour of approaches to identifying environmental water requirements and justifying environmental allocations, it is essential that scientific knowledge obtained through monitoring and evaluation of environmental outcomes is reinvested on a national scale. Some potential areas in which science could be strengthened are described in Box 18.

#### Box 18: Areas for strengthening the science behind environmental water delivery

**Identify flow-dependent values.** Establish a database of important flow-dependent values for Australian streams. Improve networks for disseminating knowledge on water requirements for species (for example, the frequency, duration and timing of red gum watering).

**Increase opportunities for scientific research relating to environmental flows.** Embed the improvement of our scientific understanding of the benefits of environmental water in monitoring and evaluation requirements. In particular, improve our scientific understanding of the benefits of environmental water delivery during drought, when the links between measurable environmental flows and ecological responses are strongest. Improved water resource monitoring programs are also required to ensure that flow recommendations are being met.

**Improve ecological and ecosystem response models.** Provide support for the development of a database of ecological response models based on empirical evidence from studies throughout Australia (for example, eWater CRC's E-mod). This requires evaluation methods explicitly linked to flow recommendations through conceptual models, such as are currently being undertaken in New South Wales (IMEF) and Victoria (VEFMAP). As conceptual models are tested and refined, the level of confidence about how to most effectively use environmental water to maximise the health of assets can be increased.

**Increase reinvestment of knowledge.** Improve networks for knowledge transfer from monitoring and evaluation throughout Australia.

CSIRO's Water for a Healthy Country Flagship is making progress in this area through one of its key research programs, Healthy Water Ecosystems. This research program focuses on:

- + understanding the key factors that determine the health of water ecosystems
- + understanding the ways in which ecosystems respond to different management actions and how those responses will impact on social and economic outcomes
- + building that understanding into tools which assist in the planning, management and monitoring of water ecosystems
- + developing science-based approaches for the restoration of degraded water ecosystems.

The Commission is concerned that water science efforts across Australia are fragmented and non-strategic. Greater investment in the necessary science will clearly be necessary in the years ahead. However, there is a risk of ineffectiveness unless a coherent research strategy to guide investments is developed.

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#### ■ Finding 4.10

Due to the complexity of ecosystems dependent on surface and groundwater resources, improved scientific research and practical application of best available knowledge are required to better understand and explain the links between environmental water delivery and ecosystem health.

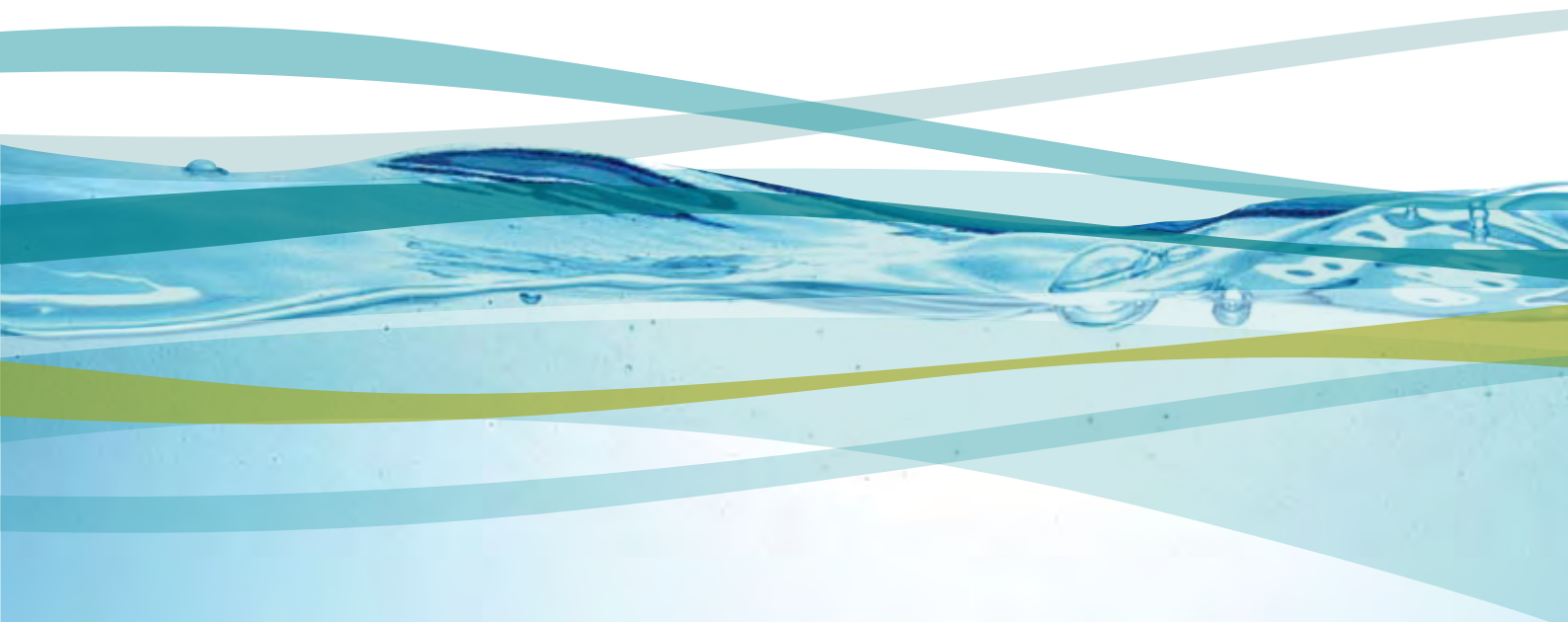
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#### ■ Recommendation 4.8

The Commission recommends that jurisdictions collaborate in the development of a national water science strategy to provide a framework for better identifying, specifying and prioritising environmental assets, and for understanding the links between environmental water delivery and ecosystem health. As a minimum, the strategy should embrace national water research objectives and priorities; resource allocation guidance and funding responsibilities; agreed key result areas; clarification of the respective roles and responsibilities of science players; collaborative opportunities; and dissemination, adoption and innovation pathways. Such a strategy, with a specific focus on the science underpinning environmental water management, would complement ongoing work by COAG to develop a more general strategy to build knowledge and research capacity to support water reform.

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# 5

## Addressing overallocation and overuse

## 5.1 Overview

**Overallocation** exists where the total volume of water permitted to be extracted by entitlement holders exceeds the environmentally sustainable level of extraction. **Overuse** exists where the total volume of water actually extracted by entitlement holders exceeds the environmentally sustainable level of extraction. An **environmentally sustainable level of extraction** is deemed to be the level of water extraction which, if exceeded, would compromise key environmental assets, or ecosystem functions. Sustainable levels of extraction are also essential in providing long-term security to consumptive water users.

The objective of the NWI in relation to addressing overallocation and overuse is to 'complete the return of all currently overallocated or overused systems to environmentally-sustainable levels of extraction' (NWI clause 23(iv)). The commitment to return overallocated systems to sustainable levels of extraction dates from as far back as 1994 when states committed to substantially completing the process for identifying overallocated systems by 2005.

The Commission anticipates that when this objective has been achieved:

1. Water plans **will explicitly identify** the status of all systems and clearly specify those that are overallocated and/or overused.
2. Where systems are identified as overallocated or overused, **clear and firm pathways** will have been established for returning those systems to environmentally sustainable levels of extraction.
3. Water plans and management provisions will be in place to maintain all systems at, or within, **environmentally sustainable levels of extraction**, particularly where systems are fully allocated or approaching full allocation.
4. **Monitoring procedures** will have been established to ensure that water extractions are maintained at environmentally sustainable levels (see Chapter 4), and there will be clear evidence that real progress has been made to return to and/or maintain all systems at environmentally sustainable levels of extraction.

The NWI states that 'substantial progress will be made by 2010 towards adjusting all overallocated and/or overused systems' (NWI clause 44). The Commission is concerned that this requirement may not be met. To date, there are very few, if any, overallocated and overused systems that have been successfully transitioned to within sustainable extraction limits.

Moreover, the Commission is concerned that a fundamental lack of agreement in regard to the sustainable levels of extraction in many systems is a major contributing factor to uncertainty amongst water access entitlement holders. Widespread and prolonged drought over the past decade has resulted in critical environmental degradation in the Murray–Darling Basin and across southern Australia. High-profile cases of ecological decline, such as in the Lower Lakes and the Coorong in South Australia, have been linked to a combination of drought and unsustainable levels of extraction. In many cases, these concerns about poor ecological health have prompted governments to recover water for the environment in the absence of agreement on the environmentally sustainable levels of extraction. While actions which recover environmental water are supported by the Commission, uncertainty and debate about the sustainable level of water extraction continue to undermine confidence in our nation's management of our water resources.

The Commission has been promoting nationally consistent terminology and definitions since 2005, believing that consistent approaches are important in gaining broad community acceptance. Some slow progress has been made in this regard and further work is required to develop nationally consistent guidelines and approaches. Meanwhile, the new MDBA has been assigned responsibility for developing a new plan for the MDB, including the core task of developing a new set of sustainable diversion limits for surface and groundwater systems across the basin.

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### Finding 5.1

From its assessment of jurisdictions' water management legislation, the Commission finds that most jurisdictions do not specifically define the NWI terms 'overallocation', 'overuse' and 'environmentally sustainable levels of extraction' in their legislation. However, with the exception of the Northern Territory and Western Australia, water management frameworks generally provide for the identification of overallocated and overused systems and measures for their recovery.

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### Finding 5.2

Since March 2008, COAG officials have been working to develop national guidelines on the concepts of overallocation, overuse and sustainable yield, including case studies to assist their application in planning processes. The Commission considers it important and urgent that a shared national understanding of these concepts is developed. Progress to date has been too slow. However it is also important that, pending completion of this work, jurisdictions do not delay further practical actions to address overallocation and overuse.

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<b>Recommendation 5.1</b>	To improve the sustainable management of our water resources and increase community acceptance and confidence, the Commission supports the current COAG initiative to develop common guidelines for determining environmentally sustainable levels of extraction for use in the development of water plans. The Commission recommends faster progress to complete the work, and that jurisdictions commit to implementing the guidelines within defined timeframes from the date of their completion.
<b>Finding 5.3</b>	Typically, the status of most water systems in relation to overallocation and overuse is not stated explicitly in water plans. This is a serious flaw in such plans. The community needs to know which systems are overallocated, not least for planning and investment purposes.
<b>Finding 5.4</b>	The Commission is concerned that surface water systems may be under-represented in current assessments of overallocation or overuse across Australia, particularly in the MDB, given evidence such as the Sustainable Rivers Audit (2008) and the CSIRO Sustainable Yields Study (2008). The vast majority of the water systems currently identified by jurisdictions as overallocated and/or overused are groundwater systems.
<b>Recommendation 5.2</b>	The Commission recommends further efforts to improve the quality and consistency of methodologies for assessing the status of water systems, particularly surface water systems. Once developed, such methods should be applied promptly to all systems where there is some degree of uncertainty or lack of community acceptance regarding the environmental sustainability of current levels of extraction.
<b>Finding 5.5</b>	All reviewed water plans that identified water systems as overallocated or overused included, to varying degrees, pathways to return those systems to environmentally sustainable levels of extraction.
<b>Finding 5.6</b>	In systems where overallocation and/or overuse have not been established, jurisdictions are implementing a range of water recovery initiatives to address environmental decline. However, many water recovery initiatives are not always linked to clear targets for environmentally sustainable levels of extraction, or embedded in planning processes. This can reduce certainty for entitlement holders, and potentially compromise levels of community support.
<b>Recommendation 5.3</b>	Where water recovery initiatives are being implemented, governments should ensure that they are also progressing work to define the target level of sustainable extraction. In the MDB this work is underway. Linking water recovery with targets for sustainable extraction will provide entitlement holders and the broader community with a better understanding of the extent of necessary adjustment.
<b>Finding 5.7</b>	While efforts have been made, evidence suggests that limited real progress has been made in reducing the number of systems identified as overallocated and overused. On the basis of this Biennial Assessment, the Commission is disappointed to conclude that this central requirement of water reform will not be met.
<b>Recommendation 5.4</b>	The Commission recommends that jurisdictions make every possible effort to meet their NWI commitments and demonstrate clear pathways for the return of all systems currently identified as overallocated and overused to within sustainable extraction limits. The Commission strongly urges jurisdictions to publicly identify the most overallocated or overused systems for immediate attention, with less urgent cases to follow. When collated, the systems identified by each jurisdiction could enable an agreed national statement of priority actions to address overallocation and overuse.

## 5.2 Context for this assessment

### Background: Terminology and relevant NWI clauses

41. The parties note that existing commitments under National Competition Policy (ref. COAG Tripartite Agreement clause 1) arrangements require that allocations to provide a better balance in water resource use (including appropriate allocations to the environment) for all river systems and groundwater resources which have been overallocated or are deemed to be stressed and identified in their agreed National Competition Council (NCC) endorsed individual implementation programs, must be substantially completed by 2005.
42. This agreement will not delay nor extend timeframes for current National Competition Policy commitments.
43. The parties further agree that with respect to surface and groundwater resources not covered by the individual NCC endorsed implementation plans, and subject to paragraph 38, states and territories will determine in accordance with the relevant water plan, the precise pathway by which any of those systems found to be overallocated and/or overused as defined in the water planning process will be adjusted to address the overallocation or overuse, and meet the environmental and other public benefit outcomes.
44. Subject to paragraph 41, States and Territories agree that substantial progress will be made by 2010 towards adjusting all overallocated and/or overused systems in accordance with the timelines indicated in their implementation plans.
45. Parties agree to address significant adjustment issues affecting water users, in accordance with paragraph 97.

While arrangements have been put in place in some systems to return them to sustainable levels of extraction, there has been a broader debate over the past decade about the extent of overallocation and overuse in other systems. In fact, identifying and returning overallocated and overused surface and groundwater systems to sustainable levels of extraction has proven to be one of the most intractable aspects of water reform. The reasons for the slow progress include differing interpretations of the terms; lack of agreed procedures for determining overallocation, overuse and sustainable levels of extraction; lack of clarity about the required environmental outcomes; uncertainties about ecosystem responses to water regimes; and concerns over the costs of recovering water to achieve environmental sustainability.

### 5.2.1 Australian Water Resources 2005

The Commission's *Australian water resources 2005* (AWR 2005) Level 1 release (NWC 2006a) included a national assessment of overallocation and overuse.

Based on self-assessment by the jurisdictions, AWR 2005 identified that of the 340 surface water management areas, three (1%) were reported as being overallocated, with a further 44 (13%) reported as being highly developed. Of the 367 groundwater management units, 19 (5%) were reported as being overallocated, with a further 85 (23%) reported by jurisdictions as being highly developed.

While these numbers represent a reduction in overallocated or highly developed systems since the independently prepared *Australian water resources assessment 2000* (NLWRA 2001), AWR 2005 found that 'it is not clear if this reduction in the number of areas reported by the states and territories as overallocated and highly developed, is due to management actions or to changes in definitions of sustainable yield ...' (NWC 2006b).

The Level 2 release of AWR 2005 (NWC 2007a) included an independent assessment by the Commission of 51 priority water management areas across Australia. Agreement on a shared understanding and interpretation of the terms overallocation and overuse could not be reached, so a nationally consistent set of water development ratios was used to identify those areas that were most likely to be stressed (overallocated, fully allocated or approaching full allocation). Of the 51 priority water management areas in 2004–05, there were 3 with consumptive use greater than sustainable yield (overused); 17 with a high level of consumptive use as a proportion of inflows; and 11 with a high level of consumptive water use as a proportion of the total water resource.

## 5.2.2 The 2007 Biennial Assessment and 2008 Update

The Commission's 2007 Biennial Assessment (NWC 2007b) concluded that:

- + overallocation and overuse of water resources were being addressed in different ways by different jurisdictions
- + some states were not meeting NWI requirements to move to sustainable levels of extraction
- + a new shared national understanding of overallocation (and 'sustainable levels of extraction') was required, which reconciled the varying approaches (and terminology) used by jurisdictions.

The Commission's 2008 Update (NWC 2008) reiterated the key findings and recommendations of the 2007 Biennial Assessment. It identified continued problems and insufficient progress against NWI timelines in identifying and addressing overallocation and/or overuse, and the need to ensure that the best possible science is used to underpin the water planning process. Overallocation was identified as a 'central national challenge [that was] not being managed as envisaged by the NWI', and as a matter of urgency there was a need to 'develop a shared national understanding of sustainable levels of extraction and responses to overallocation' (NWC 2008, pages 19, 21).

## 5.2.3 Recent and current work in this area

Previous Commission assessments have argued that not enough has been done by jurisdictions to address overallocation and overuse and that one fundamental step in moving forward is the development of a shared national understanding of what environmentally sustainable levels of extraction are and how to implement this concept in practice.

In March 2008, COAG established a work program to develop a shared national understanding of the requirements of the NWI in relation to water reform. This work aims to develop national guidelines on the concepts of overallocation, overuse and sustainable yield, including case studies to assist their application in planning processes (WGCCW 2008).

The Commission has funded a number of projects under the Raising National Water Standards Program related to the environmental sustainability of water allocation regimes:

- + A major study (jointly managed by DEWHA) by the CSIRO into water availability in the Murray–Darling Basin (CSIRO 2008). This report, released in November 2008 by the Minister for Climate Change and Water, Senator the Hon. Penny Wong, predicted that environmental assets would face a greater proportional reduction in water availability than would consumptive water users in most catchments of the Murray–Darling Basin under climate change and development scenarios.
- + *Water allocation planning in Australia—Current practices and lessons learned* (Hamstead et al 2008), a report which reviewed a sample of water plans from across Australia, and identified lessons learned during the planning process (see Chapter 1).
- + *Improving environmental sustainability in water planning* (Hamstead 2009), a report which clarifies the issues surrounding the interpretation and implementation of the NWI key concepts, makes recommendations for an improved approach to environmental sustainability in water planning and identifies critical scientific knowledge gaps.

## 5.3 The Commission's assessment and findings

### 5.3.1 Consistent definitions and approaches

#### Background: Terminology and relevant NWI clauses

Clause 23(iv) states that NWI parties agree to 'complete the return of all currently overallocated or overused systems to environmentally-sustainable levels of extraction ...'

Under clause 26(i), the parties agree that the general approach to implementing the entitlements and allocation framework will be to 'substantially complete plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG water reform framework by 2005.'

Clause 17 states that 'Recognising the importance of a common lexicon for water use and management, the Parties acknowledge the desirability of adopting within their respective water management frameworks, the words and phrases, and their interpretations, contained in Schedule B(ii).'

Given the desirability of a common lexicon outlined in the NWI, the Commission has examined the extent to which water legislation includes the key concepts of 'overallocation', 'overuse' and 'sustainable levels of extraction' in ways that are consistent with the intentions of the NWI. While recognising that there is no explicit commitment to include these terms in legislation, the Commission believes that this examination of legislation provides a relevant indicator of the extent of commonality and is illustrative of progress towards national action on overallocation.

Table 15 summarises the results of the review undertaken for the Commission (Lawlab 2009) and informed by consultation with the jurisdictions.

**Table 15: Incorporation of NWI terms and their concepts into legislation within each jurisdiction**

Jurisdiction	Assessment of incorporation of terms and concepts
ACT	Overallocation and overused systems are not expressly dealt with in the <i>Water Resources Act</i> . The stated objects of the Act do, however, include the protection of the aquatic ecosystems and aquifers from damage and, 'where practicable, the reversal of damage that has already happened' to those ecosystems and aquifers. The ACT Government has stated that the Act does not specifically refer to overallocation and overused systems because overallocation has not been an issue under the framework and history of the ACT's water resources.
NSW	The terms 'overuse' and 'overallocation' are not defined in the <i>Water Management Act</i> . However, section 5(2) (a) of the Act states that water sources, floodplains and dependent ecosystems, including groundwater and wetlands, should be protected and restored. Section 5(2)(b) states that habitats, animals and plants that benefit from water or are potentially affected by managed activities should be protected and (in the case of habitats) restored. For planning purposes, the Act also requires classification of all water resources to ascertain the 'extent that they are at risk' or 'subject to stress'. Sections 43A(3a) and 46 deal with restoration of water to the environment through actions by the Natural Resources Commission and the Minister, respectively.
NT	Under the <i>Water Act</i> , water allocation plans limit extraction to the 'estimated sustainable yield' (section 22B 5(a)). 'Beneficial uses' are defined to include environmental purposes. There is no provision for recovery of water for the environment where a system is overallocated or overused.
Qld	The NWI terms are not used in the Queensland legislation, but are implied through section 38(3e) which states that water resource plans can provide 'a framework for reversing, where practicable, degradation that has occurred in natural ecosystems, including, for example, stressed rivers.' Pathways for recovery of overallocated or overused systems are included in section 46(1f), which requires plans to include 'the strategies proposed to achieve the outcomes to the extent possible from the best scientific information available.'

Jurisdiction	Assessment of incorporation of terms and concepts
<b>SA</b>	The terms 'overuse' and 'overallocation' are not defined in the <i>Natural Resources Management Act</i> . However, South Australia has stated that sections 155 and 156 effectively embody the concepts of overallocation and overuse. The Act permits the Minister to reduce water allocations, including if there is 'damage to an ecosystem that depends on that water'.
<b>Tas.</b>	Tasmania uses the term 'overuse'; the relevant section provides for short-term water restrictions to avoid overuse. This does not address overallocation. The Tasmanian Government has stated that overuse has been dealt with through the Water Use Sustainability Project and Water Use Assessment Project.
<b>Vic.</b>	In Victoria, the Minister may determine that a sustainable water strategy be prepared for a region of the state. A strategy can identify ways to increase the volume of water in the Environmental Water Reserve to improve the environmental values and health of water ecosystems. Under the <i>Water (Resource Management) Act 2005</i> , a long-term water resources assessment can also be undertaken to determine whether there is a decline in water availability which has a disproportionate effect on the Environmental Water Reserve or a deterioration in waterway health for reasons related to flow (section 22M). The Minister can then take action to restore water for the environment or waterway health.
<b>WA</b>	Not assessed, as legislation currently under review.
<b>Commonwealth</b>	The <i>Water Act 2007</i> defines the key concepts consistently with the NWI definitions. The Murray–Darling Basin Plan anticipates the recovery of water (section 24(1)) in overallocated systems through the establishment of a temporary long-term sustainable diversion limit.

The assessment shows that the jurisdictions generally do not define the terms 'overallocation' and 'overuse' in their legislation, including in legislation developed subsequent to the NWI. However, the meaning of those terms is often captured conceptually, in descriptions of triggers for certain actions, or descriptions of situations that the legislation intends to avoid. In addition, the terms are in common use in water management across the country. For example, as South Australia commented to the Commission, 'although SA's NRM Act does not explicitly define "over-allocation" or "overuse", these terms are regularly and widely used in water allocation planning in SA.'

In addition, although jurisdictional legislation does not incorporate NWI terminology explicitly, the relevant legislation in each jurisdiction generally empowers ministers to identify overallocated and overused systems and to establish mechanisms to ensure environmental sustainability.

The Northern Territory legislation is an exception where there is no provision for recovery of overallocated or overused systems. In this regard, the Commission notes that one of the stressed groundwater systems identified in the Level 2 AWR 2005 assessment was in the Northern Territory. In the Commission's view, there is potential for further local overuse as development proceeds unless pre-emptive management measures are taken soon. The Commission has drawn this 'lesson from the south' to the attention of Northern Territory water managers.

There has been continuing debate about the appropriate definitions of overallocation, overuse and environmentally sustainable levels of extraction, and whether those definitions should be explicitly included in legislation, policies and plans. In particular, defining environmentally sustainable diversion limits for a water system is fundamental to assessing whether the system is overallocated or overused. While most legislation includes provision for environmentally sustainable levels of water use, the level of guidance on how those legislative provisions should be interpreted and implemented varies considerably between jurisdictions. Key to the practical debate is the question of whether sustainable extraction limits can be viewed from a purely technical perspective, or whether broader socioeconomic considerations need to be included.

It is the Commission's view that the divergent approaches and limited guidance about implementation are contributing to underperformance across Australia as a whole in addressing overallocation and overuse. The benefit of a broadly consistent national approach lies in drawing on the elements of best practice from across Australia and in increasing the likelihood of community acceptance of the assessment outcomes as a result of adopting a nationally consistent approach.



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#### ■ Finding 5.1

From its assessment of jurisdictions' water management legislation, the Commission finds that most jurisdictions do not specifically define the NWI terms 'overallocation', 'overuse' and 'environmentally sustainable levels of extraction' in their legislation. However, with the exception of the Northern Territory and Western Australia, water management frameworks generally provide for the identification of overallocated and overused systems and measures for their recovery.

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#### ■ Finding 5.2

Since March 2008, COAG officials have been working to develop national guidelines on the concepts of overallocation, overuse and sustainable yield, including case studies to assist their application in planning processes. The Commission considers it important and urgent that a shared national understanding of these concepts is developed. Progress to date has been too slow. However it is also important that, pending completion of this work, jurisdictions do not delay further practical actions to address overallocation and overuse.

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#### ■ Recommendation 5.1

To improve the sustainable management of our water resources and increase community acceptance and confidence, the Commission supports the current COAG initiative to develop common guidelines for determining environmentally sustainable levels of extraction for use in the development of water plans. The Commission recommends faster progress to complete the work, and that jurisdictions commit to implementing the guidelines within defined timeframes from the date of their completion.

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### 5.3.2 Assessment of the status and level of overallocation and overuse

The Commission considers that the status of each water system should be explicitly stated, based on an objective and transparent assessment. In the Commission's view, this should include specifying which systems are overallocated or overused and which systems have the potential to become so.

The Commission has undertaken a review of 107 completed water plans (see Appendix 7) in an effort to assess whether the status and level of overallocation and overuse in each water system is stated clearly. This review complemented self-reporting by the jurisdictions against NRMCC performance indicators 4.1 and 4.2, which measure the extent to which a jurisdiction has assessed and addressed overallocation or overuse in water plans (see Table 16).

From the Commission's review, it was found that, with a few exceptions, the allocation status of a plan area is normally implicit rather than explicit in water plans. For example, systems where no further entitlements are permitted or where there was no unallocated water available were assumed to be fully allocated. Similarly, overuse is usually implied through management arrangements in the plans. These range from the control of non-entitlement water users, such as water interception activities (farm dams, forestry), control of illegal use or improved monitoring of the water resources through more intensive and better metering and extraction rostering. A water plan was categorised by the Commission as overallocated or overused if either all or part of the water system was identified in the plan as being in one of these categories.

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#### ■ Finding 5.3

Typically, the status of most water systems in relation to overallocation and overuse is not stated explicitly in water plans. This is a serious flaw in such plans. The community needs to know which systems are overallocated, not least for planning and investment purposes.

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Using these interpretations, the Commission found that 19 of the 107 water systems assessed were identified as being overallocated, 15 were identified as being overused, and 48 were identified as being fully allocated or approaching full allocation. These results are generally consistent with the jurisdictions' self-assessments (Table 16) of the allocation status of their water systems (note that New South Wales and Victoria did not provide results). The results are also consistent with the self-assessments undertaken for AWR 2005, whereby 22 systems were assessed as either overallocated or overused.

The Commission's review found that jurisdictions' plans had identified only two overallocated or overused surface water systems that were in the Murray–Darling Basin, and that 16 of the 19 identified overallocated systems were groundwater systems. These results are again similar to those obtained through the AWR 2005 self-assessment, which identified only one overallocated surface water system in the Murray–Darling Basin, and in which 19 of the 22 overallocated systems identified across Australia were groundwater systems.

In contrast, the recently released Sustainable Rivers Audit (SRA) for the Murray–Darling Basin found that the ecosystem health of the vast majority of river valleys in the MDB was poor or very poor (see Box 19) (ISRAG 2008). While the SRA is just a snapshot of river health at a point in time, and measures ecosystem health on the basis of a range of factors that extend beyond levels of water extraction (the river's biological and physical make-up, its habitat structure and function, and the resilience of those factors to natural impacts or influences (MDBC 2008)), these seemingly divergent outcomes highlight the lack of practical agreement over the environmental sustainability of the MDB in particular, and the environmental impact of river regulation and extractions. Moreover, the use of the water recovery mechanisms to acquire water for the environment in systems across the MDB that are not overallocated or overused according to self-assessments by the jurisdictions highlights the definitional problems discussed above.

#### **Box 19: Results of the Sustainable Rivers Audit 2004–07**

The SRA gathers and analyses data on various biophysical components, reports on the condition of those components, and integrates that information as an assessment of ecosystem health.

Based on the 2004–07 assessment, only the Paroo Valley was rated in good health. The Border Rivers and Condamine valleys were rated in moderate health. Seven other valleys were rated in poor health and 13 were rated in very poor health. No valley was rated in extremely poor health.

Of 62 zones in 23 valleys, two were rated in good health, 11 were in moderate health and the remaining 49 were rated in poor (19 zones), very poor (27 zones) or extremely poor health (3 zones). Nine of 13 upland zones were rated in very poor or extremely poor health.

Valleys in the northern Basin generally were rated in better health than those in the south. Two of nine northern valleys were rated in very poor health, compared to nine of 14 southern valleys. The three valleys rated in moderate or good health were in the northern Basin.

Source: Independent Sustainable Rivers Audit Group (ISRAG 2008)

As previously discussed, the development of COAG guidelines for the implementation of common definitions of these concepts is expected to be important in furthering national efforts towards agreed assessment processes and outcomes. Recommendations outlined in Chapter 4 on environmental water are also considered important in implementing an adaptive management approach based on best available evidence.

#### **Finding 5.4**

The Commission is concerned that surface water systems may be under-represented in current assessments of overallocation or overuse across Australia, particularly in the MDB, given evidence such as the Sustainable Rivers Audit (2008) and the CSIRO Sustainable Yields Study (2008). The vast majority of the water systems currently identified by jurisdictions as overallocated and/or overused are groundwater systems.

#### **Box 20: NRMCC performance indicators 4.1 and 4.2**

NRMCC performance indicator 4.1 is 'the number and proportion of water systems for which a water plan has been completed that a) has not been assessed for overallocation; b) have been assessed for overallocation and are determined to be not overallocated; c) has been assessed as overallocated with a pathway in place to address overallocation and d) are assessed as being overallocated and have no pathway in place to address over allocation.'

NRMCC performance indicator 4.2 is 'the number and proportion of water systems for which a water plan has been completed that a) has not been assessed for overuse; b) have been assessed for overuse and are determined to be not overused; c) has been assessed as overuse with a pathway in place to address overuse and d) are assessed as being overused and have no pathway in place to address overuse.'

**Table 16: Jurisdictional responses to NRMCC performance indicators 4.1 and 4.2**

Jurisdiction	Indicator	Number and proportion of water systems for which a water plan has been completed that:			
		has not been assessed	has been assessed, and determined not to be overallocated/overused	has been assessed as overallocated or overused, and has a pathway in place	has been assessed as overallocated or overused, but no pathway in place
ACT	4.1 (overallocation)	0	All	0	0
	4.2 (overuse)				
NSW	4.1 (overallocation)	Recommend that a national agreed definition and methodology to determine sustainable yield is required before this indicator can be assessed for surface water systems. NSW has pathways in place to return 6 major inland alluvial systems to sustainable levels of extraction.			
	4.2 (overuse)				
NT	4.1 (overallocation)	0	2	0	0
	4.2 (overuse)	0	2	0	0
Qld	4.1 (overallocation)	Indicators cannot be assessed as systems are not explicitly identified as overallocated or overused in Queensland water plans.			
	4.2 (overuse)				
SA	4.1 (overallocation)	0	10	1	8
	4.2 (overuse)	0	12	1	5
Tas.	4.1 (overallocation)	0	5	0	0
	4.2 (overuse)	0	2	3	0
Vic.	4.1 (overallocation)	Do not explicitly identify systems as overallocated or overused.			
	4.2 (overuse)				
WA	4.1 (overallocation)	8 out of 15 completed water plans contained an overallocated system. The Department of Water is producing two policies to address overallocation. The first, <i>Confirming overallocation operational policy 2.1</i> , has almost been finalised. The second is a strategic policy on the action to be taken after overallocation is identified. It will probably be released for public comment and is expected to commence in 2010.			
	4.2 (overuse)				

## ■ Recommendation 5.2

The Commission recommends further efforts to improve the quality and consistency of methodologies for assessing the status of water systems, particularly surface water systems. Once developed, such methods should be applied promptly to all systems where there is some degree of uncertainty or lack of community acceptance regarding the environmental sustainability of current levels of extraction.

### 5.3.3 Pathways to address overallocation and overuse

#### Background: Terminology and relevant NWI clauses

Clause 25(v): '... the Parties agree that, once initiated, their water access entitlements and planning frameworks will ... implement firm pathways and open processes for returning previously overallocated and/or overdrawn surface and groundwater systems to environmentally-sustainable levels of extraction.'

Clause 43: '... the Parties further agree that with respect to surface and groundwater resources not covered by the individual NCC endorsed implementation plans, and subject to paragraph 38, States and Territories will determine in accordance with the relevant water plan, the precise pathway by which any of those systems found to be overallocated and/or overused as defined in the water planning process will be adjusted to address the overallocation or overuse, and meet the environmental and other public benefit outcomes.'

While the NWI requires firm pathways to be in place for returning overallocated and/or overdrawn systems to environmentally sustainable levels of extraction, and for those pathways to be defined in water plans, the meaning of the term 'pathway' is not defined in the NWI.

In the Commission's view, a firm pathway involves clearly stating the current level of overallocation and overuse, setting an agreed goal or target for the sustainable level of extraction based on best available science, and establishing transparent and time-bound processes and steps for moving to the sustainable level of extraction. A clear pathway that specifies each of these elements will provide greater levels of certainty for entitlement holders, which will be critical in helping them adjust to a future with less consumptive water availability (see Chapter 10).

The Commission's review has found that most jurisdictions have a range of legislative provisions to enable them to address overallocation and overuse through water planning, as required in the NWI Agreement. Those provisions include the reduction of water allocation levels, and the transfer or voluntary surrender of water licences. Of the 34 water systems which were identified as being overallocated or overused, all, to varying degrees, include pathways to return those systems to environmentally sustainable levels of extraction in their water plans. In overallocated systems, this is typically done through processes to reduce water access entitlements to the appropriate extraction volume, either on commencement or during the life of the water plan (see example in Box 21).

For example, where entitlements are permanently reduced under plans, plans typically set out transition arrangements, with reductions gradually applied over the life of the plan (as is the case for the overallocated groundwater resources in New South Wales, where extractions will be progressively returned to sustainable levels, and the Condamine – Upper Balonne in Queensland). In other cases the pathways are voluntary and thus lack certainty. For example, some plans encourage substitution of overallocated resources with provisions for trade or access to other water sources, but those arrangements are voluntary, and there is no certainty that they will contribute to the return to sustainable extraction levels.

#### Box 21: Pathways for returning systems to sustainable levels of extraction. Western Australia: Lower Gascoyne system—a case study

While current use in the Lower Gascoyne system is considerably less than the total entitlement, the limitations of the resource (increasing salinity and decreasing yields) are recognised and steps are in place to reduce the levels of overallocation.

The water plan seeks to align entitlements in the overallocated areas to the allocation limit over the seven years from the commencement of the plan. Voluntary surrender of currently unused entitlements and/or reducing the amount of unused entitlements are the main mechanisms used in this plan. At the end of the plan, all licensees who use less than their entitlement over the seven years will have their entitlements reduced by 50% of the difference between their licensed entitlement and the average of their highest three annual metered extractions over the seven years.

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#### ■ Finding 5.5

All reviewed water plans that identified water systems as overallocated or overused included, to varying degrees, pathways to return those systems to environmentally sustainable levels of extraction.

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As discussed in Section 4.3.2.4, water recovery initiatives such as the purchase of water access entitlements and the upgrading of infrastructure are becoming more common, particularly within the Murray–Darling Basin, as mechanisms to improve environmental outcomes. For example, The Living Murray initiative has been underway since 2002 and has acquired water for the environment through a variety of water recovery mechanisms.

While the Commission is very supportive of these endeavours, there are important differences between water recovery initiatives and clear targets or pathways as described in the NWI to address overallocation and overuse. In particular, many water recovery initiatives to date have been undertaken without a clear target level of environmentally sustainable extraction that is linked to best available science.

This means that the overall extent of adjustment is unclear for entitlement holders, and they may be less likely to invest efficiently or confidently (see Chapter 10). The Commission is therefore supportive of the development of the new Basin Plan and other similar planning efforts as a way to establish a clear, published target level of extraction within which water recovery initiatives can contribute.

However, as work progresses on sustainable diversion limits in the MDB, jurisdictions should continue with buyback and other water recovery initiatives (in accordance with NWI principles) as an interim measure. The Commission recognises the short timelines the MDBA is working to in the development of the Basin Plan, but in order to promote public confidence, the MDBA should take opportunities to demonstrate how water recovery initiatives are contributing to dealing with specific environmental challenges and to explain the relationship between buybacks and the transition to new sustainable diversion limits.

The Commission notes that it is often possible for entitlements purchased for the environment to be resold, often subject to the condition that the proceeds from any such sales are used to acquire water for environmental objectives. In this case, the recovered entitlements could potentially be returned to the ‘consumptive pool’, and, technically, the overallocation could return. Transparent and accountable environmental managers are expected to be able to manage these potential issues effectively (see Section 4.3.2.5).

More importantly, as noted by several jurisdictions including South Australia and Queensland, water purchasing initiatives are not the only way of returning systems to within sustainable extraction limits. In fact, there are a number of tools available and they should be assessed objectively based on their costs and benefits (either individually or in combination).

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#### ■ Finding 5.6

In systems where overallocation and/or overuse have not been established, jurisdictions are implementing a range of water recovery initiatives to address environmental decline. However, many water recovery initiatives are not always linked to clear targets for environmentally sustainable levels of extraction, or embedded in planning processes. This can reduce certainty for entitlement holders, and potentially compromise levels of community support.

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#### ■ Recommendation 5.3

Where water recovery initiatives are being implemented, governments should ensure that they are also progressing work to define the target level of sustainable extraction. In the MDB this work is underway. Linking water recovery with targets for sustainable extraction will provide entitlement holders and the broader community with a better understanding of the extent of necessary adjustment.

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Table 17 summarises each jurisdiction's planning approaches to addressing overallocation and overuse and to achieving environmentally sustainable levels of extraction, and also describes water recovery initiatives currently in place.

**Table 17: Pathways for addressing overallocation and overuse and current water recovery initiatives**

Jurisdiction	Avenue for environmental improvement	Description
ACT	Water plans	Strong mechanisms are available to the Minister to amend water access entitlements through imposing conditions on or amending an existing condition of a water access entitlement. However, unlike arrangements in many jurisdictions, the mechanisms only require that the Minister has given notice, and do not trigger financial compensation.
	Water recovery	The ACT has reported that as there are no overallocated systems in the ACT, no water recovery initiatives are required.
NSW	Water plans	NSW has taken a precautionary approach and embargoed all surface water systems across the state and all groundwater systems within the Murray–Darling Basin.  In areas with water sharing plans, the extraction limits plus the environmental water rules are designed to ensure that surface water systems are not overused. Major groundwater systems have been subjected to entitlement reductions.  The NSW Government is a partner in the Great Artesian Basin Sustainability Initiative, which will reduce extractions of artesian water through bore capping, bore rehabilitation and piping.
	Water recovery	NSW has also recovered water for the environment through purchase and recovery activities under RiverBank, Water for Rivers, the River Environmental Restoration Program, the Wetland Recovery Program and The Living Murray initiative.
NT	Water plans	The Northern Territory has no overallocated systems and therefore has no pathways in place. One groundwater system has been assessed as being overused and water allocation planning for that system has commenced. The NT Government is a partner in the Great Artesian Basin Sustainability Initiative. This will reduce extractions of artesian water through bore capping, bore rehabilitation and piping.
	Water recovery	
Qld	Water plans	A number of mechanisms and legislative instruments occur to provide a pathway, such as rationalisation of water access entitlements, caps on further resource development, water trading and water sharing rules.
	Water recovery	The Queensland Government is a partner in the Great Artesian Basin Sustainability Initiative, which will reduce extractions of artesian water through bore capping, bore rehabilitation and piping.
SA	Water plans	Overallocation and/or overuse issues are addressed through amendments to the relevant water allocation plan.
	Water recovery	The South Australian government is a partner in The Living Murray Initiative and the Great Artesian Basin Sustainability Initiative, which will reduce extraction of artesian water through bore capping, bore rehabilitation and piping.

Jurisdiction	Avenue for environmental improvement	Description
<b>Tas.</b>	Water plans	Tasmania is currently developing a number of water management plans that are setting environmentally sustainable levels of extraction. The Tasmanian Government envisages that substantial progress will have been made by the end of 2010.
	Water recovery	Not applicable
<b>Vic.</b>	Water plans	Victorian sustainable water strategies
	Water recovery	The Living Murray initiative, the Snowy Initiative; the Northern Victoria Irrigation Renewal Project; other infrastructure projects.
<b>WA</b>	Water plans	<p>Minister has a broad set of instruments to address overallocation and overuse, including the purchase of licences, the ability to vary, amend, add or remove any condition on a licence, cancel or suspend a licence or at their total discretion decide not to renew a water licence.</p> <p>Where a groundwater proclaimed area is classified as fully or overallocated, an allocation plan is written that sets out the procedure for the above instruments to be applied.</p>
	Water recovery	<p>As described above, the Minister has a broad set of instruments to address overallocation and overuse, including the purchase of licences, the ability to vary, amend, add or remove any condition on a licence, cancel or suspend a licence or at their total discretion decide not to renew a water licence.</p> <p>Where a groundwater proclaimed area is classified as fully or overallocated, an allocation plan is written that sets out the procedure for the above instruments to be applied.</p> <p>In smaller areas where there are limited users, the instruments may be applied in the absence of a plan or while a plan is being developed.</p>
<b>Commonwealth</b>	Water plans	Murray–Darling Basin Plan and subsidiary plans. The Basin Plan will contain a long-term sustainable diversion limit for limiting consumptive uses to sustainable levels.
	Water recovery	<p>Water for the Future acquisition of water entitlements and water savings through infrastructure investments.</p> <p>The Australian Government is a partner in the Great Artesian Basin Sustainability Initiative, which will reduce extractions of artesian water through bore capping, bore rehabilitation and piping.</p>



### 5.3.4 Progress in systems identified as overallocated/overused

As discussed above, all systems identified as overallocated or overused have pathways specified in water plans to achieve or maintain an environmentally sustainable level of extraction. However, the Commission has found that clear evidence of successful implementation of those pathways is limited. Some evidence of progress in New South Wales is presented in Box 22. A submission to the Commission from Environment Victoria suggests that there are insufficient management and inadequate processes to deal with overallocation in Victoria, resulting in slow progress. The submission highlights delays in the increase of the Environmental Water Reserve, and draws attention to the setting of groundwater allocations according to history of use, rather than on the basis of sustainable yield.

#### **Box 22: Implementation of pathways to return of sustainable levels of extraction: New South Wales groundwater systems in the MDB—A case study**

In the MDB, long-term extraction limits are set for each groundwater management zone within a water plan area. The extraction limit is the average annual recharge less the volume set aside for the environment. This aims to protect the entire long-term storage component from extraction. For the Macquarie, Gwydir and Murrumbidgee groundwater systems, 85% of recharge is to be made available for extraction.

For the Murray, Upper and Lower Namoi and Lachlan groundwater systems, 100% of recharge is to be made available for extraction. This is unlikely to be sustainable, given the dependence of associated ecosystems on groundwater.

When these water plans came into force, licences previously held under the *Water Act 1912* were converted to *Water Management Act 2000* aquifer access licences, and the attached extraction volume immediately reduced to the identified long-term sustainable levels. The specific reduction for each licence is based on the history of extraction for each existing licence, and the subsequent identification of the active and inactive components of the licence.

To manage transition, users were then granted a supplementary licence with a volume equivalent to their history of extraction minus the new aquifer access entitlement. The volume available under these supplementary licences is then reduced progressively.

Entitlement holders and communities in these systems are also entitled to access Australian Government and New South Wales Government financial assistance through the Achieving Sustainable Groundwater Entitlements program to further assist with the transition to a lower entitlement.

More broadly, the *Australian Water Resources Assessment 2000* (NLWRA 2001), the Commission's *Australian water resources 2005* Level 2 report (NWC 2007a), and the 2009 Biennial Assessment based upon 107 representative water plans, have continued to identify many of the same water systems as overallocated, overused and/or stressed. In other words, the status of most of these water systems has remained almost unchanged for 10 years, despite governments' commitments to address overallocation and overuse. The Commission remains concerned that this may be leading to irreversible environmental damage.

Whilst progress is occurring, the Commission has little confidence that jurisdictions will meet their NWI commitments to clearly identify overallocated and overused systems and to make substantial progress towards returning those systems to environmentally sustainable levels of extraction by the end of 2010 (as stipulated in NWI clause 44).

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#### **Finding 5.7**

While efforts have been made, evidence suggests that limited real progress has been made in reducing the number of systems identified as overallocated and overused. On the basis of this Biennial Assessment, the Commission is disappointed to conclude that this central requirement of water reform will not be met.

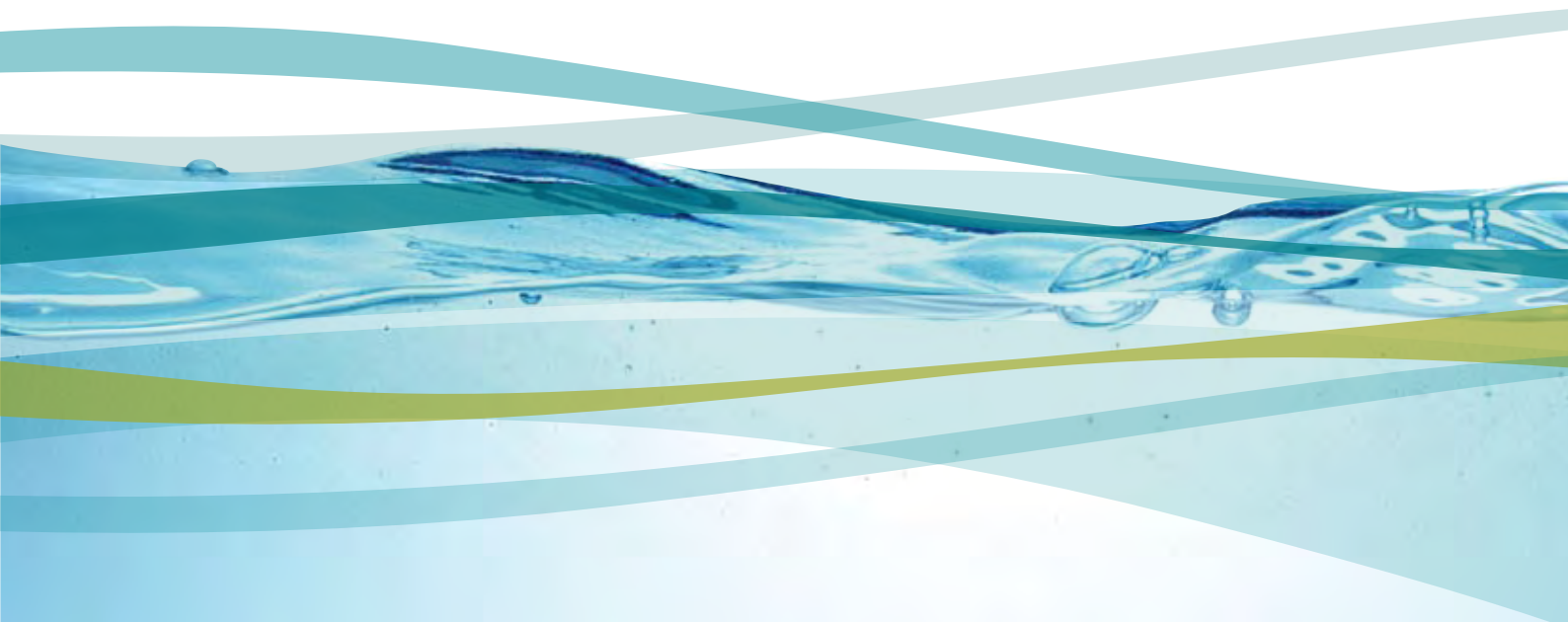
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#### **Recommendation 5.4**

The Commission recommends that jurisdictions make every possible effort to meet their NWI commitments and demonstrate clear pathways for the return of all systems currently identified as overallocated and overused to within sustainable extraction limits. The Commission strongly urges jurisdictions to publicly identify the most overallocated or overused systems for immediate attention, with less urgent cases to follow. When collated, the systems identified by each jurisdiction could enable an agreed national statement of priority actions to address overallocation and overuse.

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# 6

## Water entitlements

## 6.1 Overview

Where access to water is insecure, users are likely to lack the confidence that they require to invest in new capital equipment, improved management practices and infrastructure. Secure access to water is therefore an essential foundation for efficient water use and investment decisions.

Similarly, water-dependent communities need security to make the longer term business, social and family decisions required to sustain and build local and regional economies.

Water entitlements of various forms (such as access licences, statutory rights, contracts and supply agreements) have been used across the nation in order to define users' access to water. However, concerns about the clarity, flexibility and consistency of water entitlement products formed a significant motivator for the development of the NWI.

Importantly, the NWI establishes a framework and set of characteristics that enable the development of clear, nationally compatible and secure water access entitlements. Under the NWI, a 'water access entitlement' is to be defined in statute as a perpetual or ongoing and exclusive entitlement to a share of water. Typically, volumetric allocations are made against these entitlements each year or irrigation season depending on the amount of water available, as defined in the relevant water plan. In the majority of cases, these water access entitlements are valuable business assets that underpin confidence for lending and investment.

In addition to defining the characteristics that provide for secure access to water, the NWI water access entitlements framework facilitates the development of markets and trade in water (see Chapter 7) by defining water entitlements separately from land tenure ('unbundling'). Trade is further promoted in the NWI through its emphasis on national compatibility and the development and maintenance of reliable public water registers. However, the NWI recognised that NWI water access entitlements may not be the most suitable form of water entitlement for all water products and systems (see clause 33(i)), and that other mechanisms may be used to ensure secure access to underpin investment, and to enable trade where possible.

It is anticipated that when the NWI water access entitlements objective (clause 23(i)) has been achieved there will be **certainty** for both productive and environmental entitlement holders. This requires the following:

1. There will be a **secure legislative/statutory basis** for water entitlements.
2. Water entitlements will be **clearly, completely and transparently defined** based on the NWI water access entitlements characteristics wherever possible.
3. Water entitlements will be **protected from erosion** as a result of unregulated growth in interception of water through land-use and land management changes (see Chapter 1).
4. Water entitlements will be **unbundled** from land wherever possible (see Chapter 7).
5. Water entitlements will be **clearly specified in registers** in a transparent and nationally compatible manner.
6. Water entitlements will clearly **specify the assignment of risks** of future changes in water availability (see Chapter 9).
7. Water entitlements will be effectively **monitored and enforced** (see Chapter 3).

As noted above, many of the other characteristics of secure entitlements are dealt with in detail in other chapters of this biennial assessment. While environmental entitlements must also meet the characteristics outlined above, this chapter focuses on consumptive use.<sup>16</sup>

Based on evidence provided in this chapter, in the Commission's view, while significant progress has been and continues to be made in this area, the implementation of the NWI water access entitlements framework is too slow in some jurisdictions. Slow progress on entitlements means slow delivery of many contingent NWI benefits. Meanwhile, the development of water markets and the emergence of new challenges associated with low water availability has heightened the need for more complete and transparent specification of water entitlements.

<sup>16</sup> Refer to Chapter 4 for the Commission's assessment of environmental water, including entitlement-based and rules-based water.

<b>Finding 6.1</b>	Most jurisdictions have undertaken significant legislative reforms to enable the implementation of NWI-consistent water access entitlements. However, Western Australia and the Northern Territory are notable cases where legislative reform has not been finalised.
<b>Recommendation 6.1</b>	The Commission recommends that Western Australia and the Northern Territory finalise and introduce the remaining legislative reforms as soon as possible to enable implementation of their NWI commitments to NWI-consistent water access entitlements and the benefits that flow from them.
<b>Finding 6.2</b>	As a result of incomplete implementation of entitlement reforms, there are water users in each jurisdiction who do not yet benefit from the additional security provided by NWI-consistent water access entitlements. To date, implementation has concentrated on high-priority water systems. In remaining systems, the intended extent of implementation of NWI-consistent water access entitlements and the timeframe for such reform are uncertain.
<b>Recommendation 6.2</b>	The Commission recommends that jurisdictions pursue the implementation of NWI-consistent water access entitlements with greater urgency. Recognising that the NWI allows for the issue of fixed-term or other types of entitlements where demonstrably necessary, the Commission urges jurisdictions to clearly articulate where such arrangements are to be made and on what grounds. The Commission recommends that jurisdictions review and reset their implementation plans within six months to spell out the proposed extent and timetable for entitlement reforms across all water systems.
<b>Finding 6.3</b>	The Commission has identified mixed progress in relation to robust and transparent annual allocation methods and processes (including announcements), which are particularly important in times of drought and as markets develop. While there are examples of positive reforms and good practice, concerns have been expressed by stakeholders about allocation processes in some cases and there are other examples of ad hoc changes to allocation policy that undermine confidence in water management.
<b>Recommendation 6.3</b>	The Commission recommends that for hydrologically connected systems, jurisdictions work together to develop and adopt more transparent and robust allocation methods and processes. The Commission proposes undertaking a national review of allocation methods and processes prior to the next biennial assessment in 2011.
<b>Finding 6.4</b>	There is evidence that some jurisdictions, such as New South Wales, Victoria and South Australia, are improving the flexibility of water access entitlements to better manage the risks associated with low water availability.
<b>Finding 6.5</b>	Ministerial interventions and special water sharing arrangements have been used to ensure water supply for critical human needs during periods of critical and severe water shortage. These arrangements are necessary in exceptional circumstances. However, such arrangements are generally less transparent than standard water allocation arrangements, and are susceptible to more ad hoc intervention. While recognising jurisdictions' efforts to improve community understanding of these arrangements, and limit their use, the Commission is concerned that ongoing use of such arrangements may erode the overall integrity of water entitlements.
<b>Recommendation 6.4</b>	Recognising that drought conditions may become more frequent as a result of climate change, the Commission recommends that jurisdictions make further efforts to develop detailed allocation policies covering the full range of inflow conditions, and that these are promulgated to improve public understanding of how drought-related contingencies will be managed in future, including through arrangements to provide for critical human water needs under the new Murray–Darling Basin Plan. While recognising that ministers usually have statutory rights or reserve powers to intervene, and that such interventions may be necessary in exceptional circumstances, it is in the interests of entitlement holders that those be exercised rarely, with full transparency, and in accordance with previously signalled principles and processes.

<b>Finding 6.6</b>	Registers to provide security for water entitlements are improving, especially in Victoria and Queensland. Registers outside the MDB states are significantly trailing developments in MDB states. While progress has not yet been sufficient to achieve compatible registers in the MDB, COAG commitments to the development of a National Water Market System are being progressed and are expected to address this matter.
<b>Finding 6.7</b>	Water to meet Indigenous social, spiritual and customary objectives is rarely clearly specified in water plans. It appears often to be implicitly assumed that these objectives, where considered at all, can be met by rules-based environmental water provisions.
<b>Recommendation 6.5</b>	The Commission recommends further exploration of Indigenous needs in relation to water access and management, and mechanisms to meet those needs. The Commission proposes to initiate a national study on this matter.
<b>Finding 6.8</b>	While the NWI Agreement recognises (through special clause 34) the potential for further policies and measures beyond the agreement for minerals and energy industries, the circumstances in which they would apply are not defined and identified in a consistent and transparent manner. Little progress has been made in the five years since the signing of the NWI in fleshing out the special provisions for the minerals and related industries. As a consequence, there has been little integration of those industries with broader water markets and water planning processes, despite the potential for considerable benefits in many cases.
<b>Recommendation 6.6</b>	The Commission recommends that NWI-consistent water access entitlements be defined for the minerals, petroleum and other industrial sectors (including plantations and other extractive industries) in order to provide those industries with secure access and the ability to trade with other users. Particular circumstances (such as mine dewatering and return flows) and potential third-party impacts that might limit the applicability of NWI-consistent water access entitlements should be clearly identified and managed. This recommendation is particularly important for Western Australia and the Northern Territory, where legislative reforms have still not been finalised.
<b>Finding 6.9</b>	There are a range of new and alternative urban water sources emerging, such as desalinated water, purified recycled water, and stormwater reuse. Access to some new and alternative sources is less secure than for conventional sources (particularly stormwater and managed aquifer recharge). However, providing secure access is challenging due to the interrelationships within the urban water cycle.
<b>Recommendation 6.7</b>	The Commission recommends that jurisdictions identify and pursue reforms to ensure that (i) secure access is provided for all new and alternative sources of urban water supply so that they can compete on an equal footing with more conventional supply options, and (ii) growth in the use of particular sources does not undermine the security of entitlements in other parts of the urban water cycle or adversely affect third parties and the environment. These benefits could be provided through NWI-consistent water access entitlements, or through alternative licensing or contractual arrangements.

## 6.2 Context for this assessment

The 2007 Biennial Assessment (NWC 2007) and subsequent 2008 Update (NWC 2008a) assessed progress in implementing the water access entitlements and planning framework elements specified in NWI clause 24. The previous assessments found the following:

- + Almost all states and territories had made good progress in developing water access entitlement and planning frameworks as prescribed by the NWI, particularly in high-priority water systems.
- + New South Wales, Victoria, Queensland and South Australia had put in place or amended legislation to incorporate elements of the entitlement and planning frameworks prescribed by the NWI.
- + Western Australia was reviewing its systems with a view to introducing new legislation into parliament in 2008. Tasmania, the Northern Territory and the Australian Capital Territory were reviewing their legislation to ensure that it meets NWI requirements.
- + Key achievements (in water reform) included the introduction of legislative and administrative arrangements to facilitate trade in water access entitlements.

While the COAG Working Group on Climate Change and Water is not specifically examining water access entitlements, the issue is relevant to many of the priority areas in its workplan (WGCCW 2008).

The Commission has contributed to further reform of water entitlements by commissioning the think piece *New water entitlement products for Australia* (SKM 2008), which was designed to raise issues surrounding new and emerging water sources and their relationship with existing water access entitlement frameworks. The report aimed to help develop the necessary water entitlement requirements for new sources of water. In addition, the Joint Steering Committee for Water Sensitive Cities, a cross-jurisdictional group involving the Commission with specific commitments under the NWI, recently released its report, *Review of urban water entitlements in Australia* (Frontier Economics 2008a).

### Box 23: Security vs reliability

The terms 'security' and 'reliability' are used differently across different jurisdictions, often interchangeably. The Commission encourages the adoption of nationally consistent terminology based on the NWI. The definitions below relate to NWI-consistent use of these terms.

*Reliability:* The frequency with which water allocated under a water access entitlement is able to be supplied in full (referred to in some jurisdictions as 'high security' and 'general security').

*Security:* Includes the overall level of confidence that a water entitlement will provide that which it specifies. Security thus includes the reliability of supply. It also relates to the legal status of the water entitlement (security of tenure).

The range of characteristics detailed in the NWI are all factors that contribute to the security of a water entitlement. A water entitlement that demonstrates all NWI characteristics is more secure than an entitlement or licence that does not have those characteristics.



## 6.3 The Commission's assessment and findings

### 6.3.1 Development of secure and nationally consistent water access entitlements

#### Background: Terminology and relevant NWI clauses

NWI clauses 28–31:

28. The consumptive use of water will require a water access entitlement, separate from land, to be described as a perpetual or open-ended share of the consumptive pool of a specified water resource, as determined by the relevant water plan (paragraphs 36 to 40 refer), subject to the provisions at paragraph 33.
29. The allocation of water to a water access entitlement will be made consistent with a water plan.
30. Regulatory approvals enabling water use at a particular site for a particular purpose will be specified separately to the water access entitlement, consistent with the principles set out in Schedule D.
31. Water access entitlements will:
  - i) specify the essential characteristics of the water product;
  - ii) be exclusive;
  - iii) be able to be traded, given, bequeathed or leased;
  - iv) be able to be subdivided or amalgamated;
  - v) be mortgageable (and in this respect have similar status as freehold land when used as collateral for accessing finance);
  - vi) be enforceable and enforced; and
  - vii) be recorded in publicly-accessible reliable water registers that foster public confidence and state unambiguously who owns the entitlement, and the nature of any encumbrances on it.

Clause 33(j) is also relevant:

33. The provisions in paragraphs 28–32 are subject to the following provisions:
  - i) fixed term or other types of entitlements such as annual licences will only be issued for consumptive use where this is demonstrably necessary, such as in Western Australia with poorly understood and/or less developed water resources, and/or where the access is contingent upon opportunistic allocations, and/or where the access is provided temporarily as part of an adjustment strategy, or where trading may otherwise not be appropriate. In some cases, a statutory right to extract water may be appropriate ...

This section examines the extent to which the NWI water access entitlements framework has been defined in legislation and implemented in practice. It also considers the extent to which nationally compatible entitlements are being developed across jurisdictions.

#### 6.3.1.1 Legislative framework for water access entitlements

The Commission finds that the states and territories, except for Western Australia and the Northern Territory, have made significant efforts to incorporate an NWI-consistent water access entitlement framework into legislation and policy.

Western Australia has yet to introduce legislation to incorporate recent water reforms and continues to operate under a water licensing regime that is not consistent with the NWI. Under its original NWI implementation plan, Western Australia committed to having the legislation in place by 2008 (NWC 2009). Full conversion to NWI-compatible water access entitlements will not occur until legislative changes have been made and a water plan has been developed for each plan area (see Box 24).

#### Box 24: Legislative changes in Western Australia

Western Australia is proposing significant changes to its water legislation in order to implement a new water reform agenda that incorporates the key elements of the NWI. Three proposed Bills will repeal 10 existing Acts.

Western Australia expects that a Water Services Bill will be introduced into parliament in the 2010 autumn session. The Bill will enable the delivery of much of the urban water management requirements of the NWI and COAG agenda.

A Water Resource Management Bill is currently being considered by government. It is expected to be introduced to parliament in early 2011. The Minister has committed to releasing a Green Bill for three months' consultation before introduction into parliament.

Western Australia has indicated that it recognises that some key components or mechanisms of the NWI cannot be implemented until the new legislation is finalised. In the meantime, it is seeking to implement as much of the intent of the NWI as is practicable under existing legislation.

The Northern Territory Implementation Plan lists March 2007 as the completion date for passing legislation and establishing a framework for NWI-consistent water access entitlements (NWC 2009). Two years later, the appropriate changes have not been made and old water licensing arrangements remain in place in the Northern Territory, which is at odds with the territory's commitments under the NWI.

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#### ■ Finding 6.1

Most jurisdictions have undertaken significant legislative reforms to enable the implementation of NWI-consistent water access entitlements. However, Western Australia and the Northern Territory are notable cases where legislative reform has not been finalised.

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#### ■ Recommendation 6.1

The Commission recommends that Western Australia and the Northern Territory finalise and introduce as soon as possible the remaining legislative reforms to enable implementation of their NWI commitments to NWI-consistent water access entitlements and the benefits that flow from them.

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#### 6.3.1.2 Implementation of water access entitlements

Table 18 provides an overview of the status of entitlements across Australia (information drawn from the Commission's *Australian water markets report 2007–2008* (NWC 2008b) and other sources). As discussed above, it shows that in most states water access entitlements exist that are generally consistent with the NWI. However, the table also shows that those entitlements exist alongside other entitlement mechanisms that remain embedded in pre-existing legislation and that do not meet many of the characteristics outlined in the NWI. For example, many 'pre-existing' entitlements are not unbundled from land and are not tradeable.

Table 18: Overview of status of water access entitlements across Australia

Jurisdiction	Entitlement (NWI water access entitlement / other)	Water allocation	Statutory basis	Planning instrument	Unbundled and tradeable	Duration	Where recorded
ACT	Water access entitlement	Water allocation	<i>Water Resources Act 2007</i> (ACT)	Territory Plan under the <i>Planning and Development Act 2007</i> (ACT)	Unbundled and tradeable	Perpetual	Register of water access entitlements
	Water allocation	N/A	<i>Water Resource Act 1998</i> (ACT)	Remains in force subject to 2007 Act.	Unbundled and tradeable within the ACT	Perpetual	Register of water access entitlements
NSW	Water access licence	Water allocation	<i>Water Management Act 2000</i> (NSW)	Water sharing plans, consistent with five-year State Water Management Outcomes Plan	Unbundled <sup>a</sup> and tradeable	Perpetual	Water access licence register
	Water licence	No (volumetric or area based)	<i>Water Act 1912</i> (NSW)	No concept of a water plan involved	Not unbundled; not tradeable (new licence issued instead, or else part of sale of land)	Not perpetual (volumetric or area based), but renewable	Not recorded on register, but listed in licensing database
NT	Water licence	N/A	<i>Water Act 1992</i> (amended 2008) (NT)	Declared water control districts with water allocation plan areas and water management zones (plans have 10-year duration)	Not unbundled; tradeable (within a water control district where plan is in place)	Not perpetual (up to 10 years but renewable)	Water licence database

Jurisdiction	Entitlement (NWI water access entitlement / other)	Water allocation	Statutory basis	Planning instrument	Unbundled and tradeable	Duration	Where recorded
Qld	Water allocation	Seasonal water assignment	<i>Water Act 2000</i> (Qld)	Water resource plan implemented by resource operations plan	Unbundled and tradeable	Perpetual	Water allocations register
	Interim water allocation	Seasonal water assignment	<i>Water Act 2000</i> (Qld)	Exist in areas where a resource operations plan has not been finalised	Not unbundled, yet can be relocated to other land in limited circumstances.	Not perpetual (stated duration). Converted to tradeable water allocations on completion of a resource operations plan.	Recorded on DERM water accounting and management systems
	Water licence	Seasonal water assignment	<i>Water Act 2000</i> (Qld)	Generally exist in non-water resource plan / resource operations plan areas <sup>b</sup>	Principal entitlement for unsupplemented water in non-water resource plan / resource operations plan areas. They are usually attached to the land title.	Not perpetual (stated duration). Specified licences converted to tradeable water allocations on completion of a resource operations plan.	Recorded on DERM water accounting and management systems
SA	Water access entitlement	Water allocation	<i>Natural Resources Management (Water Resources and Other Matters) Amendment Act 2007</i>	Natural resource management plans implemented through water allocation plan	Unbundled and tradeable (SA River Murray only)	Perpetual	Water information and licensing management application (WILMA)
	Water licence	Water allocation	<i>Natural Resource Management Act 2004</i> (SA)	Natural resource management plans implemented through water allocation plan	Not unbundled, but tradeable	Perpetual	Water information and licensing management application (WILMA)

Jurisdiction	Entitlement (NWI water access entitlement / other)	Water allocation	Statutory basis	Planning instrument	Unbundled and tradeable	Duration	Where recorded
<b>Tas.</b>	Water licence	Water allocation	<i>Water Management Act 1999</i> (Tas)	Water management plans	Unbundled and tradeable	Perpetual <sup>c</sup>	Water information management system
	Irrigation right	Water allocation	<i>Irrigation Clauses Act 1973</i> (Tas)	Water management plans	Unbundled and tradeable	Perpetual <sup>c</sup>	Relevant irrigation entity's irrigation rights register
<b>Vic.</b>	Water share	Water allocation	<i>Water Act 1989</i> (Vic)	Sustainable water strategies and management plans	Unbundled and tradeable	Perpetual	Victorian water register
	Water licence (s. 51) (groundwater and surface water)	No (licence provides a maximum amount of water which may be taken, subject to restriction)	<i>Water Act 1989</i> (Vic)	Sustainable water strategies and management plans	Not unbundled, but tradeable in certain circumstances	Not perpetual (maximum 15 years)	Progressively being added to Victorian water register
<b>WA</b>	Water licence	No (volumetric basis and no consumptive pool)	<i>Rights in Water and Irrigation Act 1914</i> (WA)	Proclaimed water management areas	Not unbundled, but tradeable within a water resource management unit	Not perpetual (fixed period or an indefinite period)	Water resource licensing system

Note: this table does not address the concept of works (NSW) or water use licences (Victoria).

- a While trusts in NSW do hold a separate water access licence, water allocation decisions by some trusts are still made on a per hectare basis.
- b Specific Water Licences can continue to exist in a water resource plan area for which a resource operations plan has been finalised, including groundwater entitlements and other authorisations such as stock and domestic licences.
- c Note discussion on the duration of water access entitlements in Tasmania in Section 6.3.2.4.

The fact that most states still have both an NWI-consistent water access entitlements framework and pre-existing entitlement arrangements demonstrates that the transfer from one system to the other is incomplete. Most of the reforms to introduce NWI-consistent water access entitlements have been implemented in high-priority regulated surface water systems with significant water use. While this covers a large proportion of consumptive water use, there are many other systems where entitlements are yet to be converted. Lawlab (2009) found that the rollout of water access entitlements has been slow. For example, while the majority of water use (by volume) in New South Wales is covered by water access entitlements, 87% of total water licences (by number) have not been converted.

The Commission is concerned about the slow implementation of NWI-consistent water access entitlements, while recognising that:

- + implementing legislative conversions to water access entitlements is often slow due to the strong links with the rollout of water plans
- + in some cases, conversions can occur at a certain time (for example, an opportunity is triggered when entitlement holders are seeking to trade, as in New South Wales).

The Commission also recognises (under NWI clause 33(i)) that fixed-term or other types of entitlements such as annual licences may be issued, where demonstrably necessary. However, even in those cases, there need to be certain limits on rights to access and take water, including to protect the interests of third parties and the environment. The Commission therefore considers that NWI-consistent entitlements should be implemented wherever possible. Furthermore, the Commission is concerned that there is a lack of clarity in relation to:

- + whether jurisdictions intend to implement NWI-consistent entitlements in all remaining surface and groundwater systems
- + if not, the extent to which 'pre-existing' entitlements will be reformed to improve their compliance with NWI entitlement characteristics
- + the timetable for implementation of such reforms.

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#### ■ Finding 6.2

As a result of incomplete implementation of entitlement reforms, there are water users in each jurisdiction who do not yet benefit from the additional security provided by NWI-consistent water access entitlements. To date, implementation has concentrated on high-priority water systems. In remaining systems, the intended extent of implementation of NWI-consistent water access entitlements and the timeframe for such reform are uncertain.

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#### ■ Recommendation 6.2

The Commission recommends that jurisdictions pursue the implementation of NWI-consistent water access entitlements with greater urgency. Recognising that the NWI allows for the issue of fixed-term or other types of entitlements where demonstrably necessary, the Commission urges jurisdictions to clearly articulate where such arrangements are to be made and on what grounds. The Commission recommends that jurisdictions review and reset their implementation plans within six months to spell out the proposed extent and timetable for entitlement reforms across all water systems.

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### 6.3.1.3 Compatibility across jurisdictions

#### Background: Terminology and relevant NWI clauses

To assist water reform, including water trading, to be seamless across borders, the NWI states that 'water access entitlements and planning frameworks will ... be compatible across jurisdictions ...' (NWI clause 25(vii)).

National compatibility with the NWI definition of entitlements across jurisdictions is desirable as it contributes to broadening the water market where the hydrological and ecological characteristics of water systems allow, such as in the southern connected Murray–Darling Basin. Compatible entitlements facilitate more efficient allocation of water across a larger group of users, and reduce administrative costs associated with water market transactions, particularly across state borders. Even where the absence of hydrological connections means that physical water trade is not feasible, compatibility facilitates financial and risk comparisons and thus capital flows and optimal patterns of investment across Australia. Compatibility also supports a national approach to water management, data collection, reporting and policymaking.

However, the Commission notes that compatibility or consistency does not necessarily require entitlements to have the same reliability—different products will exist in different systems to reflect the underlying physical characteristics and allow water holdings to be tailored to meet demand characteristics.

Findings and recommendations relating to cross-jurisdictional compatibility are found in the discussion on water markets and tagged trade in Chapter 7 and on water registers for entitlements and allocations in Section 6.3.2.5.

## 6.3.2 Complete and transparent definition of entitlements

As with any valuable asset, it is important that water entitlements are defined or specified so that entitlement holders fully understand the nature of their asset and the risks associated with it. This section examines factors that affect the full and clear specification of entitlements and highlights the importance of further reform to better manage drought and climate change, and to underpin confidence in the water market.

### 6.3.2.1 Lack of transparency of individuals' water rights within a bulk entitlement structure

The Commission notes that South Australia has recently passed legislation (*Irrigation Bill 2009* and *the Renmark Irrigation Trust Bill 2009*) that requires irrigation trusts to fix an initial irrigation right for each of its members.

However, the Commission also notes that some irrigation trusts in New South Wales still allocate individual shares of a bulk entitlement on a per hectare basis. A number of trusts are yet to specify and make transparent the individual rights of members, as against the rights of the bulk entitlement. This may constrain trade.

### 6.3.2.2 Robust and transparent allocation processes

Allocation processes provide water access entitlement holders with an actual volumetric amount that can be used or traded in each period (for example, an irrigation season). The magnitude and timing of allocations to water access entitlements is critical in determining on-farm water use and production decisions. Water allocations indicate the relative scarcity of water in any one season and thus have a significant impact on the water market, where trade is allowed. Recent experience demonstrates that allocation outcomes can significantly influence market activity.

Therefore, robust and transparent methods and processes for determining and announcing allocations are critical for the full implementation of clearly specified water access entitlements. In the Commission's view, there should be clarity and transparency in the way that the total available pool is calculated, how the consumptive pool is calculated, and when and how allocation announcements are made. The Commission is of the view that resource availability and outlook (inflows and storage levels) should be the sole determinants of allocation decisions, and that there should be clear and publicly available formulas and calculation methodologies driving allocation decisions, rather than, as has been claimed by stakeholders, ad hoc rules of thumb or allocation decisions based on perceptions of entitlement holder requirements. Information on resource availability (storage levels and inflows) should be publicly available so that entitlement holders can form realistic expectations about likely allocations. Allocation announcements (including when there is no change in allocations) should be made publicly at regular and predetermined intervals, those involved in allocation decisions should be subject to strict confidentiality and disclosure arrangements, and allocation processes and announcements should be independently audited at regular intervals.

The Commission finds that there has been mixed progress in this important area of water entitlement management. There are some examples of positive reforms and good practice. For example, there is a fixed and transparent allocation announcement system in operation in Victoria whereby fortnightly announcements are made to the public (including by email) for all systems and entitlements, even when there are no changes in allocations. Formal announcements are also accompanied by a description of water availability conditions and seasonal outlook. In addition, the MDBA has recently published online maps of up-to-date information on storage levels across the basin. Victoria has also stated that the allocation is only adjusted according to inflows and storage levels and that all entitlement holders are aware of the relationship between allocations to their entitlement and storage levels.

On the other hand, concerns have been expressed about some allocation processes. For example, in 2008 ABC Radio (ABC 2008) reported that:

*... irrigators are calling for more formality between the states on water allocation announcements, after South Australia announced a 2% new season allocation for irrigators yesterday. New South Wales and Victoria are not due to announce allocations until the first day of the season on July 1 when a zero allocation is again expected. Sunraysia Irrigators Council representative Malcolm Bennett says ad hoc announcements can potentially affect water markets, particularly with the entry of speculators to the market. 'Last year, for instance, there were announcements made by South Australia and the other states that had significant effects on the prices of temporary water and it would be good if somebody could get everybody together and have some sort of uniform approach to these sort of announcements.'*



While limited evidence is available, there have also been cases brought to the attention of the Commission of high volumes of trading activity prior to announcements associated with changes in trading policy in particular regions. Finally, case studies on water entitlements for mining and large industrial customers 'suggest that clear policies and practices for defining the resource share of the consumptive pool are required. This is of particular importance for defining resource shares in water storages developed by mining, petroleum, energy, pulp and paper industry (MPEPP) operations, as well as for the consumptive pool in general ...' (ACIL Tasman 2007).

While it recognises that decisions have sometimes been driven by drought and circumstances unforeseen in water plans, the Commission considers that the lack of consistency and transparency in those approaches undermines the overall security of water access entitlements and confidence in water management. The Commission considers that it is difficult for entitlement holders and the public to understand the detailed method and processes underpinning allocation decisions, and that there is therefore significant room for further improvement.

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### ■ Finding 6.3

The Commission has identified mixed progress in relation to robust and transparent annual allocation methods and processes (including announcements), which are particularly important in times of drought and as markets develop. While there are examples of positive reforms and good practice, concerns have been expressed by stakeholders about allocation processes in some cases, and there are other examples of ad hoc changes to allocation policy that undermine confidence in water management.

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### ■ Recommendation 6.3

The Commission recommends that for hydrologically connected systems, jurisdictions work together to develop and adopt more transparent and robust allocation methods and processes. The Commission proposes undertaking a national review of allocation methods and processes prior to the next biennial assessment in 2011.

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#### 6.3.2.3 Providing flexibility and managing risk

Governments, water businesses and entitlement holders are equally powerless in preventing droughts from occurring. However, the water entitlements framework can ensure that flexible tools are in place to manage such risks. Carryover provisions (under which irrigators can choose to keep their allocations in storage for use in the subsequent season, subject to storage constraints) are an example of such an approach, which recognises that irrigators are best placed to make interseasonal water use decisions. However, at the same time, it is important that governments and water authorities clearly state whether carryover water held in storage can be delivered. If an irrigator decides to forego production in one year to boost security for the following year, they need to be confident that this water will be delivered.

Box 25 outlines some of the recent reforms proposed in the Victorian draft *Northern Region Sustainable Water Strategy* (DSE 2008) to add flexibility to the entitlements framework in northern Victoria. Carryover has been available in some other jurisdictions, including New South Wales for some time, and in South Australia.

#### Box 25: Management of risk associated with reduced water availability

Managing the risk associated with reduced water availability requires understanding which parties are best placed to manage different types of risk. For example, the Victorian *Northern Region Sustainable Water Strategy—Draft for community comment* (NRSWS) has outlined a number of possible reforms in this regard:

**Carryover:** The NRSWS outlines reforms that could increase the ability of irrigators to carry over water from one season to another. This recognises that users are best placed to make decisions about their own security of supply across irrigation seasons.

**System reserve:** However, the NRSWS also recognises that irrigators need to be confident that any water they do carry over can be delivered. The NRSWS develops options to help ensure that the irrigation system can operate in very dry years.

Source: DSE 2008

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### ■ Finding 6.4

There is evidence that some jurisdictions, such as New South Wales, Victoria and South Australia, are improving the flexibility of water access entitlements to better manage the risks associated with low water availability.

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### 6.3.2.4 Ministerial changes to entitlements in response to drought

#### Background: Terminology and relevant NWI clauses

32. Water access entitlements will also:

- i) clearly indicate the responsibilities and obligations of the entitlement holder consistent with the water plan relevant to the source of the water;
- ii) only be able to be cancelled at Ministerial and agency discretion where the responsibilities and obligations of the entitlement holder have clearly been breached;
- iii) be able to be varied, for example to change extraction conditions, where mutually agreed between the government and the entitlement holder; and
- iv) be subject to any provisions relating to access of water during emergencies, as specified by legislation in each jurisdiction.

The Commission and the NWI Agreement recognise the responsibility of ministers and governments to intervene in emergency situations, or where entitlement holders have breached their responsibilities. Such intervention has also been used to deal with contingencies, such as extreme low inflows, that lie beyond the range of normal, prudent water planning. However, the security of water entitlements may be undermined by decisions to reduce water allocations outside the usual accepted methods for determining allocations, particularly where decisions lack transparency. In some cases, such interventions can also favour some irrigators over others, often penalising those individuals who are best prepared to manage seasonal conditions.

It is important for governments to clearly specify the circumstances under which water access entitlements and associated allocations will be varied and to promote understanding of those circumstances by entitlement holders. Moreover, as a result of ongoing drought and potential impacts of climate change, it is important to more fully define how entitlement security (particularly annual allocations and deliverability) will be affected during times of low water availability.

#### Box 26: NRMMC performance indicator 1.1

NRMMC performance indicator 1.1 seeks to measure 'the number of decisions by governments that revoke, suspend or change the security of statutory water access entitlements and the reasons for these decisions'.

This assessment discusses cases in which governments have intervened to change the security of entitlements.

There have been cases where state governments have unilaterally intervened to change the security of water access entitlements or associated water allocations in particular jurisdictions. In the Commission's view, those decisions have negatively affected confidence in the security of water access entitlements.

In Victoria, water access entitlements generally are not subject to ministerial changes and allocations are not adjusted by a minister, with the only exception being the qualification of rights under section 33AAA and 33AAB of the *Water Act 1989*, which can be applied by the Minister when there is a 'water shortage'. Due to the ongoing dry conditions, there are a number of qualifications in place. Victoria has reported to the Commission that it qualified eight water supply systems, three water supply protection areas and a number of smaller unregulated water supply protection areas in 2007–08, and again in 2008–09, in order to ensure that critical water needs (domestic, stock and industrial) were met. Currently, a qualification of rights is a temporary measure (no permanent qualification of rights can be made until after 2021).

Victoria has stated that it aims to prevent the need to qualify rights in the future (DSE 2008, page 70). With this in mind, in northern Victoria there has been a move towards reducing the trigger for lifting a qualification. For example, current qualifications on the Murray are lifted when allocations reach 20%. It is proposed that any future qualifications will be lifted when allocations reach 10%. This is intended to send a strong signal to the beneficiaries of the qualification, namely towns, that when allocations reach moderate levels they can meet their needs by buying water on the market. In addition, urban water authorities have been advised that their water supply planning should not assume that any qualification of rights will be ongoing.

New South Wales has suspended five water sharing plans and reduced the water allocations in those areas in an attempt to ensure that critical water supplies could be met. 'Critical water advisory groups' were established to provide advice on the priorities of water supply. In the absence of an active water sharing plan, water resources are managed under contingency rules that are changed

and updated regularly to reflect water availability at a particular time. Greater flexibility has also been provided by extending the water trading and carryover rules. In some cases trading is allowed; in other cases it is not (DWE 2009).

The South Australian Government has not made any decision that has revoked, suspended or changed the security of statutory water licences since the end of 2006.

However, low inflows in the Murray–Darling Basin continue to affect water security. Special water sharing arrangements have been in place within the southern MDB since June 2007, as the normal water sharing arrangements did not allow for the severe, prolonged drought conditions experienced in recent years. As a result of reduced flows across the state border, South Australia has issued 14 notices of restriction (including variations to notices of restriction) that affect River Murray Prescribed Watercourse licensees. Reduced flows to South Australia are likely to continue unless there is a significant increase in water resource availability (MDBA 2009).

The Commission is concerned that approaches for temporarily reducing water allocations may be eroding the confidence of water users and investors in their water access entitlements, as well as the effectiveness of water management arrangements in water plans. The Commission recommends that principles be developed and promulgated to improve public understanding of existing processes to adjust entitlements and allocations in times of water shortage, and provide greater certainty with regard to how such contingencies will be managed in future. Such principles should promote transparency, minimise the need for ad hoc intervention, and minimise the circumstances where reserve powers can be used.

The Commission recognises efforts, such as through South Australia's River Murray drought water allocation decision framework and Victoria's qualification of rights framework, to describe processes for adjusting water entitlements or allocations in times of critical and severe water shortage. The Commission considers it essential that such processes are implemented transparently and consistently and in accord with previously signalled principles and processes, so that the confidence of water users and investors in water access entitlements and water management arrangements is not eroded.

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#### ■ Finding 6.5

Ministerial interventions and special water sharing arrangements have been used to ensure water supply for critical human needs during periods of critical and severe water shortage. These arrangements are necessary in exceptional circumstances. However, such arrangements are generally less transparent than standard water allocation arrangements, and are susceptible to more ad hoc intervention. While recognising jurisdictions' efforts to improve community understanding of these arrangements, and limit their use, the Commission is concerned that ongoing use of such arrangements may erode the overall integrity of water entitlements.

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#### ■ Recommendation 6.4

Recognising that drought conditions may become more frequent as a result of climate change, the Commission recommends that jurisdictions make further efforts to develop detailed allocation policies covering the full range of inflow conditions, and that these are promulgated to improve public understanding of how drought-related contingencies will be managed in future, including through arrangements to provide for critical human water needs under the new Murray–Darling Basin Plan. While recognising that ministers usually have statutory rights or reserve powers to intervene, and that such interventions may be necessary in exceptional circumstances, it is in the interests of entitlement holders that those be exercised rarely, with full transparency, and in accordance with previously signalled principles and processes.

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Under the NWI, water access entitlements should provide open or perpetual rights to a share of water. As shown in Table 18, most jurisdictions have adopted this characteristic in new statutory entitlements. However, Tasmania has entitlements that are issued for a 40-year term. The Tasmanian Government has advised that the *Water Management Act 1999* (Tas) provides for 'ongoing' entitlements, where a licence is in force for such time as the Minister determines and is endorsed on the licence, but *must* be renewed if the Minister is satisfied that a set of specific, limited considerations have been met. In 2008, section 80 of the Act was amended to allow for automatic renewal of water licences at the end of the period of tenure. Previously, licensees were required to apply for renewal. Under the new arrangements, there is a presumption of renewal as long as all fees have been paid, the conditions of the licence have been complied with, the licensee is not disqualified from holding a licence, and the renewal is not inconsistent with the objectives of the Act or a relevant water management plan. These amendments were made to provide water users and investors with greater certainty and security regarding entitlements to water (Government of Tasmania 2009), following a 2007 review of Tasmania's water access entitlement system.

In the Commission's view, these changes have brought the level of certainty and security of Tasmanian water access entitlements to a level comparable to jurisdictions that are fully NWI-compliant.

### 6.3.2.5 Effective and nationally compatible water registers

Registers of water entitlements help improve the transparency and accountability of water entitlements. This contributes to the security and certainty of the entitlements framework, and underpins water markets and trade.

Table 19 provides an overview of the current status of water registers in Australia, based on the Commission's *Australian water markets report 2007–08* (NWC 2008b).

**Table 19: Summary of current water registers across Australia**

Jurisdiction	Register name	Function	Administrator	Availability
<b>ACT</b>	Register of licences and water access entitlements	Register of licences, water allocations and permits granted, including transfers made under the <i>Water Resources Act 2007</i>	Environment Protection Authority	Public, not online
<b>NSW</b>	Water access licence register	Statutory register for title of ownership of water access licences and encumbrances on those licences	Department of Lands (Land and Property Information)	Public, online (fee based search)
	Register of applications for water approvals	Provides information about the status of applications held by the department	Department of Water and Energy (DWE)	Public, online
	Register of water approvals	Provides information about the status of approvals held by the department	DWE	Public, online
	Water access licence conditions register	Provides basic information on water access licences under the <i>Water Management Act 2000</i> . Full details are only available on the water access licence register	DWE	Public, online
	Available water determinations (AWD) register	Provides information on the volume of water available for extraction determined by the Minister's AWD. AWDs are made for each access licence category in each water source	DWE	Public, online
	Water allocation assignments register (water allocation trading)	Provides information about trade in water allocations under the <i>Water Management Act 2000</i>	DWE	Public, online
	Water share register (water access entitlement trading)	Provides information about trade in water access licence share components (part or all of the share of the available water under the licence) to another licence holder in the same water source under s. 71Q of the <i>Water Management Act 2000</i>	DWE	Public, online

Jurisdiction	Register name	Function	Administrator	Availability
<b>NT</b>	Register of water access entitlements and licences	Register of licences granted to use and trade surface water and take groundwater	Controller of Water Resources (Department of Natural Resources, Environment and the Arts)	Public, online
<b>Qld</b>	Water allocation register	Records ownership and other information on water allocations	Registrar of Water Allocations (also the Registrar of Land Titles)	Public, online (fee-based search)
<b>SA</b>	Water Information and Licensing Management Application (WILMA)	WILMA records information about water access entitlements, allocations, site use approvals and works approvals. It records sales but does not record the allocation/use right.	Department of Water, Land and Biodiversity Conservation	Information in WILMA is available via the South Australian NRM Register, which is public and available online.
<b>Tas.</b>	Register of licences and water access entitlements	Register of licences, water allocations and transfers made under the <i>Water Management Act 1999</i> . Register based upon the Water Information Management System.	Department of Primary Industries and Water	Public, not online
<b>Vic.</b>	Victorian water register	<p>The register is shared between the Office of Water, rural water authorities and the Victorian Water Registrar. The register records:</p> <ul style="list-style-type: none"> <li>– who has been issued with water shares and the reliability, tenure, location and holding in megalitres for each water share</li> <li>– how much water has been allocated against water shares, how much has been used, and where it was used</li> <li>– interests in water shares, such as mortgages and leases</li> <li>– volumes of trades of allocations, transfers of water shares and other transactions.</li> </ul>	Department of Sustainability and Environment, Office of Water	Public, online
<b>WA</b>	Water resource licensing system	Records water licences and details of transfers	Department of Water	Public, not online

The 2007 Biennial Assessment found that continued effort was required to enhance the compatibility of individual southern MDB registers (as operated by states and private irrigation entities). In the two years since that assessment, the imperative has been redefined beyond just the basin and beyond basic registry requirements to incorporate broader water market and accounting data. In the 2008 Update, the Commission proposed that governments seek to go beyond the NWI commitment to develop 'compatible registers' of water entitlements and move directly to a common national registry system for water entitlements.

In 2008, the Commission undertook a review of states' registry arrangements (see Box 27), and it is continuing to contribute to work in this area.

#### **Box 27: Commission's review of states' registry arrangements**

In May 2008, the Commission reviewed states' registry arrangements. That review (NWC 2008c) confirmed that, while there are water entitlement registers in each jurisdiction (with the exception of Western Australia) that enable water trade, there is limited compatibility or interoperability between the systems. In a number of jurisdictions, there has been significant investment in registry systems to meet the particular requirements of those jurisdictions—Victoria and Queensland, for example. In other jurisdictions where there has not been the recent investment, registers or registry systems currently require attention and investment to meet even internal requirements.

There is a greater need for registry systems to meet external reporting requirements since the passage of the *Water Act 2007* (in particular, with respect to the Bureau of Meteorology's data collection responsibilities). Aside from the need for data collection, the capacity of the registers in the MDB states to interact smoothly is critical to promoting interstate trade.

As of late 2008, significant compatibility issues remained unresolved in regards to registers across jurisdictions. COAG's commitment to a National Water Market System is expected to significantly improve the compatibility of registration of water access entitlements across jurisdictions. The development of the compatible registry system will also provide an opportunity for other jurisdictions to draw on the experiences of Victoria and Queensland who have recently undertaken significant work to improve their register systems.

Interoperability between registers is one of the three elements of the National Water Market System (see Section 7.3.2.2). The Commission supports the National Water Market System initiative in the hope that it will deliver national registry systems capable of facilitating interstate trade and data collection—both of which will improve market performance.

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#### **■ Finding 6.6**

Registers to provide security for water entitlements are improving, especially in Victoria and Queensland. Registers outside the MDB states are significantly trailing developments in MDB states. While progress has not yet been sufficient to achieve compatible registers in the MDB, COAG commitments to the development of a National Water Market System are being progressed and are expected to address this matter.

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## 6.3.3 Entitlements for non-irrigation uses

### 6.3.3.1 Indigenous entitlements

#### Background: Terminology and relevant NWI clauses

25. The Parties agree that, once initiated, their water access entitlements and planning frameworks will:
- ix) recognise indigenous needs in relation to water access and management ...

While requiring that water access entitlements and planning frameworks recognise Indigenous needs in relation to water access and management, the NWI provides little guidance on how those needs should be addressed. In its review of water plans (see Chapter 1), the Commission found that Indigenous water requirements appear to be rarely explicitly included in water plans. There is commonly an implicit assumption that environmental flows (typically rules-based environmental water) will serve as a surrogate mechanism to meet Indigenous social, cultural or spiritual requirements.

During consultations with stakeholders for this assessment, arguments have been put to the Commission that this approach does not enable Indigenous people to benefit from the much-needed economic development opportunities that might be provided by more secure and excludable NWI-consistent water access entitlements. While the Commission believes there is merit to that argument, the Commission also considers it critical that such an approach does not devalue important spiritual and cultural values associated with water, and that it can be implemented in a way that takes into account existing entitlement holders.

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#### ■ Finding 6.7

Water to meet Indigenous social, spiritual and customary objectives is rarely clearly specified in water plans. It appears often to be implicitly assumed that these objectives, where considered at all, can be met by rules-based environmental water provisions.

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#### ■ Recommendation 6.5

The Commission recommends further exploration of Indigenous needs in relation to water access and management, and mechanisms to meet those needs. The Commission proposes to initiate a national study on this matter.

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### 6.3.3.2 Integrating the minerals, petroleum and other industrial sectors

#### Background: Terminology and relevant NWI clauses

NWI clause 34 states that 'there may be special circumstances facing the minerals and petroleum sectors that will need to be addressed by policies and measures beyond this agreement ...'

Secure access to and delivery of water are critical to the productivity and development of the minerals, petroleum, energy generation, pulp and paper (MPEPP) and other industrial sectors in Australia. A national report by ACIL Tasman (2007) found that the availability of water is a constraint on further investment and expansion of the MPEPP industries and suggested that the potential value of lost production, due to the unavailability of water of suitable quality, is high.

The Commission considers that NWI-consistent water access entitlements should be applied to these industries wherever possible. As noted above, this would provide them with secure access, enable them to access water markets to buy or sell water to alter their level of overall water security, and allow new entrants to purchase water in the market. The large sectoral differences between the average value-added generated per unit of water used suggests that significant economic benefits are likely to be gained if water can be more freely traded between industry and agricultural users (ACIL Tasman 2007, page xi):

*Full implementation of the NWI reforms should provide the necessary market and other arrangements to ensure these industries have access to a water supply in a market which reflects both demand and the opportunity cost of supply. The NWI reforms should create opportunities for MPEPP industries to make a significant contribution to regional and national economic growth.*



Another benefit of this approach is that it should limit the potential for adverse impacts on the reliability of entitlements held by other water entitlement holders, which could occur if these industries were given priority access and their demands for water increased over time. Evidence of the need for further reform is drawn from the submission of the Minerals Council of Australia (2009) which states that 'there has been a lack of investment in market establishment in areas of importance for minerals activities.'

The NWI recognises that there are a number of other important features of the water requirements and usage patterns in these industries that might need to be addressed for through provisions outside those specified in the NWI. For example, some of the features of these industries that require further consideration include:

- + the impact of mine dewatering activities on groundwater resources
- + the potential for entitlements to treated and/or untreated water from dewatering activities to enable productive use while managing any potential environmental impacts
- + management of any return flows associated with water use in these industries, both in regard to water quantity/flow and water quality.

As Rio Tinto Iron Ore (2009) noted in its submission to the Commission, there may be instances where it may be more appropriate to continue with other water entitlements, such as water access licences that specify a range of conditions on extraction. In addition to secure entitlements, mining operations often require a number of other water-related regulatory and licensing measures to ensure sustainable resource and environmental management. A number of states have made progress in this regard. For example, New South Wales has stated that it is close to completing aquifer interference guidelines which clarify the assessment of impacts and accounting of water for mining. Box 28 provides a case study on the approach taken to the management of the environmental impacts of water extraction and use in the Ernest Henry copper–gold mine in north-western Queensland.

#### **Box 28: Case study on mine dewatering in Queensland**

The Ernest Henry copper–gold mine in north-western Queensland is located on the eastern margins of the Great Artesian Basin (GAB). Ore is extracted through an open-cut mine through the 40–60 metre thick GAB sediments. Dewatering, which is required to access the underlying ore body, could potentially impact on groundwater in the GAB and existing users in the surrounding area. The mine was required to obtain a water licence for dewatering purposes so that such impacts could be managed.

The mine was required to conduct a comprehensive groundwater investigation that identified the impacts of mining on groundwater. The application for a water licence was granted after the consideration of public submissions and a comprehensive investigation by the department. The water licence contains a number of conditions aimed at mitigating the effects of take on existing users and requiring monitoring, regular assessment and reporting on the effects of the take.

Currently, about 4,000 megalitres of water per year is dewatered, of which 90% is estimated to be from the ore bodies, with relatively low impact on the GAB. The water is used for the production and processing requirements of the mine. As part of the water licence condition, the mine has provided alternative water supplies to a number of adjacent landholders and continues to monitor the impacts of the mine's dewatering on their bores.

The Commission believes that it is important to:

- + clearly identify the circumstances and features that are unique to particular industries
- + assess whether they prevent NWI-consistent water access entitlements from being applied to these users in a consistent manner
- + implement alternative arrangements to effectively manage these issues using the most appropriate mechanisms.

In this regard, the Commission agrees with the submission by the Minerals Council of Australia (2009, page 3):

*The MCA considers that maintaining the current approach will not result in the best possible water resource outcomes, or the worthy vision that the NWI presents. Continuing the current approach also presents serious water supply and therefore business risks for the minerals industry. Accordingly, we consider that there must be greater investment in either:*

- (1) *Integration of minerals operations and their access arrangements into water sharing planning processes (through modifying entitlements, and integration of industrial users into water sharing planning); or*
- (2) *Consideration and development of opportunities under Clause 34 of the NWI with clarity around their relationships with water sharing plans ...*

The Commission supports the council's view that reform progress in integrating minerals operations' water requirements into the NWI-preferred water sharing planning model has been too slow.

In Western Australia and the Northern Territory, where legislative reforms to entitlements are yet to be finalised and mining is extremely important, the Commission suggests that every effort be made to ensure that entitlements for these industries comply with as many of the NWI water access entitlements characteristics as possible, in order to provide a secure legislative underpinning for these important water users.

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#### ■ Finding 6.8

While the NWI Agreement recognises (through special clause 34) the potential for further policies and measures beyond the agreement for minerals and energy industries, the circumstances in which they would apply are not defined and identified in a consistent and transparent manner. Little progress has been made in the five years since the signing of the NWI in fleshing out the special provisions for the minerals and related industries. As a consequence, there has been little integration of those industries with broader water markets and water planning processes, despite the potential for considerable benefits in many cases.

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#### ■ Recommendation 6.6

The Commission recommends that NWI-consistent water access entitlements be defined for the minerals, petroleum and other industrial sectors (including plantations and other extractive industries) in order to provide those industries with secure access and the ability to trade with other users. Particular circumstances (such as mine dewatering and return flows) and potential third-party impacts that might limit the applicability of NWI-consistent water access entitlements should be clearly identified and managed. This recommendation is particularly important for Western Australia and the Northern Territory, where legislative reforms have still not been finalised.

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##### 6.3.3.3 Enabling secure access to new urban water sources

Most major Australian cities have expanded and diversified their sources of water to improve security to consumers and improve sustainability (see Chapter 11). New and emerging water sources include recycled water, stormwater harvesting and reuse, greywater reuse, rainwater harvesting and reuse, managed aquifer recharge and desalinated seawater. Appropriate water entitlement and usage regimes are important to improve the uptake of these new water sources and to ensure that water from them is used efficiently. As these sources develop, it is also important that environmental outcomes are protected and enhanced.

There has been debate about the clarity of entitlements to urban stormwater and managed aquifer recharge. In many cases, the reliability of stormwater supply for one project might be undermined by a new development 'upstream'. Often, these issues are compounded by institutional boundaries (for example, between local government authorities).

More generally, there are a number of challenges to the definition of secure water entitlements in an urban water cycle context. Water often changes name and form as it moves through the urban water cycle. For example, potable water becomes greywater or sewage after it is used by an urban customer. It then flows through sewerage systems to wastewater treatment plants where it may become recycled water that can be provided to another customer for fit-for-purpose uses. Control of water also changes through the urban water cycle, and there are legal debates over the exact form of 'ownership' or control of water enjoyed by various parties.

Therefore, reform of entitlements at any one part of the water cycle is likely to affect water use in another, and is quite complex. Currently, a number of types of water entitlements are being used for these sources, including contracts, supply agreements and licences, as well as NWI-consistent water access entitlements (see Frontier Economics 2008a). It is recognised that these new and alternative sources of urban supply do not always fit within the water access entitlement characteristics under the NWI, and in some cases may be effectively accommodated within existing entitlement frameworks. However, there are other cases where the Commission considers that improved legislative and regulatory arrangements may be required to ensure resource sustainability and secure access through a clearer specification of rights to best reflect the interdependent nature of urban water cycle sources.

For example, uncontrolled growth in groundwater extractions based on statutory landholder rights is an issue in Perth and an emerging issue in other urban areas, particularly where water restrictions are in place. Reforms in this area should follow a principled and outcome-oriented approach with the aim of ensuring that there are no unnecessary barriers to efficient and secure access and use of all water sources (see Frontier Economics 2008a; SKM 2008). A key consideration in defining such rights is to ensure that there are no adverse third-party impacts on existing or new water users.

Tradeability is a desirable additional feature which, where implemented, further increases the opportunities for users to maximise the value of water. However, there are many differences between urban and rural systems which are likely to affect the type of market mechanisms that are applicable in urban areas (see Frontier Economics 2008ab).

Given the importance of diversifying water supplies towards less climate-vulnerable water sources, the Commission supports the consideration and pursuit of reforms to urban water entitlements (also see Chapter 11). The Commission notes that Victoria plans to release a discussion paper on rights to alternative water supplies at the end of September 2009.

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#### ■ Finding 6.9

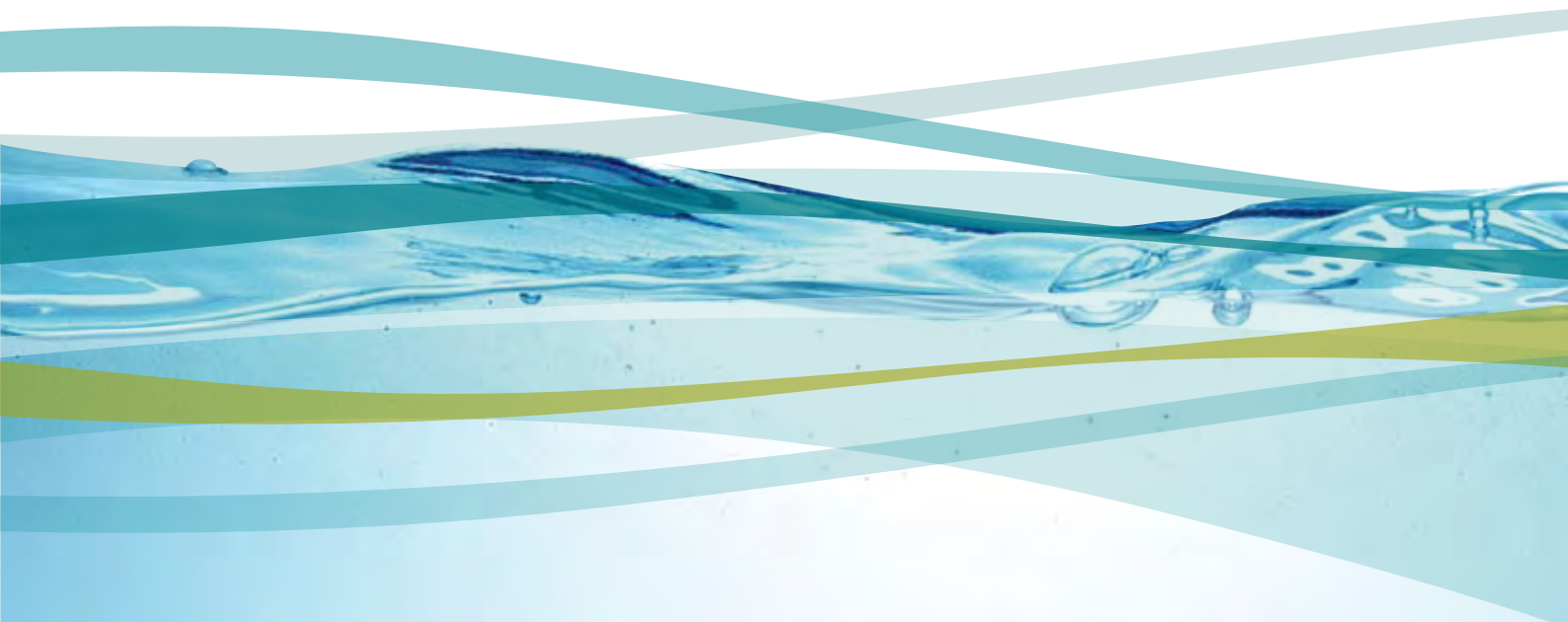
There are a range of new and alternative urban water sources emerging, such as desalinated water, purified recycled water, and stormwater reuse. Access to some new and alternative sources is less secure than for conventional sources (particularly stormwater and managed aquifer recharge). However, providing secure access is challenging due to the interrelationships within the urban water cycle.

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#### ■ Recommendation 6.7

The Commission recommends that jurisdictions identify and pursue reforms to ensure that (i) secure access is provided for all new and alternative sources of urban water supply so that they can compete on an equal footing with more conventional supply options, and (ii) growth in the use of particular sources does not undermine the security of entitlements in other parts of the urban water cycle or adversely affect third parties and the environment. These benefits could be provided through NWI-consistent water access entitlements, or through alternative licensing or contractual arrangements.

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# 7

## Water markets and trading

## 7.1 Overview

Water markets provide opportunities for water to be reallocated between competing uses. An effective market for water trading provides flexibility in responding to emerging issues, such as drought and climate change. Water markets are therefore an important mechanism to allocate water efficiently and contribute to the NWI goal of managing water in a way that optimises economic, social and environmental outcomes (NWI clause 23). The development and enhancement of water markets represents a centrepiece of national water reform, and provides an example of successful national micro-economic reform, boosting Australia's economic performance during challenging times.

Water trading helps to ensure that increasingly scarce water resources are allocated to their most valuable uses (including both productive and environmental uses). This will require markets in which:

1. **Water is tradeable with no impediments**—except where water trade rules represent the least-cost way to manage hydrological and environmental constraints.
2. **Water trades occur with minimum transaction costs and in a competitively neutral market environment**—costs include both financial costs and those associated with the time involved in acquiring information, processing trades and registrations, and facilitation of trade by market intermediaries.
3. **The necessary diversified range of water products are available to water market participants**—that can be traded either in whole or in part, or through leasing or other arrangements.
4. **Water trade does not cause unacceptable third-party impacts**—on the environment or other water users.

Clauses 58–63 of the NWI outline specific actions relating to water markets and trading to achieve these objectives.

To date, good progress has been made by all states to ensure that they have the institutional, regulatory and administrative arrangements to enable trade in water. This progress is delivering tangible 'on the ground' benefits. There is, however, a need for considerable further improvement. Further efforts to enhance market performance, promote competition and efficient investment, and develop a more seamless approach to market design, regulation and operation are likely to deliver further substantial national productivity benefits in the short and long term.

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### Finding 7.1

Jurisdictions have progressed water markets to the point where very large volumes of water are being traded—and significant benefits are flowing to buyers and sellers both within and outside the Murray–Darling Basin. Movements in water have facilitated industry adjustment and economic development.

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### Finding 7.2

The annual 4% limit on water entitlement trading out of an irrigation area is being reached in regions in several basin states, with a wide range of undesirable consequences. The Commission considers that the 4% limit has impeded the use of buyback programs to assist in returning overallocated water systems to sustainable levels of extraction; unfairly and arbitrarily penalised willing sellers of irrigation entitlements; distorted patterns of water trade out of irrigation areas (including interstate trade); inhibited desirable and necessary structural change; and complicated interstate collaboration in other areas of water reform.

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### Recommendation 7.1

The Commission recommends the coordinated removal of all artificial barriers to trade, including the 4% limit. The Commission considers that buyback programs should continue without being constrained by the 4% limit or other trade barriers in order to provide financial resources directly to entitlement holders and facilitate adjustment. The Commission supports monitoring and enforcement of the new water market and charge rules for the MDB by the ACCC, and the trading rules by the MDBA, to ensure that the rules are implemented effectively.

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### Finding 7.3

The Commission welcomes the Victorian Government's recent decision to remove the 10% non-water user limit.

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<b>Finding 7.4</b>	Difficulties in separating water from a bulk entitlement have been a constraint to trade in the past, particularly in South Australia and New South Wales. However, the monitoring and enforcement by the ACCC of the recently established market rules due to come into full effect on 1 January 2010 should assist in removing this significant restriction to water trade under a bulk entitlement structure.
<b>Finding 7.5</b>	The Commission is concerned that sub-dividing co-held entitlements typically held by joint water supply schemes under the NSW <i>Water Management Act 2000</i> may be difficult and potentially costly, particularly where an application to the New South Wales Supreme Court is required. These difficulties are not addressed through the water market rules as the rules have limited application to co-held entitlements.
<b>Finding 7.6</b>	While exit fees are prohibited under the MDB Agreement, the compulsory termination of delivery entitlements that automatically trigger termination fees as a condition of water trade by operators, particularly in many privately operated areas in New South Wales, effectively act as exit fees. The Commonwealth water charge rules (termination fees) and water market rules should address this trade barrier, once they come into full effect on 1 September 2009 and 1 January 2010, respectively.
<b>Finding 7.7</b>	It is commonly thought that unbundling water from land is largely complete. However, the Commission finds that, while significant progress has been made in the process of unbundling, additional reform is required in most states.
<b>Recommendation 7.2</b>	The Commission recommends that the feasibility and benefits of further unbundling, including in unregulated surface water and groundwater systems, should be considered in all states, and where jurisdictions decide against further unbundling the reasons for that decision should be published.
<b>Finding 7.8</b>	In some states there have been delays in completing water planning, which has precluded water trading in most of those systems. However, some jurisdictions have demonstrated that they are prioritising planning processes, with preference to those water systems where the expected benefits of water trading are greatest.
<b>Finding 7.9</b>	There are a number of other potential constraints to the development of transparent, competitively neutral, and efficient water markets. These include interstate and intrastate allocation processes and government interventions (examples are listed in Section 7.3.1.9). However, there is limited information available to assist the Commission in the assessment of these matters. The Commission intends to follow up these issues as information becomes available. In the meantime, the processes to develop the Basin Plan provide a further opportunity to explore them.
<b>Recommendation 7.3</b>	The Commission suggests that an assessment of factors potentially affecting the development of water markets across the Murray–Darling Basin (see examples listed in Section 7.3.1.9) be undertaken in order to determine whether they distort market outcomes or undermine confidence in the market, and to recommend potential reforms. The development of the Basin Plan by the MDBA, including the water trading rules based on advice from the ACCC, could inform such an assessment.
<b>Finding 7.10</b>	While there have been some improvements, delays in processing transactions, especially in water access entitlements, continue to undermine the efficiency and effectiveness of water markets. Public reporting of performance against COAG service standards is expected to drive improvements in trade processing times, both within and across jurisdictions, in the period ahead.
<b>Finding 7.11</b>	Information provision for and confidence in the water market are improving with new information sources and expected web-based information aggregation, notably the annually published <i>Australian water markets report</i> , the development of a National Water Market System and the Bureau of Meteorology's Australian Water Resources Information System (AWRIS). The Commission is concerned that the recommendations of the 2006 Pricing and Personal Information Disclosure Consultancy Project have not been fully adopted by NWI parties. These recommendations would provide a good framework for improving the quality of water market information.

<b>Recommendation 7.4</b>	The Commission recommends that NWI parties adopt consistent approaches to disclosure in line with the recommendations of the Commission's 2006 Pricing and Personal Information Disclosure Consultancy Project. The Commission supports further improvements to overcome current limitations of registry arrangements by ensuring full and accurate reporting of the volume and price of entitlement and allocation trades on individual state water registers, including for government purchases for the environment.
<b>Finding 7.12</b>	The level of confidence in market intermediaries is critical to the continued growth and efficient operation of water markets. The Commission recognises that significant efforts have been made to improve confidence in market intermediaries, in particular through the provision of better information about rights and obligations under consumer protection legislation by relevant authorities (for example, the ACCC). While the Commission is concerned about reported incidents of misconduct, and acknowledges arguments in favour of regulation from some market participants, there is not yet a compelling case for industry- specific regulation of market intermediaries beyond the generally available trade practices and consumer protection regulations.
<b>Recommendation 7.5</b>	The jurisdictions and the ACCC should continue to monitor the actions of market intermediaries and should adopt any further measures considered necessary to preserve and build user confidence in the water trading system and to advance water market objectives under the NWI.
<b>Finding 7.13</b>	Water allocations and water access entitlements remain the most widely traded water products, while other instruments have been slow to develop. The development of a wide range of different products will enable better risk management and better matching to the particular needs of different water users (including irrigators, environmental water managers and urban water corporations). As Australian water markets further develop, such alternative and complementary products should be encouraged.
<b>Finding 7.14</b>	Even though tagged trade was agreed as the preferred approach in relation to interstate trading arrangements, the introduction of tagged interstate entitlement trade has not been accompanied by an increase in interstate entitlement trade. The Commission considers that facilitating and promoting interstate entitlement trade is an important next step in water market reform.
<b>Recommendation 7.6</b>	The Commission recommends that having decided to adopt tagged trade, jurisdictions do more to simplify and promote its use. The Commission notes that the ACCC will be investigating the issue of how to improve tagged trading.
<b>Recommendation 7.7</b>	The Commission recommends that direct impacts of water trade on third parties (for example, congestion and environmental externalities) be addressed through the most cost-effective instrument (such as water use licences) rather than by imposing trading restrictions where such restrictions are not based on hydrological or ecological constraints. Indirect impacts of water trade should not be managed by restricting the water market—they are better addressed directly through other policies (such as structural adjustment measures). Given the increasing volumes of water trade (including as a result of environmental water purchases), the Commission considers that further efforts are now required to ensure that rules governing water trade account for and manage the impacts of transmission losses, to ensure that third parties are not adversely affected.



## 7.2 Context for this assessment

The potential benefits of water trading in ensuring that scarce water resources are allocated to their most productive uses have long been recognised in Australia. The 1994 COAG water reforms required the separation of water rights from land, a necessary first step to expand trade in water. The reforms also sought to open up trading arrangements, including interstate trading.

The Murray–Darling Basin (MDB) continues to be the most active region for trading water. Following decades of developing irrigated agriculture, made possible through the issuing of more access rights to water, in 1995 the MDB Ministerial Council established that continued growth in diversions in the MDB would cause significant detriment to basin river systems. As a result, New South Wales, Victoria, South Australia and Queensland agreed to cap diversions in the MDB at the volume of water that would have been diverted under 1993–94 levels of development. The cap has the effect of requiring users to obtain additional water requirements through the market rather than through increased diversions under existing or future entitlements (except where demand has been redirected to groundwater).

While trading gradually expanded over the next decade, the signing of the NWI in 2004 provided a renewed impetus to expand the scope and depth of water markets in Australia. Under the NWI, states and territories undertook to facilitate the operation of efficient water markets and the opportunities for trading within and between the jurisdictions through a number of actions.

The Commission's 2007 Biennial Assessment and 2008 Update found that good progress had been made in introducing institutional, legislative and administrative arrangements that enable water trade but that a number of priority areas for advancing water trading remained. These included continued steps to remove barriers to trade, streamlining transaction processes, implementation of compatible registers and improving water market transparency and confidence in water intermediaries (NWC 2007, 2008a).

At its meeting in March 2008, the COAG Working Group on Climate Change and Water agreed on a forward work program to focus on four areas of water reform, including enhancing water markets. Recent and ongoing work by COAG and the Commission to enhance water market operation include the following:

- + **Review of registry arrangements:** In May 2008, the Commission reviewed states' registry arrangements. The review (NWC 2008b) confirmed that while there are water entitlement registers in each jurisdiction (with the exception of Western Australia) that enable water trade, there is limited compatibility or interoperability between the systems.
- + **National Water Market System:** in November 2008, the COAG agreed to the development of a national water market system which will involve states and territories maintaining their statutory role for water registers; a common registry system (CRS); enhancements to the Victorian and Queensland registers; a national online portal as a source of market information; and interoperability, as required, to support interstate trade.
- + **The *Australian water markets report*:** the Commission published the first *Australian water markets report* in December 2008 (NWC 2008c). The primary objective of the report is to inform market participants about market structure, trading activity, prices and policy drivers. Providing this type of information to direct and indirect participants in the water market is an important step towards improving market transparency and performance.

This assessment builds on these earlier initiatives but also takes account of significant recent developments affecting water markets and trading. Two of the key developments are recent reforms to the management of water (including water trading arrangements) in the MDB, and the increasing role of water markets beyond the irrigation sector (for example, rural–urban trade and environmental purchasing programs).

### 7.2.1 Water trading in the Murray–Darling Basin

Markets for water resources—be they surface water systems, groundwater aquifers, or a mix of both with significant interconnectivity—may exist entirely within a state's borders, but there are many examples in Australia where a water resource, and hence a potential water market, spans state borders. It is in the national interest that the existence of a state border through a water resource should not prevent efficient water resource management and water market performance. Too often, however, interjurisdictional differences in water management and other policies are impediments to efficient water markets and may add multiple layers of administration to otherwise straightforward trades.

To address these problems, recent reforms under COAG and the *Water Act 2007* have pursued consistency among the states—especially among New South Wales, Victoria, Queensland, South Australia and the ACT in management of the shared water resources of the Murray–Darling Basin.

The Commonwealth *Water Act 2007* was a major step towards consistency between MDB states. The Act strengthened Commonwealth leadership (with states referring some powers) and roles for the MDBA, the ACCC and the Bureau of Meteorology (BoM). The newly formed

MDBA has been tasked with preparing a Basin Plan by 2011. The ACCC has been given new powers to provide advice on water market rules (including the transformation of shares of bulk entitlements to tradeable entitlements), water charge rules (including termination fees) and water trading rules. The BoM has been given additional functions regarding water information and forecasts of future water availability.

The *Water Act 2007* provides for the development of a Basin Plan—a strategic plan for water resources in the MDB. Water trading rules (that is, ‘rules for the trading or transfer of tradeable water rights in relation to basin water resources’) are an important component of the Basin Plan.

Currently, rules for the trading and transfer of water within the basin are set through state processes and the procedures and policies of infrastructure operators, or under the Murray–Darling Basin Agreement. Rules developed through state processes are often contained within water resource plans.

As new state water resource plans are made, they will have to be consistent with the Basin Plan—meaning that by 2019 all water trading arrangements will have to be in line with Basin Plan rules for the trading or transfer of tradeable water rights in relation to basin water resources.<sup>17</sup> Over time, existing state plans could become more closely aligned with the Basin Plan, since any amendments must make state plans ‘no less consistent’ with the Basin Plan.

## 7.2.2 The increasing role of water markets for non-irrigators

Water trading is not only relevant to irrigators; it is also a tool increasingly being used by urban water authorities (for example, SA Water, ACTEW, the WA Water Corporation and Coliban Water). Trading is also used by agents purchasing on behalf of the environment (such as the Commonwealth, Water for Rivers, former Murray–Darling Basin Commission Pilot Environmental Water Purchases, and the New South Wales RiverBank program).

In response to reduced water availability in regional urban areas, some regional urban water corporations have sought to use water markets to flexibly manage supply constraints. This has included the purchase of water access entitlements by urban water corporations to address long-term supply shortfalls, as well as purchases of water allocations, either by urban water supply authorities to increase security and potentially ease urban restrictions, or directly by urban water users, such as councils, to provide water for community assets.

In Western Australia, the Water Corporation entered into a water trade arrangement with Harvey Water, receiving a one-off trade of 21.6 GL and an annual trade of 17.1 GL, which was purchased for public water supply. Funding from this trade was put towards Harvey Water replacing its old fashioned open ditch irrigation system with pipes, resulting in an estimated 30% water saving. It was this water saving that was traded to the Water Corporation. This innovative arrangement had multiple positive outcomes, including better water efficiency through improved infrastructure and the transfer of water to a higher-use purpose through a market mechanism.

Environmental water managers can and do participate in markets for both water access entitlements and water allocations, and the role of markets as a cost-effective and flexible means of recovering water to achieve environmental outcomes has become increasingly important since the Commission’s 2007 Biennial Assessment. Over 10 years, the Commonwealth’s Restoring the Balance in the Murray–Darling Basin program is seeking to purchase \$3.1 billion worth of water in the MDB, to be held by the Commonwealth Environmental Water Holder and used to protect or restore environmental assets. Trading by environmental managers is also expected to increase in the future because the *Water Act 2007* (section 106(2)) explicitly enables the Commonwealth Environmental Water Holder to dispose of water and use the proceeds to improve its capacity to achieve environmental objectives.

## 7.2.3 Other recent developments

### 7.2.3.1 Changes to trade barriers

There have been a number of recent changes to trade barriers. These include:

- + the Victorian Government’s decision in May 2009 to legislate to remove the 10% non-water user limit
- + a decision by the New South Wales Government in May 2009 to place an embargo on environmental water trading with a view to halting future permanent trades, in response to the Commonwealth purchase of entitlements from Twynam Agricultural Group
- + the announcement of an agreement between the Commonwealth and the Victorian Government in relation to the Commonwealth buyback program and the infrastructure renewal program in northern Victoria
- + developments associated with the Commonwealth *Water Act 2007*, including the creation of water charge and water market rules.

<sup>17</sup> However, the ACCC has informed the Commission that water trading arrangements may be set out in state legislation or regulations, and that the Basin Plan applies to particular entities (rather than generally) and is subject to constitutional considerations.

As this is a rapidly evolving policy space, there are significant challenges in making a definitive assessment of the water market at any specific point in time. The Commission has attempted to include up-to-date information wherever possible, although it should be recognised that in some cases further change is likely to occur.

### 7.2.3.2 COAG agreement on service standards for processing of allocation trade

COAG has recently adopted a set of service standards for processing times (approval or rejection) for allocation trades. The standards require public reporting of trade processing times against set service standards. The standards are based on the percentage of intrastate allocation trades that are processed within 10 days and the percentage of interstate allocation trades that are processed within 20 days. Under the COAG agreed standards, the maximum timeframe for processing of allocation trades was reduced on 1 July 2009 to 10 business days for interstate trade and 5 business days for intrastate trade (except in South Australia).

In addition, service standards for processing of entitlement trades were adopted by the Natural Resource Management Ministerial Council in May 2009. These standards, which commenced on 1 July 2009, require 90 per cent of entitlement trades to be processed within 20 business days for the approval stage and within 10 business days for the registration stage.

## 7.3 The Commission's assessment and findings

This chapter assesses the extent to which jurisdictions have enabled efficient, well-functioning water markets to develop, and identifies impediments that prevent this from being fully realised. Efficient markets are characterised by a sufficient number of buyers and sellers; well-informed market participants; appropriate management of any externalities associated with market activities; low barriers to entry; low transaction costs; few impediments to trade; and well-defined and secure property rights (ACCC 2008a).

The assessment is structured in relation to the goals identified in Section 1.1:

- + removing barriers to water trade
- + reducing transaction costs
- + facilitating a range of water products
- + addressing third-party impacts.

### 7.3.1 Removing barriers to water trade

#### Background: Terminology and relevant NWI clauses

NWI clause 23(v) states that full implementation of the NWI Agreement will achieve 'progressive removal of barriers to trade in water and meeting other requirements to facilitate the broadening and deepening of the trading market, with an open trading market to be in place'.

Clause 58(i) goes on to state that 'the States and Territories agree that their water market and trading arrangements will ... facilitate the operation of efficient water markets and the opportunities for trading, within and between States and Territories, where water systems are physically shared or hydrologic connections and water supply considerations will permit water trading ...'

#### 7.3.1.1 Extent of water trade

The current performance of Australian water markets shows that significant volumes of water entitlement and allocations are being reallocated. The Commission's inaugural *Australian water markets report* (NWC 2008c) found that:

- + a total of 32,205 trades in water access entitlements and water allocations were recorded throughout Australia during the 2007–08 water year
- + between October and March, many hundreds of trades occur each day
- + trade in water access entitlements and water allocations in 2007–08, most of which occurred in the connected MDB, involved 2,515 GL of water.

Table 20 shows that the southern MDB system accounts for approximately half of total entitlement on issue in Australia. However, it accounts for even greater shares of allocation (77%) and entitlement (67%) trade.

**Table 20: Water trading in the southern Murray–Darling Basin (GL)**

	Within MDB connected system	Rest of Australia	Total
Entitlements on issue	11,032	12,056	<b>23,088</b>
Allocation trades	1,237	357	<b>1,594</b>
Entitlement trades	618	302	<b>921</b>

Source: Adapted from NWC (2008c)

Water trade activity can be measured at three levels: within valley, between valley, and between states. Within the southern MDB in 2007–08, there was a large amount of within-valley trade in allocations, particularly in the Murrumbidgee (NSW) (Table 21).

**Table 21: Water allocation trade volumes (ML) for MDB surface water systems**

	Internal trade (ML)	Trades in (ML)	Trades out (ML)	Net change (ML)	Total trade (ML)
NSW Murray	77,932	47,897	65,402	–17,505	<b>143,334</b>
Murrumbidgee	334,568	2,729	141,825	–139,096	<b>476,393</b>
Vic. Murray	117,694	131,922	36,028	95,894	<b>153,722</b>
Goulburn	88,996	21,380	105,893	–84,513	<b>194,889</b>
Rest of northern Vic.	3,922	664	1,083	–419	<b>5,005</b>

Source: Adapted from NWC (2008c)

In 2007–08, there was also significant between-valley trade in allocations (including trade among valleys in different states). For example, water users in the South Australian Murray region purchased large volumes of allocations from the Murrumbidgee (NSW). Within Victoria, water users in the Victorian Murray sourced allocations from the Goulburn (Table 22).

**Table 22: Inter-valley allocation trades in the southern connected MDB system**

Buying	Selling					Total
	NSW Murray	Murrumbidgee	Vic. Murray	Goulburn	SA Murray	
NSW Murray	–	33,710	5,890	8,113	184	<b>47,897</b>
Murrumbidgee	2,372	–	217	30	110	<b>2,729</b>
Vic. Murray	21,462	39,811	–	68,957	1,692	<b>131,922</b>
Goulburn	3,332	6,533	11,170	–	344	<b>21,380</b>
SA Murray	38,236	61,800	18,752	28,794	–	<b>147,582</b>
Total	<b>65,402</b>	<b>141,854</b>	<b>36,029</b>	<b>105,893</b>	<b>2,331</b>	<b>351,509</b>

Source: Adapted from NWC (2008c)

The Commission's *Australian water markets report 2007–2008* (NWC 2008c) reported that trade in the non-basin jurisdictions (Northern Territory, Western Australia and Tasmania) accounted for:

- + less than 6% of the water access entitlement trade in Australia
- + less than 1% of the water allocation trade
- + less than 1% of the estimated market turnover.

It should be noted, however, that in each of the basin jurisdictions there are water markets that are part of the MDB and water markets that are not connected (with the exception of the ACT, which is entirely within the basin). The trade that occurred in non-basin markets (including those markets within basin jurisdictions) accounted for 33% of the water access entitlement trade in Australia, and 22% of the water allocation trade.<sup>18</sup> This includes large water markets outside of the basin, such as the Barron, Burnett and Fitzroy, which accounted for over 60 GL of Queensland's 76 GL of water access entitlement trade. In addition, during the 2007–08 water year there were:

- + 6 water access entitlement trades totalling 34.5 ML in the Australian Capital Territory
- + 79 licence transfers (56,515 ML) and 15 temporary transfers (2,913 ML) totalling 59,428 ML in Tasmania
- + 14 water licence transfers (486 ML) and 259 water allocation trades (13,169 ML) totalling 13,655 ML in Western Australia
- + no trades in the Northern Territory, although trade is possible.

Another way of measuring trading activity and market depth is through an indicator of trading intensity (that is, the volume of water trade as a percentage of entitlement). Box 29 describes why the 2009 Biennial Assessment did not use this NRMCC indicator.

#### **Box 29: NRMCC performance indicator relevant to water trade activity**

The NRMCC performance indicator for assessing market activity and depth is:

5.1—Percent (by volume and number) of entitlements / allocations traded permanently, temporarily or leased.  
(Data to be provided on a within valley, between valley and between state basis.)

The first problem with this approach for understanding progress in promoting water markets is that some regions have a greater endowment of higher reliability entitlements and will therefore have a greater volume of allocations to trade (and most likely a higher trading intensity) in drier years compared with other regions. In such cases, drawing inferences about the success of water market reform by comparing trading intensity across valleys and states may be invalid.

The second problem is that, at the state level, measures of trade intensity may provide limited insight into market depth. This is because water markets in the southern MDB system cross state boundaries and are hydrologically separated from other markets within and outside the basin.

For these reasons, the Commission considers that the summary information presented above is more relevant in providing an overview of water market activity across Australia. Further detailed information can be accessed in the Commission's *Australian water markets report 2007–08* (NWC 2008c).

The development of water trading has led to benefits at the individual (farm), industry, regional and basin levels (see Box 30).

<sup>18</sup> Similarly, out of the 23,088 GL of entitlements on issue nationwide, only 4,480 GL of entitlements are in non-basin jurisdictions (19 per cent); there are 12,056 GL of entitlements in non-basin markets (52 per cent). It should be noted that entitlements on issue do not correspond with trading activity, and that entitlements have different levels of reliability (that is, they accrue different allocations of actual water).

### Box 30: The benefits of water trade

At the individual or farm level, water markets provide water users with flexibility to manage their supplies. For example, a report prepared for the Commission in September 2007 (Frontier Economics et al 2007) found that water trading in an agricultural system that has both annual and perennial crops gives farmers greater flexibility in making decisions about water use, offers a means of managing risk and cash flow—particularly in dry times—and facilitates business growth and development.

Water markets have provided benefits to industries and communities as a means of facilitating adjustment and responding to reduced water availability. With respect to northern Victoria, Frontier Economics et al (2007) concluded that:

- without trade, the dairy industry would have fared much worse than it did in the past 10 years of drought
- in situations where dairy enterprises left the industry, permanent water trade enabled them to leave with more money than they otherwise would have had
- without trade, many horticultural enterprises in the Goulburn system would not have survived the extraordinarily low seasonal allocations.

Water trade has also helped to improve urban supply security in metropolitan and regional urban areas. For example, Coliban Water, a regional urban water authority, recently purchased entitlements and seasonal allocations from rural water users to reduce the severity of urban water restrictions in several regional towns.

At the basin level, studies have shown the potential benefits from water trade in reducing the economy-wide effects of reduced water availability. In 2004, the Productivity Commission (Peterson et al 2004) used computable general equilibrium modelling to demonstrate that moving from a no-trade to a trade scenario 'more than halves the impact of reductions in water availability on Gross Regional Product within the southern MDB'. The authors stated that 'markets for trading irrigation water enable water to be re-allocated to more productive uses'.

Most recently, research by the Australian Bureau of Agricultural and Resource Economics found that, faced with unprecedented cuts to water allocations, the active market for water allocations provides irrigators with increased flexibility for coping with water scarcity. While there was a reduction in total water use for irrigation in the southern basin during 2007–08, the ability to trade water has allowed water to be reallocated to its highest value uses, substantially mitigating the economic impact of low water allocations. The study also found that the volume of interstate trade increased from around 70 GL in 2004–05 to 235 GL in 2007–08, representing 18% of the total traded volume (Mallawaarachchi and Foster 2009).

As noted in Chapter 8, as water becomes more scarce and the price of water traded in the market increases, water markets are helping to promote the uptake of water-efficient technology and innovations, such as alternative water sources.

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### ■ Finding 7.1

Jurisdictions have progressed water markets to the point where very large volumes of water are being traded—and significant benefits are flowing to buyers and sellers both within and outside the Murray–Darling Basin. Movements in water have facilitated industry adjustment and economic development.

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Although the market arrangements put in place by jurisdictions have permitted the significant water trading activity that has been observed, as that activity increases, administrative barriers to water trade have become increasingly apparent and increasingly counterproductive. Barriers to water trade can result in a thinner market than might otherwise exist, distort the decisions of market participants, dampen signals for necessary investment and long-term structural adjustment, and result in a reduction in the gains from trade that may otherwise have been realised.

The Commission highlights in this assessment a number of these constraints which are limiting (or have had the potential to limit) the ability of markets to reallocate water efficiently:

- + the NWI 4% annual threshold limit on water entitlement trading out of a water irrigation area
- + the Victorian 10% limit on ownership of water entitlements separate from land
- + constraints on the ability of member irrigators to separate or transform their individual irrigation right from a bulk or co-held entitlement in New South Wales and South Australia

- + a lack of transparency as to the rights of individuals where a volumetric allocation has not been specified under a bulk entitlement arrangement in New South Wales
- + termination fees and exit fees imposed by irrigation infrastructure operators
- + lack of 'unbundling' of entitlements in some water systems and jurisdictions
- + delays in developing water plans to permit water trading
- + other potential constraints to the development of a transparent market that is competitively neutral.

### 7.3.1.2 The NWI 4% annual threshold limit

#### Background: Terminology and relevant NWI clauses

NWI clause 60(iv) states that 'in respect of any existing institutional barriers to intra and interstate trade ... immediate removal of barriers to permanent trade out of water irrigation areas up to an annual threshold limit of four percent of the total water entitlement of that area, subject to a review in 2009 with a move to full and open trade by 2014 at the latest, except in the southern Murray–Darling Basin where action to remove barriers to trade is agreed as set out under paragraph 63 ...'

NWI clause 63 states that 'in regard to the Southern Murray–Darling Basin, the relevant Parties (Commonwealth, New South Wales, Victoria and South Australia) that are members of the Murray–Darling Basin Ministerial Council agree to:

- ...ii) reduce barriers to trade in the Southern Murray–Darling Basin by taking the necessary legislative and other actions to permit open trade and ensure competitive neutrality, and to establish an interim threshold limit on the level of permanent trade out of all water irrigation areas of four percent per annum of the total water access entitlement for the water irrigation area by June 2005, including:
  - a) in the case of NSW, making necessary legislative changes to give effect to a Heads of Agreement between Government and major irrigation corporations to permit increased trade, including to remove barriers to trade up to the above interim threshold limit; and
  - b) in the case of Victoria and South Australia, bringing into effect change to permit increased trade including to remove barriers to trade up to the above interim threshold level, in the respective Authorities and Trusts, at the same time that NSW amends its legislation ...'

Under the NWI, the annual threshold limit of 4% on entitlement trade is common to all jurisdictions (clause 60(iv)(b) and clause 63(ii)). The most commonly cited rationale for the limit is to manage the rate of community adjustment. The limit has been the subject of increasing attention because of its impact on Victorian irrigation districts. However, it is now beginning to have an impact in non-Victorian districts also (see below).

Table 23 shows that the 4% limit is binding or close to binding in many Victorian irrigation areas (data as at 30 June 2009). Importantly, the 4% limit, which is meant to be applied to 'irrigation areas' under the NWI, is interpreted in Victoria as applying to smaller irrigation districts within the area served by Goulburn–Murray Water. The limit also applies separately to different reliability classes of water access entitlements (high and low reliability water shares).



**Table 23: The 4% limit in Victorian irrigation areas**

Irrigation area	Reliability class	4% trade-out limit (ML)	Net water traded out (ML)	4% trade-out limit remaining (ML)
Campaspe Irrigation District	High	751.9	817.0	-65.1
Campaspe Irrigation District	Low	402.5	152.8	249.7
Central Goulburn Irrigation Area	High	14,267.2	14,833.9	-566.7
Central Goulburn Irrigation Area	Low	6,475.8	6,234.0	241.8
First Mildura Irrigation District	High	2,547.1	599.3	1,947.8
Murray Valley Irrigation Area	High	10,462.0	11,729.8	-1,267.8
Murray Valley Irrigation Area	Low	4,826.9	4,974.3	-147.4
Nyah, Tresco and Woorinen	High	1,171.6	369.2	802.4
Nyah, Tresco and Woorinen	Low	225.9	99.0	126.9
Pyramid–Boort	High	8,176.1	8,169.4	6.7
Pyramid–Boort	Low	3,960.2	3,924.2	36.0
Robinvale, Red Cliffs and Merbein	High	3,891.8	3,884.2	7.6
Rochester Irrigation Area	High	6,975.5	7,238.4	-262.9
Rochester Irrigation Area	Low	3,152.5	3,235.2	-82.7
Shepparton Irrigation Area	High	6,712.4	6,822.9	-110.5
Shepparton Irrigation Area	Low	3,028.0	1,579.8	1,448.2
Torrumbarry Irrigation Area	High	13,097.8	15,720.0	-2,622.2
Torrumbarry Irrigation Area	Low	6,000.0	7,127.2	-1,127.2

Source: DSE (2009)

The 4% limit is now being reached in states other than Victoria, but there is less transparency in the information available. In New South Wales, Murrumbidgee Irrigation (2009) has advised that applications approved for water access entitlement trade out of the Murrumbidgee Irrigation Area for the 2008–09 season have reached the 4% limit, and consequently Murrumbidgee Irrigation will not accept or deal with any further external transfer applications for 2008–09. Murrumbidgee Irrigation reports that 90% of the buying has been on behalf of the New South Wales Government for the Snowy Initiative (Water For Rivers) or The Living Murray initiative, with almost all the remaining 10% being purchased to increase water security for Canberra. Furthermore, applications for the 2009–10 season will not be accepted by Murrumbidgee Irrigation until water sharing arrangements for that year are announced.

The Commission notes that Victoria has recently announced a bilateral agreement with the Commonwealth. Under the agreement, and ‘subject to a review of progress of the modernisation project’, Victoria has agreed to start phasing out the 4% cap on water entitlement trades from irrigation districts from July 2011, with a view to removing the cap entirely by 2014. The agreement allows exemptions to the 4% limit to enable the buyback program to purchase up to 300 GL of water entitlements over and above the 4% limit over five years, subject to those purchases occurring in targeted regions associated with the irrigation renewal program (Premier of Victoria 2009).

In South Australia, some irrigation districts served by Central Irrigation Trust (CIT) reached the 4% limit in 2008–09. The limit therefore had the potential to limit trade. CIT subsequently increased the limit to 12% to be applied over a two year period rather than annually, and announced that any transfers that relate to irrigators wanting to take advantage of the Australian Government Small Block Irrigator Exit Package would be exempt from its new limit (CIT 2008). As of mid-2009, the Commission understands that CIT has now entirely removed this limit to external entitlement trade.



South Australia passed new legislation for irrigation trusts on 23 April 2009 to increase consistency with the NWI and new arrangements in the MDB under the Water Act 2007. This includes preventing trusts from restricting entitlement trade out of their network, although it is unclear how these legislative prohibitions will be given practical effect.

The Commission notes that, although the 4% limit is argued by its proponents to be a protection for irrigators, once the limit is reached for a district, willing sellers will be prevented from realising the full market value of their entitlement (as subsequent transfers are arbitrarily restricted to 'within district' sales only). Those irrigators will therefore be financially penalised by their government's policy.

The Commission acknowledges that the 4% limit was implemented under the NWI as a well-intentioned measure to manage the rate of structural adjustment. However, since its establishment the pressures of drought and the critical need to address overallocation in the MDB have highlighted the unintended consequences of the 4% limit as a barrier to efficient adjustment. Buybacks provide financial resources directly to entitlement holders to facilitate adjustment. However, buybacks do not necessarily transfer resources to non-entitlement holders, such as local businesses, in irrigation-dependent communities. In cases where there is a need to respond to impacts on such individuals and communities, a more direct approach, such as through well-targeted purpose-built measures, is required (see Chapter 10).

COAG has stated its ambition to increase the annual threshold limit from 4% to 6% by the end of 2009. The Commission welcomes the possibility of at least some relaxation of the limit, but observes that simply increasing the limit does not deal with the fundamental problems of such a limit. A number of studies have assessed the impacts of the 4% limit, and the Commission's report on monitoring the impacts of trade (to be released later in 2009) is expected to provide further data upon which the impact of the 4% limit can be assessed. Considering recent and rapidly evolving policy announcements and the fact that the Commission has ongoing work in this respect, the Commission will return to this issue later in 2009 once further information is available. However, even now, the Commission is convinced of the need for a coordinated and agreed approach to achieve the speedy removal of such trade barriers (see also Chapter 10 on structural adjustment).

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#### ■ Finding 7.2

The annual 4% limit on water entitlement trading out of an irrigation area is being reached in regions in several basin states, with a wide range of undesirable consequences. The Commission considers that the 4% limit has impeded the use of buyback programs to assist in returning overallocated water systems to sustainable levels of extraction; unfairly and arbitrarily penalised willing sellers of irrigation entitlements; distorted patterns of water trade out of irrigation areas (including interstate trade); inhibited desirable and necessary structural change; and complicated interstate collaboration in other areas of water reform.

One recent direct consequence of the 4% limit, and other contributing factors, has been the decision by New South Wales in May 2009 to place an embargo on environmental water trading with a view to halting future permanent trades. That decision was made as New South Wales considered that it was bearing an inequitable proportion of the Commonwealth purchase of water entitlements for the environment, particularly after the Commonwealth purchased 240 GL of entitlements from Twynam Agricultural Group. The water purchasing program's focus on New South Wales was driven in part by the 4% limit having been reached, or almost reached, in Victorian irrigation districts. The Commission considers this New South Wales Government decision to be in the worst parochial traditions of MDB water management. The decision directly disadvantages New South Wales water entitlement holders—some of whom had negotiated voluntary sales to the Commonwealth which have now been put on hold. It delays and distorts the important environmental buyback program across the basin and further entrenches interstate tensions at a time when cooperation is increasingly vital.

The Commission has been equally disappointed by Victoria's self-interested interpretation of the 4% limit. Even given Victoria's recent agreement with the Commonwealth that the limit will be phased out, the costs of the policy will extend for some years into the future.

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#### ■ Recommendation 7.1

The Commission recommends the coordinated removal of all artificial barriers to trade, including the 4% limit. The Commission considers that buyback programs should continue without being constrained by the 4% limit or other trade barriers in order to provide financial resources directly to entitlement holders and facilitate adjustment. The Commission supports monitoring and enforcement of the new water market and charge rules for the MDB by the ACCC, and the trading rules by the MDBA, to ensure that the rules are implemented effectively.

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### 7.3.1.3 Victoria's 10% limit on non-water users

Until recently, Victoria imposed a 10% limit on the proportion of water access entitlements in any water supply system that could be owned without being associated with land.<sup>19</sup> In each water system, there were separate 10% limits for high-reliability and low-reliability water shares that could be held as unassociated water shares. This limit is commonly referred to as the 10% non-water user limit.

Victoria argued that the limit was necessary to prevent opportunities for absentee 'water barons' to take control of an excessive share of local water resources. In recently agreeing to the removal of the limit, the Victorian Minister for Water (2009) stated that:

*[the] Non-Water User limit was introduced to allay fears among some people that non-irrigators, or 'water barons', could buy large volumes of water that had been dissociated from the land and drive up the trading price. These fears have proven unfounded. There is no evidence of water barons entering markets in a big way in other jurisdictions that do not have this provision. Recent growth in ownership of water that is not linked to land is being influenced by irrigators themselves, looking for more flexibility in where and when they can use their water ...*

The Commission notes that the 10% limit will not be formally removed until October 2009. However, the limit was already reached in the Goulburn and Campaspe systems at the opening of the 2009–10 irrigation season (G-MW 2009a). Any further water access entitlement trade to non-water users (such as environmental purchases) will therefore be restricted while it remains in place.

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#### ■ Finding 7.3

The Commission welcomes the Victorian Government's recent decision to remove the 10% non-water user limit.

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### 7.3.1.4 Separation of water from a bulk entitlement in New South Wales and South Australia

In New South Wales and South Australia, concerns have been raised about arrangements that inhibit or prevent irrigators within an irrigation membership group (such as an irrigation company or trust) from separating and trading their individual water access entitlements. Under these arrangements, irrigators often do not hold their water entitlements directly. Instead, irrigation infrastructure operators (operators) hold water entitlements collectively on behalf of their members in the form of a bulk or group entitlement. In these cases the operator's cooperation is required to first separate (transform) the individual entitlement from the bulk entitlement if an irrigator wants to trade their water entitlement.

Separation of an individual water entitlement from a bulk entitlement has been a significant constraint to trade in the past, with operators (as opposed to governments) delaying and/or preventing such transformation. The ACCC has received a number of complaints about operator-imposed restrictions on water trade (ACCC 2008a). A number of submissions from irrigators to the ACCC also point to examples of non-cooperation from operators.

However, under the Commonwealth *Water Act 2007*, the Minister (with advice from the ACCC) has developed water market rules, including rules to ensure that irrigation operators cannot prevent the transformation of irrigation rights into tradeable water access entitlements. The water market rules provide a regulatory framework to ensure that irrigators are able to 'transform' the water entitlements held on their behalf by operators into separately held (and tradeable) entitlements. A number of irrigation operators have taken steps to comply with the rules—for example, Murray Irrigation Limited has developed and circulated supporting information to its member irrigators. The ACCC is responsible for monitoring and overseeing compliance with the rules.

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#### ■ Finding 7.4

Difficulties in separating water from a bulk entitlement have been a constraint to trade in the past, particularly in South Australia and New South Wales. However, the monitoring and enforcement by the ACCC of the recently established market rules due to come into full effect on 1 January 2010 should assist in removing this significant restriction to water trade under a bulk entitlement structure.

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<sup>19</sup> The Victorian *Water Act 1989*, section 33AL, defines this as land that is specified in a Victorian water-use licence, therefore not necessarily land within a given water system.

### 7.3.1.5 Separation of water from a co-held water entitlement

Under the New South Wales *Water Act 1912*, multiple operators were able to apply for an 'authority' to operate a joint water supply work. These schemes are often referred to as joint water supply schemes. It is estimated that there are approximately 400 of these schemes in New South Wales. Under the *Water Management Act 2000*, these 'authorities' to operate a joint water supply work were replaced by a single water access licence. Typically, these water access licences are co-held as they were issued as tenants in common (DWE 2008).

It is possible, under Section 74 of the NSW *Water Management Act 2000* to separate the co-held entitlement and then trade out of the joint water supply scheme (this procedure is known as subdivision). However, the application to exit from a co-held access licence requires the written consent of all co-holders of the entitlement concerned, or of co-holders who hold a majority share of the holdings specified on the co-held entitlement. Where the written consent of all co-holders or co-holders with a majority holding cannot be obtained, the applicant(s) can apply to the Supreme Court of New South Wales to approve the separation. In these cases the Supreme Court must be of the view that it is just and equitable to approve the application to sub-divide.

The Commission is aware that entitlements within joint water supply schemes have been successfully separated and traded outside the schemes. However, there are examples of individuals calling for trading to be made easier within these schemes (Leslie and Ferguson 2008).

Under the *Water Act 2007*, the market rules apply to entities which satisfy the definition of an irrigation infrastructure operator and also satisfy the elements of transformation as defined under the *Water Act 2007*. The Commission notes that because of the limited coverage of the *Water Act 2007*, the market rules may not apply to co-held entitlement structures such as those that generally exist in the joint water supply schemes in New South Wales.

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#### ■ Finding 7.5

The Commission is concerned that subdividing co-held entitlements typically held by joint water supply schemes under the NSW *Water Management Act 2000* may be difficult and potentially costly, particularly where an application to the New South Wales Supreme Court is required. These difficulties are not addressed through the water market rules as the rules have limited application to co-held entitlements.

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Outside the basin, Western Australia has noted that transformation of irrigator entitlements is expected to be a key issue as the Western Australian Government considers the management of schemes such as the Harvey and Ord.

### 7.3.1.6 Termination fees and exit fees

#### Background: Terminology and relevant NWI clauses

NWI clause 62 states that 'recognising the need to manage the impacts of assets potentially stranded by trade out of serviced areas, the Parties agree to ensure that support mechanisms used for this purpose, such as access and exit fees and retail tagging, do not become an institutional barrier to trade (paragraph 60(v) refers).'

Schedule D to the Murray–Darling Basin Agreement is also relevant.

Termination fees and exit fees are payments to infrastructure operators associated with a reduction in the demand for and use of water delivery infrastructure. They are designed to manage the risk of 'stranded assets' which may emerge when irrigators terminate access to the delivery system and the operator is left with committed fixed costs, which threaten the financial viability of the delivery systems for remaining irrigators. However, the fees also have the potential to impede trade.

Termination and exit fees differ in terms of the action which triggers their payment. Termination fees are payable by an irrigator upon surrendering a delivery entitlement to the infrastructure operator (reducing use of or disconnecting from the network), with the corresponding removal of the rights and obligations associated with that delivery entitlement. In contrast, exit fees are levied on the sale of a water entitlement out of the infrastructure operator's network or district, and hence directly relate to the act of trading water. Prior to the unbundling of water entitlements from delivery entitlements, termination fees did not exist. In recognition of the trade benefits of the unbundling process, there has been a move in recent years towards using termination fees and a movement away from the use of exit fees to manage the stranded asset issue.

Termination fees are provided for in Schedule D to the Murray–Darling Basin Agreement. Under the Commonwealth *Water Act 2007*, the Minister's water market rules prevent operators from requiring termination of delivery as a condition of transformation or trade. The water charge termination fees rules regulate the fees or charges payable to an operator for terminating access to the operator's network.

Although exit fees are not permitted under Schedule D of the MDB Agreement, there have been concerns that the way in which termination fees have been implemented by some irrigation authorities (where compulsory termination of delivery entitlements is automatically triggered by water entitlement trade) imposes the same barrier to water trade as an exit fee. For example, termination fees triggered by water sales, such as occurs in Western Murray Irrigation (WMI 2008), constrain water trading. New South Wales has advised that Murray Irrigation Limited recently removed the option of an ongoing access fee and is insisting that members pay a one-off termination fee for trading entitlement to an external buyer. New South Wales has suggested that, by doing this, Murray Irrigation Limited has 'in effect re-introduced the exit fees which were considered to be a barrier to trade'. The Commission is aware that these barriers to trade have been adopted by a number of irrigation operators across the MDB in breach of Schedule D of the MDB Agreement.

The Commonwealth water charge rules (termination fees) and water market rules are expected to address this trade barrier. The Minister for Climate Change and Water signed the water termination fees rules and the water market rules on 10 June 2009 (see ACCC 2008b). After a transition period, operators are expected to comply with these rules by 1 September 2009 and 1 January 2010 respectively.

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#### ■ Finding 7.6

While exit fees are prohibited under the MDB Agreement, the compulsory termination of delivery entitlements that automatically trigger termination fees as a condition of water trade by operators, particularly in many privately operated areas in New South Wales, effectively act as exit fees. The Commonwealth water charge rules (termination fees) and water market rules should address this trade barrier, once they come into full effect on 1 September 2009 and 1 January 2010, respectively.

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#### 7.3.1.7 Lack of unbundling

Unbundling is the process of separating various elements of water entitlements into individual entitlements so that each can be separately tradeable (for example, the separation of entitlements to land from entitlements to water; separation of water delivery rights and water access rights; separation of the right to use water on a specific piece of land). Unbundling can facilitate water trading by allowing water users outside irrigation districts (urban water users, environmental water managers, private diverters, etc.) to purchase water entitlements. It also provides irrigators with flexibility to sell entitlements while maintaining access to infrastructure so they can opportunistically purchase seasonal allocations when that suits their water requirements.

Unbundling may facilitate lower cost and more timely processing of water access transactions by requiring agencies processing applications to consider only issues directly relevant to those trades (such as hydrological connectivity and trade constraints on traded water volumes). It may also remove the need to consider entitlement holders' other obligations, such as funding delivery infrastructure (in districts) and compliance with environmental standards for water application on land. As stated in the submission by Goulburn–Murray Water (G-MW 2009b), unbundled water entitlements in northern Victoria mean that delivery and use conditions are pre-approved, eliminating the need for time-consuming and costly checks.

Significant progress has been made in unbundling access to regulated surface water resources in the Murray–Darling Basin. However, the Commission notes that this process is not complete and water access is still associated with delivery and use in the MDB, notably in unregulated surface water and groundwater systems; nor has the unbundling process been completed outside the basin.

The *Australian water markets report 2007–08* (NWC 2008c) revealed the significant progress yet to be made in unbundling in Victoria, where there were apparently no firm plans to unbundle water rights for unregulated rivers or groundwater. In New South Wales, as is the case in Victoria, there has been slow unbundling of entitlements pertaining to unregulated rivers. However, it is recognised that:

- + most entitlements have been unbundled
- + unregulated and groundwater entitlements may not always require unbundling of delivery rights and access rights (because there are no delivery rights involved)
- + the access rights for such systems are by definition very local, so unbundling from land brings fewer benefits than in regulated systems
- + such rights are often tradeable without unbundling.

In New South Wales, the Commission notes that some irrigation trusts are yet to make transparent the individual water rights of members against the bulk entitlement.

Nevertheless, these basin states are ahead of South Australia, where unbundling was formalised in the South Australian River Murray on 1 July 2009, following changes to the *Natural Resources Management Act 2004*. The process of unbundling for the rest of South Australia is expected to be completed in 2010. In New South Wales, a number of irrigation trusts are yet to effectively unbundle as water is still allocated on a per hectare basis and irrigators are uncertain with respect to their 'share' of the trust's bulk entitlement.

Three types of water access entitlements exist in Queensland: water allocations, interim water allocations and water licences. Of those three instruments, only water allocations are unbundled from land and registered as title on the Queensland Water Allocation Register. In addition, although there were 11 completed resource operations plans at 30 June 2008, three of them do not have unbundled, tradeable entitlements on issue. However, the Queensland Government has noted that there is a lack of demand for water trading in these areas (for example, Coopers Creek) and the nature of these western systems means that it is very unlikely that entitlements will ever be unbundled.

In Western Australia, unbundling has not occurred. While a new Water Resources Management Bill is planned, and it is expected that it will allow for NWI-consistent unbundling, until the Bill is enacted Western Australia will remain noncompliant in this important area and the benefits of unbundling will remain unavailable to WA participants in water trading.

It should be noted that unbundling is most straightforward in a regulated surface water system where the independence of water access and delivery is most clear. It is sound policy to proceed with caution where the hydrological consequences of separation are still uncertain. However, this is not a justification for indefinite inaction. The Commission considers that reform should proceed through a staged process of gathering information to resolve uncertainty, followed by implementation of unbundling where separability can be most strongly supported—such as between water access and use.

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#### ■ Finding 7.7

It is commonly thought that unbundling water from land is largely complete. However, the Commission finds that, while significant progress has been made in the process of unbundling, additional reform is required in most states.

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#### ■ Recommendation 7.2

The Commission recommends that the feasibility and benefits of further unbundling, including in unregulated surface water and groundwater systems, should be considered in all states, and where jurisdictions decide against further unbundling the reasons for that decision should be published.

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#### 7.3.1.8 Delays in developing water plans to permit water trading

The formulation of a water management plan is usually an important prerequisite for creating a water market for a particular water system. In effect, planning defines and caps the water available for consumptive use, which can then be reallocated through trade. Good planning is essential for sustainable water management to prevent overallocation and other problems that arise if caps or resource characteristics are poorly specified (see Chapter 1).

However, delays in the planning processes also delay the commencement of water trading and its associated benefits. In this regard, delays in the development of water plans can impose effective barriers to trade:

- + In New South Wales, trading is possible without a water sharing plan in some systems, but the full range of trading options under the *Water Management Act 2000* are not available. There has been a slow process of suspension of water plans from 1912 legislation and conversion to the 2000 / 2004 legislation.
- + In the Northern Territory, NWI-envisaged trade is possible after the introduction of a plan.
- + In Queensland, some resource operations plans are still pending and must be approved before trading is possible in that area. Queensland is the only state where trade of any form (NWI or otherwise) is not allowed until a resource operations plan is in place (however, some trade is possible where interim allocations are provided—see Table 24).

No plans are necessary for trading in the other states. Trading is possible in Tasmania, Victoria and South Australia directly under the relevant legislation. Trades can occur under legislation in Western Australia, but will only be consistent with the NWI once restrictions that continue to effectively tie water to landholders are lifted.

**Table 24: Water trading and water plans**

Jurisdiction	Comments
<b>NSW</b>	Full NWI-envisaged trading is not possible until a plan is complete. Thirty-nine plans are yet to be completed. Trading is available in areas without a water sharing plan, but this is more limited.
<b>NT</b>	NWI-envisaged water trading is possible only once a water allocation plan for a water source is complete. One of four plans is outstanding.
<b>Qld</b>	<p>Resource operations plans are needed for NWI-envisaged (or any other) trading to occur (with the exception of interim allocation arrangements). The implementation of the resource operations plan creates the tradeable water allocations, separate from land title, and specifies relevant trading rules. Until then, consumptive water is held under pre-existing water licences, which are not tradeable. There are still 9 (of 21) resource operations plans to be finalised.</p> <p>The Water Regulation 2002 provides an interim trading regime, whereby the holders of interim water allocations in areas without a resource operations plan in place may trade their allocations to other land. The allocation is detached from the seller's land and reattached to the buyer's land. This process applies in those areas prescribed by the regulation—at present an interim water allocation can be permanently transferred, in whole or in part, to the owner of another landholding only in the Mary River or Burdekin–Haughton Water Supply Scheme.</p>
<b>SA</b>	NWI-envisaged trade is possible where licences are issued (in prescribed areas). The <i>Natural Resource Management Act 2004</i> separated water from land and provides for water trading of water licences and allocations.
<b>Tas.</b>	There is no need for a plan to be in place for NWI-envisaged trade to occur. The <i>Water Management Act 1999</i> separated water licences from land within and outside irrigation districts and provides the basis for trade in water licences.
<b>Vic.</b>	For surface water, no plan needs to be in place—trading between landholders is provided for under the Act and managed by authorities, either under system-specific rules or, for unregulated streams, through generic trading rules set under the Act. However, NWI-envisaged trading is only fully possible where unbundling has occurred and shares are separated from land (which is complete for most major surface water systems). Some rights are tradeable in unregulated systems, and trading is permitted in groundwater systems where it is covered by a groundwater management plan.
<b>WA</b>	There is no need for a plan to be in place for trade to occur. While the current <i>Rights in Water and Irrigation Act 1914</i> allows for the trade of licences to take water, it restricts the holding of a licence to take water to a person who owns, occupies or has access to the land on which the water occurs, and then only if they demonstrate an intention to use the water. Trading in WA is therefore not yet fully consistent with the NWI. New legislation in WA is to address this issue, but has not yet been passed.

Source: Adapted from NWC (2006).

State agencies have submitted that planning processes are being prioritised in accordance with resource demands, including environmental needs. For example, New South Wales advised that initial water sharing plans focused on priority (high-stress, high-extraction) water resources. This suggests that planning processes are being prioritised, with preference to those water systems where the expected benefits of implementing water trading are greatest. The Commission would support this approach, provided it does not lessen resolve to complete all systems as soon as possible.

#### ■ Finding 7.8

In some states there have been delays in completing water planning, which has precluded water trading in most of those systems. However, some jurisdictions have demonstrated that they are prioritising planning processes, with preference to those water systems where the expected benefits of water trading are greatest.

### 7.3.1.9 Further potential constraints to market neutrality

The above barriers to trade are well known and documented, and there are generally processes in place for their progressive removal. However, there are a number of other potential constraints to the development of fully transparent, competitively neutral, and efficient water markets. A number of these were raised by jurisdictions during consultation on this assessment.

The limited current information available to the Commission precludes a comprehensive assessment at this time. However, areas of possible concern include:

- + the robustness of interstate water sharing arrangements and transparency during extreme circumstances, including the potential for manipulation of storage and operational management to avoid triggers for interstate water allocations
- + potential issues associated with the transparency, timing and robustness of allocation processes and announcements in various jurisdictions (as discussed in Chapter 6)
- + similar issues of transparency and robustness at the district level, where bulk water providers determine the volume and timing of water available (for example, season length, treatment of conveyance losses, and changes to other policies)
- + excessive divergences between intrastate and interstate trade processing times and differences in the cut-off dates for the approval of intra- and interstate trades
- + divergences in trade (entitlement and allocation) application fees and other entitlement-related fees
- + government purchases of allocations to underpin security (for example, in September 2008 the South Australian Government announced that it would underwrite critical water allocations to irrigators to ensure their survival, in the event that water availability does not improve (South Australian Government 2008))
- + borrowings of water against water savings and recovery initiatives or failure to pass on water savings to the environment in a timely manner
- + potential breaches of the MDB cap on diversions in the northern reaches, and divergent water use monitoring and enforcement efforts
- + possible distortions created by public investment in water savings and infrastructure projects in some regions and/or subsidisation of infrastructure access and bulk supply charges.

The Commission has limited available information with which to assess the extent to which such areas of concern are distorting water trading outcomes, but their potential to do so is well recognised. For example, James Cox and Richard Warner (2009) of the Independent Pricing and Regulatory Tribunal of New South Wales argue the following in relation to governments subsidising irrigators for the cost of making water available:

*Not only does under recovery of costs increase the profit that irrigators can gain from trading water, but the under recovery of costs can also induce marginal and inefficient irrigators and irrigating enterprises to stay in the industry and resist engaging in trade when this would be the most logical and rational thing for them to do.*

Some of these issues (such as allocation processes and announcements) have been identified by the ACCC in its issues paper on water trading rules advice. Other issues relating to higher level water planning and management could potentially be addressed in other components of the Basin Plan.

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#### ■ Finding 7.9

There are a number of other potential constraints to the development of transparent, competitively neutral and efficient water markets. These include interstate and intrastate allocation processes and government interventions (examples are listed in Section 7.3.1.9). However, there is limited information available to assist the Commission in the assessment of these matters. The Commission intends to follow up these issues as information becomes available. In the meantime, the processes to develop the Basin Plan provide a further opportunity to explore them.

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#### ■ Recommendation 7.3

The Commission suggests that an assessment of factors potentially affecting the development of water markets across the Murray–Darling Basin (see examples in Section 7.3.1.9) be undertaken in order to determine whether they distort market outcomes or undermine confidence in the market, and to recommend potential reforms. The development of the Basin Plan by the MDBA, including the water trading rules based on advice from the ACCC, could inform such an assessment.

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## 7.3.2 Reducing water trade transaction costs and improving timeliness

### Background: Terminology and relevant NWI clauses

Under NWI clause 58(ii), parties 'agree that their water market and trading arrangements will ... minimise transaction costs on water trades, including through good information flows in the market and compatible entitlement, registry, regulatory and other arrangements across jurisdictions ...'

Clause 59 goes on to state that 'the States and Territories agree to have in place pathways by 2004, leading to full implementation by 2006, of compatible, publicly – accessible and reliable water registers of all water access entitlements and trades (both permanent and temporary) on a whole of basin or catchment basis, consistent with the principles at Schedule F. The Parties recognise that in some instances water service providers will be responsible for recording details of temporary trades.'

One indicator that a market is efficient is that there are institutional arrangements in place that facilitate timely and low-cost transactions. Elements here include:

- + the financial costs of trading in water and, importantly, processing times for water transactions
- + access to and dissemination of market information
- + confidence in market intermediaries
- + effective arrangements for recording ownership and transfers of underlying entitlements (water registers).

The NWI therefore requires that transaction costs be minimised, including through information flows, and registry and regulatory arrangements (clause 58(ii)).

Excessive transaction costs (be they high financial costs or costly delays due to long processing time) will prevent efficient water trades from occurring. It is important to note that trades should not necessarily be costless, because resources are involved in assessing, approving and processing them. However, when costs become excessive (charges exceed efficient costs), water trading may be impeded and inefficient patterns of water ownership and use will result.

However, important as the level of charges may be, the Commission considers the timeframes for completion of trades to be even more important. Delays in executing a trade add to uncertainty and risk for market participants, deter trading and investment, and distort resource allocation. They reduce market responsiveness and flexibility, and the value of water trading as a business and risk management tool for irrigators and environmental water managers.

### 7.3.2.1 Timeliness

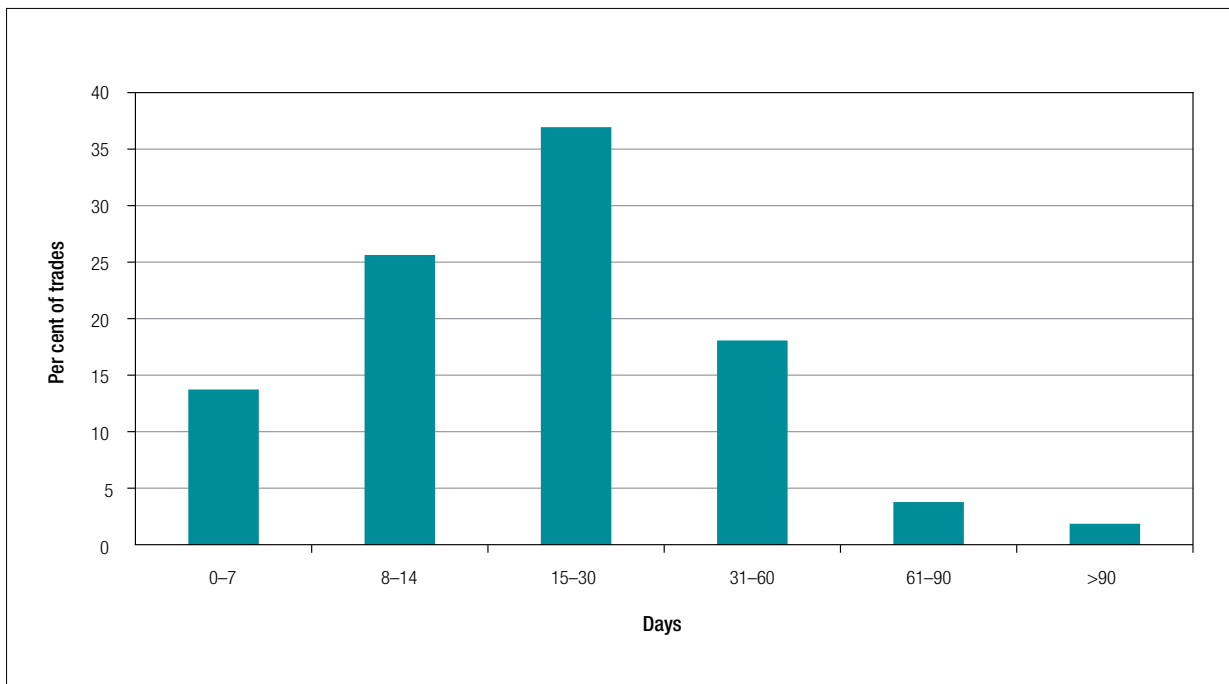
Delays in processing water trade applications can impose significant costs on water users. In the case of water allocation trades, delays can lead to lost opportunities for water use at critical decision points in a crop's development. In the case of water entitlement trades, delays can lead to deferred investment or excessive risk through exposure to water allocation markets.

Several jurisdictions, including South Australia, New South Wales, Queensland and Victoria, reported on approval times for trades as part of the Commission's *Australian water markets report 2007–08* (NWC 2008c), as shown in the sections on over the page.

## South Australia

Water trade processing times for South Australia are reported in Figure 4 and Figure 5.

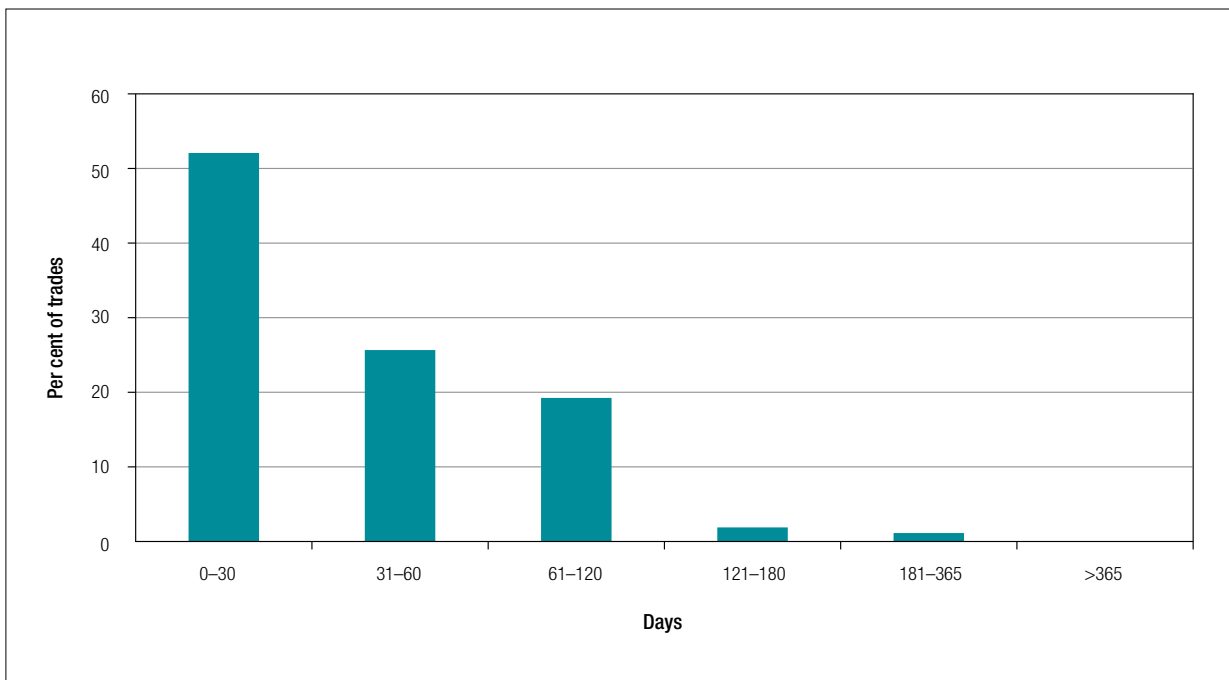
**Figure 4: Approval times for water allocation trades, South Australia**



Note: Excludes interstate trades.

Source: NWC (2008c)

**Figure 5: Approval times for water licence transfers, South Australia**

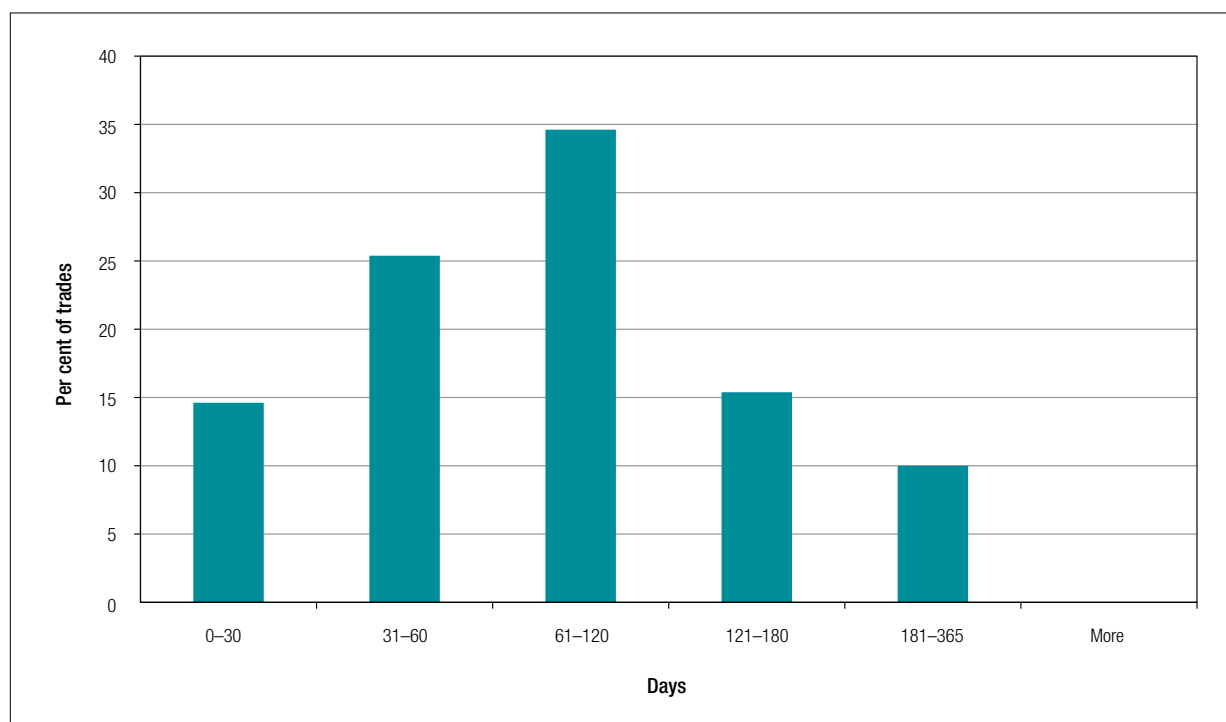


Source: NWC (2008c)

## New South Wales

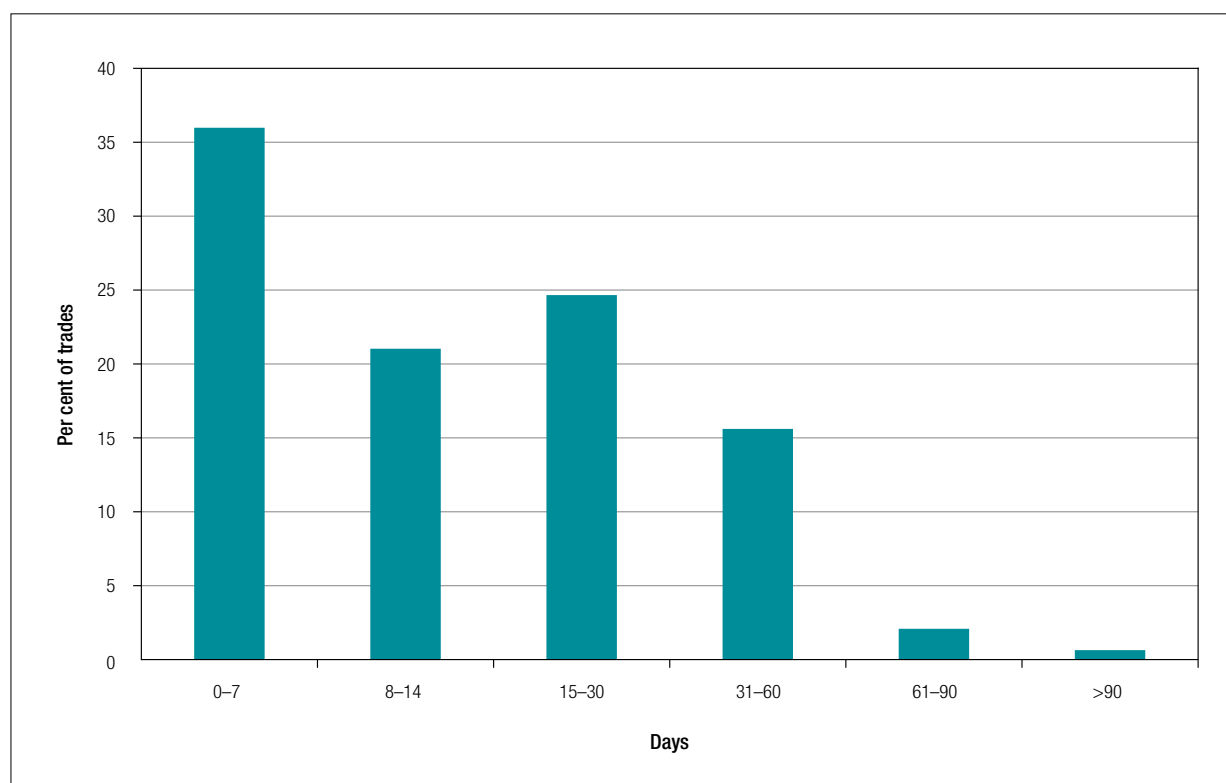
Water trade processing times for New South Wales are reported in Figure 6 and Figure 7.

**Figure 6: Processing times for water access licence transfers, New South Wales**



Source: NWC (2008c)

**Figure 7: Approval times for assignment of water allocations, New South Wales**



Note: Excludes interstate transfers.

Source: NWC (2008c)

## Queensland

SunWater processes the bulk of allocation trades within the regulated systems in Queensland. Although a complete dataset of allocation trade was not available for this assessment, SunWater has advised the Queensland Government that, of a total of 624 allocation trades in the St George, Bundaberg, Mareeba and Nogoa Mackenzie catchments, only five took longer than five business days. SunWater advises that this accounts for approximately 50% of all allocation trades in Queensland.

Within these areas, 99% of allocation trades are completed within five business days. When transactions are completed through SunWater's online process, SunWater has advised that they can be approved within minutes (Hyder Consulting 2008).

Existing service standards for processing trade times in Queensland are:

- + change assessment and issue dealing certificate: no more than 5 business days (DERM)
- + registration of transfer on Water Allocation Register: 90% within 5 business days (Titles Office)
- + 100% correct dealings completed in 5 business days (SunWater).

## Victoria

Water trade processing times for Victoria are reported in Table 25 below.

**Table 25: Approval times for water allocation trades, Victoria**

Ninety per cent of applications were finalised within the specified number of days		
	July to December 2007	January to July 2008
Interstate trade inbound	25 days	20 days
Interstate trade outbound	40	40
<b>Interstate total</b>	<b>40</b>	<b>35</b>
Trade between Victorian rural water authorities	25	12
Trade within authorities	10	5
<b>Intrastate total</b>	<b>15</b>	<b>7</b>
<b>All trades</b>	<b>20</b>	<b>10</b>

Source: NWC (2008c)

## Work to improve timeliness

In submissions, several jurisdictions reported recent improvements in approval times.

- + New South Wales reported that the average processing time for licence dealings fell from 76 days in 2006–07 to 30 days in 2007–08.
- + Queensland advised that it is currently meeting national service standards for allocation and entitlement trade. Queensland credited this performance to the substantive investments that have been made over the past decade in SunWater's water accounting system and in the state's water entitlement register. In the case of allocation trades, although SunWater has consistently publicly reported processing and approval times of under 5 business days, it advises that over 70% are processed and approved in less than 15 minutes.
- + South Australia advised that, despite a growing number of applications, it had significantly improved processing times and now meets nationally agreed service standards.

Some jurisdictions also identified factors that have limited timely processing of trade applications and which could potentially be improved. For example:

- + South Australia advised that the ‘bundled’ environment compounds the complexity of trading procedures but that processing times are expected to improve once entitlement is legislatively separated from allocation (scheduled for the 2009–10 irrigation season). It also highlighted the lack of a single register across trading states as a factor affecting processing times.
- + Tasmania has advised that its biggest constraint to achieving better turnaround times is staff resources, and that the time it takes to process a transaction in Tasmania may not be as critical as in, for example, the southern MDB. Tasmania has noted the need to consider the costs and benefits of further efforts to improve processing times.
- + Victoria advised that in 2007–08 initial turnaround times were in some cases slow, partly due to authorities, brokers and irrigators adjusting to unbundled entitlements. Turnaround times had, however, improved by the end of the season.
- + The Western Australian Government noted that trades are assessed under existing legislation (the *Rights in Water and Irrigation Act 1914*) and that processing times for transactions can be lengthy due to requirements of the Act. For example, requirements for information to process water trades include (but are not limited to) legal access to property where water is to be taken, proof of historical use, public advertisement (when required) and any supporting hydrological or hydrogeological investigations. All the requirements of the Act must be satisfied prior to the approval of any trade.

It should be noted that the shift from exchange rate to tagged trading in the southern Murray–Darling Basin<sup>20</sup> could make the processing of transactions more complex and therefore entail higher costs and longer timelines. This has been linked to significantly reduced volumes of interstate entitlement trades in 2007–08 (WaterFind 2008). However, purchase of an interstate entitlement and subsequent trade of allocations can provide a very similar result with some additional flexibility. Hence, tagged trade is not the only way of effectively achieving interstate permanent trade.

COAG has initiated work to reduce timeframes, but in the view of the Commission, the target timeframes are still generous. Progress towards a National Water Market System, now initiated by COAG, should bring consistency to transaction processes, costs and timeframes that would undoubtedly improve market confidence.

With regard to allocation trade, COAG has agreed to improve service standards, which will be publicly reported. The service standards commenced on 1 January 2009. For the first six months, the service standard is 20 business days for interstate trade and 10 business days for intrastate trade. From 1 July 2009 these standards were halved to 10 and 5 business days, respectively (except in South Australia). Upon the development of the National Water Market System, the service standard will move to 5 days for all trade. Service standards entitlement trade introduced on 1 July 2009 require 90% of entitlement trades to be processed within 20 business days for the approval stage and within 10 business days for the registration stage.

It is important that time delays are reduced wherever possible and that processing times are generally consistent between intrastate and interstate water trade. Effective processing of entitlement trade will become increasingly important, as adjustment pressures are expected to further increase the number of such trades in coming years.

The Commission supports the efforts of the jurisdictions to improve transaction processes and also their efforts to improve communication and education opportunities with market participants, particularly with brokers who should be expected to understand and comply with state and interstate procedures. The jurisdictions accept that there have been difficulties and delays in processing transactions but should also be credited with improving processing times in 2009.

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#### ■ Finding 7.10

While there have been some improvements, delays in processing transactions, especially in water access entitlements, continue to undermine the efficiency and effectiveness of water markets. Public reporting of performance against COAG service standards is expected to drive improvements in trade processing times, both within and across jurisdictions, in the period ahead.

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<sup>20</sup> Introduced to reduce potential third – party impacts of water entitlement transfers on other water entitlement holders in either the destination or original water resources.

### 7.3.2.2 Access to and dissemination of market information

Efficient markets require good information flows on matters such as the price at which assets have been traded, so that market participants are well informed. This in turn underpins business decisions that are consistent with optimising the value of the resource.

The Commission has previously identified a lack of publicly available market information as a potential impediment to efficient water trading in Australia. To date, state-based registers have generally not provided the information required to fully inform water trading decisions. As registers continue to become more accessible and complete, such as the web-searchable Victorian and New South Wales water registers (which include price and volume information), they will provide more of this required information. However, there will always be limitations in relying on state-based information sources in situations where interstate water trade is relevant. Therefore, multijurisdictional information is needed to inform water trading decisions.<sup>21</sup>

Although the Commission intends to continue to produce its annual water markets report, participants' access to basic current market information remains a concern. The lack of accurate and up-to-date market information is an issue that was frequently raised through the Commission's public submissions process, and the comparison with other commodities markets is not flattering.<sup>22</sup> COAG is also seeking to improve access to and dissemination of market information through the National Water Market System (Box 31).

The findings of the 2006 Pricing and Personal Information Disclosure Consultancy Project (the 'Disclosure Project', PWC 2006a) have not been fully taken up by NWI parties. The report's recommendations included the following:

- + All jurisdictions should introduce mechanisms which support the mandatory disclosure of both entitlement and allocation price information through legislative or regulatory amendments. This may include amendments which would allow for fines on parties which report inaccurate information.
- + Systems should be introduced, or upgraded, so that they support the collection of entitlement or allocation price information.
- + A consistent set of information processing and disclosure standards should be adopted, to improve the accuracy, consistency and comprehensiveness of information disclosed to water markets.

As noted by the Disclosure Project in 2006, price information is expected to significantly benefit the development and effective operation of water markets. For this reason, the Commission considers that the collection of price information is worthwhile for its own sake, and should not be seen as a secondary outcome of the administration of government revenue measures.

The Commission continues to urge the adoption of these recommendations, while recognising that any measures put in place should not increase barriers to trade.

Under the *Water Act 2007*, the Bureau of Meteorology has been given data collection responsibilities. Stage 1 of the Australian Water Resources Information System (AWRIS) is expected to produce publicly available summary trade information; however, this could take some time to develop.

<sup>21</sup> To deal with this problem, the Commission published the inaugural *Australian Water Markets Report 2007–2008* (NWC 2008c) with a view to improving the performance of Australia's water markets by providing information for both direct and indirect market participants.

<sup>22</sup> In producing the *Australian Water Markets Report 2007–08* (NWC 2008c), it became clear that there are different (and typically insufficient) requirements among the states and territories with respect to providing price information. This crucial lack of price information typically available from registers or authorities confirmed the findings of the Commission's Pricing and Personal Information Disclosure Consultancy Project, which was prepared by PricewaterhouseCoopers and published on the Commission's website in November 2006. The project investigated market drivers for pricing and personal information disclosure on registers, and recommended areas where consistent approaches to disclosure could be adopted by jurisdictions.

### Box 31: National Water Market System

In November 2008, COAG agreed to the establishment of a National Water Market System. The project is being coordinated and funded by the Commonwealth, and will be overseen by a National Water Market System project group (which includes representatives from each jurisdiction, the Commission and the Bureau of Meteorology).

States and territories will maintain their statutory responsibility for water registers.

The proposed system would include:

#### 1. High performance state and territory registers

A common registry system (CRS) will be developed and implemented in New South Wales, South Australia, Western Australia, Tasmania, the Northern Territory and the ACT. The CRS will record the details of water access entitlements and remaining water licences, market information, individual water accounts, and transactions and dealings in relation to water access entitlements and remaining water licences.

Enhancements will be made to the Queensland and Victorian registers. These states have recently undertaken significant work to improve their register systems.

#### 2. National portal

A national online portal will be created as a source of market information. Initially, the portal will collate and provide summary information, while directing users to the relevant state registers (a first step). Over time, as the CRS is developed, the national portal could (subject to costs and benefits) also provide a means for initiating transactions.

#### 3. Interoperability

Interoperability is the automated exchange of information between state and territory registers to facilitate interstate trade. In developing the CRS, enhanced registers and national portal, particular attention will be paid to ensuring interoperability and compatibility between registers.

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### ■ Finding 7.11

Information provision for and confidence in the water market are improving with new information sources and expected web-based information aggregation, notably the annually published *Australian water markets report*, the development of a National Water Market System and the Bureau of Meteorology's Australian Water Resources Information System (AWRIS). The Commission is concerned that the recommendations of the 2006 Pricing and Personal Information Disclosure Consultancy Project have not been fully adopted by NWI parties. These recommendations would provide a good framework for improving the quality of water market information.

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### ■ Recommendation 7.4

The Commission recommends that NWI parties adopt consistent approaches to disclosure in line with the recommendations of the Commission's 2006 Pricing and Personal Information Disclosure Consultancy Project. The Commission supports further improvements to overcome current limitations of registry arrangements by ensuring full and accurate reporting of the volume and price of entitlement and allocation trades on individual state water registers, including for government purchases for the environment.

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#### 7.3.2.3 Confidence in water market intermediaries

The confidence of market participants in the conduct of intermediaries is critical to the continued growth and efficient operation of markets. The Commission is conscious that water markets in Australia are still maturing and may for that reason be vulnerable to loss of confidence as a result of poor behaviour by market intermediaries.

While water market intermediaries are subject to general market and consumer protection regulation, such as the *Trade Practices Act 1974*, and state and territory fair trading legislation, there is no industry-specific regulation governing water intermediaries.

The question of regulation of water market intermediaries was considered in the Commission's July 2007 Waterlines report *Improving market confidence in water intermediaries* (Allen Consulting Group 2007). The report found that reported incidents of misconduct by intermediaries were serious but not widespread, and that many issues related to teething problems in the development of water markets.



More recently, the ACCC has noted that the number of complaints about intermediaries has been very limited. The ACCC received three complaints concerning water market intermediaries between March 2008 and April 2009. From January 2006 to February 2008, a total of six complaints about water market intermediaries' conduct were received by the ACCC, other state consumer agencies and government departments.

The Waterlines report by the Allen Consulting Group (2007, page 11) recommended that:

*... On balance, taking into account the various stakeholder views, relevant factors in the water market and experiences with licensing in other markets, ACG does not recommend a mandatory licensing or registration scheme at this stage ...*

The report provided a number of detailed reasons for not licensing intermediaries. Instead, it recommended a number of other actions be taken to improve confidence in intermediaries in the water market, including:

- + exploring the appropriate level of market regulation
- + providing better information about consumer rights, obligations, complaints and consumer protection legislation—a task that was subsequently adopted by the ACCC and the relevant consumer affairs agencies in certain jurisdictions
- + developing and publishing standard sale contract templates and agency contracts for engaging the services of a broker
- + examining ways of streamlining the approvals process, particularly in regard to protocols governing transactions between approvals authorities, brokers and exchange operators
- + periodic studies assessing the incidence of any misconduct by intermediaries—a task also adopted by the ACCC
- + providing more regular information updates for market participants.

The Commission supports the implementation of these recommendations and recognises that significant efforts have been made in this regard.

In particular, the ACCC recently issued three new publications to assist irrigators, water brokers and water exchanges to understand their rights and responsibilities under the *Trade Practices Act 1974*:

- + *Water trading: A guide to your fair trading rights when using brokers and exchanges* (ACCC 2008c) aims to help irrigators understand their fair trading rights. The guide includes tips for irrigators when looking for a broker or exchange; examples of conduct that is likely to contravene the Act; information about remedies and penalties for breaches of the Act; and steps to resolve a dispute with a broker or exchange.
- + *Water trading: An overview of your fair trading rights when using brokers and exchanges* (ACCC 2008d) is a shorter overview of fair trading rights.
- + *Water brokers and exchanges: Your fair trading obligations* (ACCC 2008e) will help brokers and exchanges understand their obligations under the Act when dealing with irrigators.

The issue of regulation of market intermediaries was also considered in 2008 by the COAG Water Markets Project Group and the MDBA Trade Working Group.

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#### ■ Finding 7.12

The level of confidence in market intermediaries is critical to the continued growth and efficient operation of water markets. The Commission recognises that significant efforts have been made to improve confidence in market intermediaries, in particular through the provision of better information about rights and obligations under consumer protection legislation by relevant authorities (such as the ACCC). While the Commission is concerned about reported incidents of misconduct, and acknowledges arguments in favour of regulation from some market participants, there is not yet a compelling case for industry-specific regulation of market intermediaries beyond the generally available trade practices and consumer protection regulations.

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#### ■ Recommendation 7.5

The jurisdictions and the ACCC should continue to monitor the actions of market intermediaries and should adopt any further measures considered necessary to preserve and build user confidence in the water trading system and to advance water market objectives under the NWI.

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### 7.3.3 Facilitating development of a range of water products

#### Background: Terminology and relevant NWI clauses

Under NWI clause 58(iii), parties agree to 'enable the appropriate mix of water products to develop based on access entitlements which can be traded either in whole or in part, and either temporarily or permanently, or through lease arrangements or other trading options that may evolve over time ...'

Development of a range of different tradeable water products is a sign of a mature market which caters to the different needs of its participants. For example, water access entitlements provide a basis for long-term decision making and investment, whereas water allocations can be used for managing seasonal variability. Water options of various forms could help manage risk. A portfolio of different entitlement types can be tailored to expected water demands (Freebairn and Quiggin 2006).

Other water products have been slow to evolve in Australia's water markets:

- + Lease of water access entitlements<sup>23</sup>: limited use in 2007–08, with 2 in New South Wales totalling 1.5 GL, 36 in Victoria totalling 8.3 GL and 69 in Queensland totalling 6.6 GL (NWC 2008c)
- + Forward contracts for allocations accruing to entitlements: offered by WaterExchange but with limited take-up.
- + Option contracts for environmental flows in the Murrumbidgee (Heaney and Hafi 2005). Options may be valuable for sourcing water in dry years, but high premiums are expected to be required and there are no known examples.
- + In addition, the Sydney Futures Exchange has created SFE State Water Indexes with a view for the trading of futures contracts on each regional index to be a mechanism to hedge financial risk associated with water availability. The indexes were established in August 2005. The market, although originally expected to be established during 2006–07, has yet to commence.

Although not separate water products per se, entitlements can also be specified in a way that enables water users to access storage and affect storage management decisions. In particular, capacity sharing and carryover provisions are two mechanisms providing storage management opportunities to mitigate the use-it-or-lose-it incentives that sometimes apply at the end of an irrigation season (see Box 32).



Rice channel gates, New South Wales

<sup>23</sup> Referred to as a 'term transfer' in NSW and a 'limited term transfer' in Victoria.

### Box 32: Capacity sharing and carryover

A capacity share is a form of entitlement that gives the holder the rights to a proportion of an asset's capacity (for example, rights to store water in a dam) and thus devolves the decision on how much water to carry over to the next season to the entitlement holder rather than the communal storage operator. However, capacity share arrangements are not widespread (they include, for example, St George and MacIntyre Brook in the northern MDB for irrigators, some urban bulk entitlements in the southern MDB, and state water sharing arrangements where shared storage capacity exists).

According to Hughes and Goesch (2009), 'capacity sharing is typically considered in the context of relatively simple water supply systems, where all water is sourced from a single storage. While some concern may exist about the suitability of capacity sharing in more complex systems, it is not obvious that the concept could not be sufficiently generalised. The ability for the capacity sharing framework to be applied to a range of more complex water supply systems remains a subject for potential future research.'

With carryover, water unused at the end of an irrigation season may be made available in the following period. This, in effect, permits water users to increase the reliability of a given water product by smoothing water between periods. Carryover is embodied in the continuous accounting provisions in some northern MDB water systems. Carryover was first introduced in the southern MDB in New South Wales in 1998–99. Carryover has been available since 2006–07 in Victoria and is now permanently available. South Australia allows carryover as an emergency drought measure, but those arrangements are not permanent. Currently observed rules for carryover arrangements include limits, such as for carryover volumes to be a maximum of 50% of entitlement in New South Wales and Victoria. These constraints arise in reaction to the possibilities of third-party impacts. However, the limits may be overconservative and not well aligned with the actual probability of third-party impacts occurring, such as through storages spilling or overflowing. This prevents efficient uptake of opportunities to tailor storage management to individual requirements.

Another product, not directly linked to water access but essential to the water use decisions of many water users, is the water delivery right. Such rights relate to maintaining access to the network of irrigation infrastructure operators. These have been defined as part of the unbundling process that separates out rights to water access, water delivery and water use. The recently released water charge rules (termination fees) set out the responsibilities of irrigators to pay ongoing network fees for holding water delivery rights, as well as the ability for the infrastructure operator to require a termination fee upon surrender or termination of a water delivery right. Water delivery rights may also be tradeable, potentially providing flexibility to irrigators and infrastructure operators.

While tagged trade was agreed as the preferred approach in relation to interstate trading arrangements (see Box 33), the introduction of tagged interstate entitlement trade has been accompanied by a decline in interstate entitlement trade (one trade of 200 ML in 2007–08). Having decided to adopt tagged trade, jurisdictions should do more to simplify and promote its use. The Commission notes that, as part of developing advice on the water trading rules, the ACCC will be undertaking consultation on the issue of improved tagged trading.

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#### ■ Finding 7.13

Water allocations and water access entitlements remain the most widely traded water products, while other instruments have been slow to develop. The development of a wide range of different products will enable better risk management and better matching to the particular needs of different water users (including irrigators, environmental water managers and urban water corporations). As Australian water markets further develop, such alternative and complementary products should be encouraged.

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#### ■ Finding 7.14

Even though tagged trade was agreed as the preferred approach in relation to interstate trading arrangements, the introduction of tagged interstate entitlement trade has not been accompanied by an increase in interstate entitlement trade. The Commission considers that facilitating and promoting interstate entitlement trade is an important next step in water market reform.

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#### ■ Recommendation 7.6

The Commission recommends that having decided to adopt tagged trade, jurisdictions do more to simplify and promote its use. The Commission notes that the ACCC will be investigating the issue of how to improve tagged trading.

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### Box 33: Overview of tagged trade

The former Murray–Darling Basin Ministerial Council agreed that from 1 July 2007 transfers of interstate water entitlements would be facilitated through ‘tagged trade’. Prior to that date (and particularly during the Murray–Darling Basin Commission’s Pilot Interstate Water Trade project that ended in May 2006), transfers of interstate water entitlements were facilitated by ‘exchange rates’.

The exchange rate mechanism converted the entitlement in the state of origin (SOO) to an entitlement issued in the state of destination (SOD) through a process of cancellation and reissue. The mechanism was adopted in an attempt to recognise differences in entitlement reliability, modelled transmission losses and to minimise third-party impacts. The mechanism worked efficiently for water products traded with similar reliability but, as the area of interstate water trade increased and different water products were able to be traded, the exchange rate system became too complex. Uncertainties about the impacts of climate change pose further difficulties in setting exchange rates.

Under the tagged trade mechanism, entitlements are not converted from SOO to SOD (or cancelled and reissued), but remain issued by the water authority from the SOO. Therefore, the water allocated to the entitlement remains referable to the original source. However, the water is delivered to the buyer under the regulations of the SOD, where an allocation account is established. While tagged trade has largely replaced the exchange rate mechanism, there are some exceptions, including back trades into the Goulburn, Loddon and Campaspe valleys.

The advantages of tagged trade include the following:

- There is no requirement for the complex calculation or modelling of exchange rates.
- Lower security entitlements can be traded interstate without needing to use ‘conversion factors’, as the characteristics of the SOO remain. Conversion factors are used to convert an entitlement of one type into an entitlement of another type (NSW general security entitlements can still be converted to high security entitlements).
- Entitlements can be traded interstate without having to cancel and reissue.
- Once a tag is established, the owner only needs to order water, rather than undertake further trade transactions.

Despite these benefits, there has been very little tagged trade since its introduction. One trade of 200 ML was processed from Victoria to New South Wales in the entire 2007–08 water year. Tagged trade also has implications for cap calculations, as the annual cap accounts must be corrected by the amount of water actually used in the SOD by the interstate tagged entitlements.

As noted above, purchase of an interstate entitlement and subsequent trade of allocations can provide a very similar result to tagged trade, with some additional flexibility. Hence, tagged trade is not the only way of effectively achieving interstate entitlement trade. Nevertheless, the Commission considers that it is in the long-term interests of the water market as a whole that interstate entitlement trade be liberalised.

## 7.3.4 Third-party impacts of water trading

### Background: Terminology and relevant NWI clauses

Under NWI clauses 58(iv) and (v), parties agree that their water market and trading arrangements will ‘recognise and protect the needs of the environment; and ... provide appropriate protection of third-party interests’.

Unimpeded water markets will lead to the reallocation of water entitlements and water allocations in line with the interests of market participants. This results in water being reallocated towards its ‘highest value’ uses.

However, where private incentives are not aligned with social objectives, so that costs and benefits of market transactions are not taken into account by those undertaking them, water trade may have third-party impacts.

Impacts of trade on third parties can arise in two distinct ways: directly, where trading decisions by one party have an unintended direct cost on another party (a formal ‘externality’); and indirectly, where water trade facilitates changes in irrigated agriculture or the local environment that subsequently affect the local community or other industries.

In recognition of the need for the market to operate within rules which adequately recognise this, the NWI requires that the water trading arrangements developed by jurisdictions recognise and protect the needs of the environment and provide appropriate protection of third-party interests. As an essential first step, this requires the identification and classification of the sources and impacts of externalities attached to water trading. Further Commission work (discussed further in Chapter 10) is underway to monitor the impacts of water trade in the southern MDB.

Governments have implemented a number of approaches to manage third-party impacts of changes in river hydrology and water use that may arise following a water trade:

- + water trade approval processes—such as volume restrictions to manage congestion constraints and disallowing trade where hydrological connectivity does not exist
- + water use management—water use licensing and salinity mitigation programs
- + structural adjustment and community change—such as volume restrictions on water being traded out of an irrigation district.

One of the clearest examples of a potential third-party impact relates to changes in transmission losses as a result of trade. Currently, transmission losses are generally not attributed to traded water—fixed transmission losses in the system (such as seepage and evaporation) are already taken into account and the marginal transmission losses from altered flow patterns due to water trade are likely to be small. Also, in the past, changes to total operational water releases (for all users) as a result of trade have been relatively small. This means that, above and beyond the ‘operational requirement’ only a small component of water has typically been provided to meet trade demand (relative to that required to meet the operational requirement). Expected transmission losses that can be attributed to these small components have therefore been considered to be negligible and have not been accounted for in transactions.

However, a number of factors are now exacerbating the potential for transmission losses associated with trade to be material:

- + volumes reallocated by trade are no longer small, including as a result of water being purchased for the environment (see Chapter 4)
- + trade is greatest in periods of low flow, therefore marginal transmission losses may not be insignificant
- + trade is generally moving water downstream, in some cases over long distances (e.g. trade from irrigators in the Goulburn system in Victoria to the Sunraysia and South Australian Riverland regions; environmental purchases might also result in more water being used further downstream).

While not all environmental purchases are targeted at improving the flow regime at the Murray mouth, recent work by CSIRO (2008) suggests that transmission losses or ‘delivery efficiency’ should be an important consideration in effective environmental water delivery. For example, CSIRO found that, on average, 1 ML of water in the Condamine–Balonne region (at the point of maximum flow) represents only 0.18 ML of water at the Murray mouth, whereas 1 ML in the Murrumbidgee represents 0.61 ML and the Goulburn–Broken 0.75 ML at the Murray mouth.<sup>24</sup> (It should be noted that these average measures may significantly overestimate transmission losses for a marginal change in the flow regime). The Commission observes that these results highlight the importance of carefully targeting purchases of entitlements for the environment to particular environmental objectives, in a cost-effective manner.

The Commission understands that the ACCC and MDBA are considering issues around transmission losses in developing their trade rules and new Basin Plan. Given the increasing volumes of water trade (including as a result of environmental water purchases), the Commission considers that further efforts are now required to ensure that rules governing water trade account for and manage the impacts of transmission losses, to ensure that third parties are not adversely affected.

Water trade is also sometimes linked to indirect impacts such as community decline (see Chapter 10), but some communities may benefit considerably from local water trade. In most cases, indirect negative impacts of water trade are best addressed directly through other policies (such structural adjustment assistance), rather than through restraints on water trading, which can impose significant welfare losses.

Jurisdictions have previously undertaken two studies on water trading to help achieve identified water market and trading outcomes, including recognising and protecting the needs of the environment and providing appropriate protection of third-party interests (see Box 34).

<sup>24</sup> These efficiencies apply to average annual flow volumes and are based on flows for without-development conditions and the historical climate.

#### Box 34: NWI water market studies

Under the NWI, jurisdictions agreed to undertake four studies on water trading to help achieve identified water market and trading outcomes (including recognising and protecting the needs of the environment and providing appropriate protection of third-party interests).

In the 2007 Biennial Assessment, the Commission noted that states subsequently agreed (through the COAG Water Trading Group) that the objectives of the four studies could be covered by two studies: one by PricewaterhouseCoopers (PWC 2006b) and the other by the Productivity Commission. The studies were completed in mid-2006.

*Rural water use and the environment: The role of market mechanisms*, by the Productivity Commission (2006), examined the feasibility of establishing market mechanisms to encourage economic efficiency of rural water use, including managing environmental externalities.

A work plan was drawn up by the COAG Water Trading Group to ensure that the actions proposed by the reports were addressed. However, the work plan focuses on the recommendations in the PricewaterhouseCoopers report, *National Water Initiative: Water trading study*.

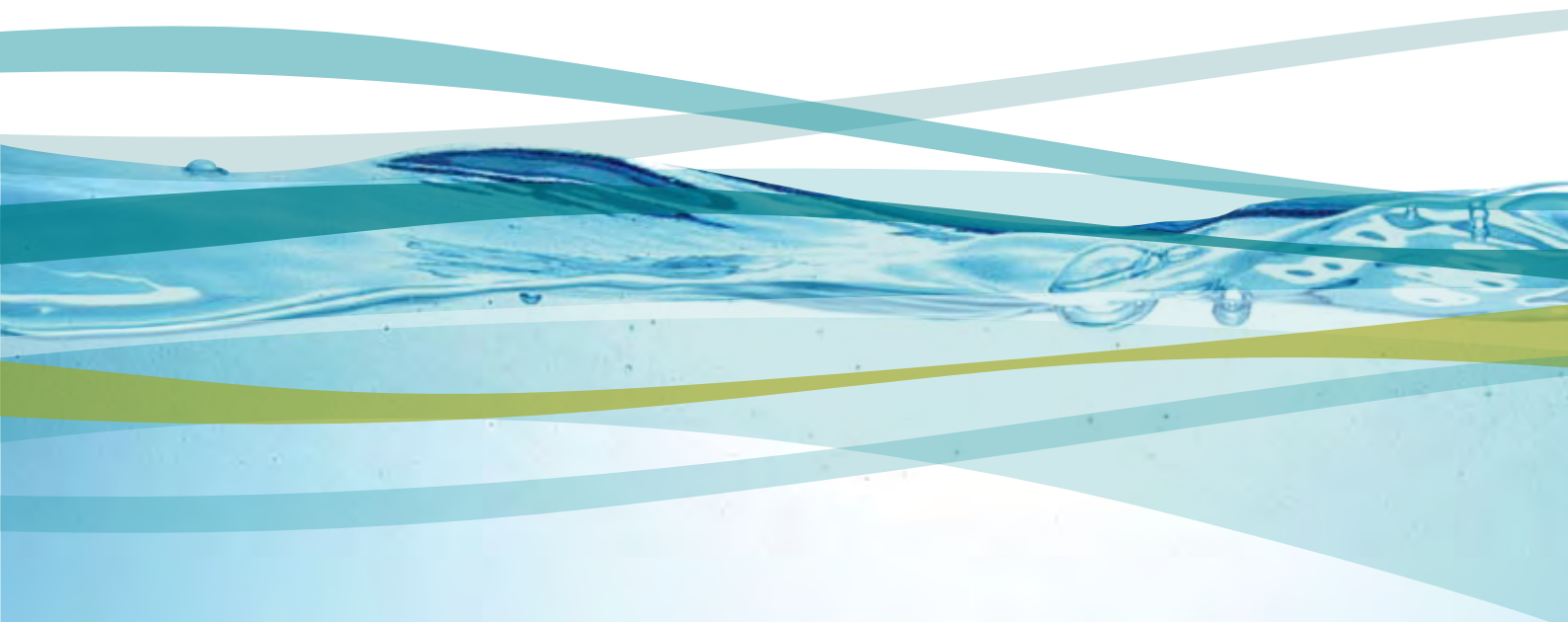
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#### ■ Recommendation 7.7

The Commission recommends that direct impacts of water trade on third parties (for example, congestion and environmental externalities) be addressed through the most cost-effective instrument (such as water use licences) rather than by imposing trading restrictions where such restrictions are not based on hydrological or ecological constraints. Indirect impacts of water trade should not be managed by restricting the water market—they are better addressed directly through other policies (such as structural adjustment assistance). Given the increasing volumes of water trade (including as a result of environmental water purchases), the Commission considers that further efforts are now required to ensure that rules governing water trade account for and manage the impacts of transmission losses, to ensure that third parties are not adversely affected.

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# 8

## Pricing, demand management and other policy initiatives

## 8.1 Overview

A central aim of the NWI (clause 23(viii)) is to implement policies that promote water use efficiency and innovation in both urban and rural areas. This recognises that past policies and practices adopted by governments often did not encourage efficient, sustainable and responsible use of water, resulting in poor management of the resource, uneconomic or excessive investment in water supply infrastructure, and adverse environmental impacts.

However, this objective does not imply that the goal is to minimise water use per se, or to adopt water conservation and demand management programs or water-efficient appliances and production technologies regardless of cost. Such an approach would ignore, for example, the significant economic and social costs of the continuing water use restrictions across urban areas in Australia. Rather, consistent with the overarching objective of the NWI, the Commission sees the objective as to facilitate a level and pattern of water use and related investment that maximises economic, social and environmental benefits. This chapter assesses progress by NWI parties in implementing policy settings which facilitate water use efficiency defined in this way.

It is anticipated that when this objective has been achieved, water resources, water infrastructure assets and government resources devoted to the management of water will be used in an efficient and sustainable manner through:

1. Pricing and charging policies which promote efficient use of and investment in water resources
2. Water metering and billing arrangements which provide clear information to users in a way that can influence their behaviour
3. Adoption of demand management programs and water-efficient technologies where the total social benefits exceed the total social costs
4. Adoption of cost-effective recycling and utilisation of innovative water supply sources
5. Effective management of environmental impacts of water use via pricing, regulatory and other instruments
6. Appropriate application of financial incentives, information provision, and extension services where investment in water use efficiency and innovation is expected to generate public benefits.

Efficient pricing or charging for water-related services underpins investment and provides signals for efficient use of water services in urban and rural areas. Getting the price signals right by ensuring that they fully reflect the efficient costs of service provision as well as external costs is a key element in encouraging innovation, efficient water use and ensuring revenue streams are sufficient to deliver required levels of service.

Water prices provide a signal against which individuals and commercial actors can make decisions about water use and investment in water-saving technologies and alternative supplies. While non-price approaches to demand management (regulatory requirements, restrictions) are useful in some cases, their costs and benefits need to be assessed. For example, with water restrictions, the costs to individuals, businesses and the community are often hidden. The Commission supports efforts to address information failures and regulatory barriers to demand-side measures; however, private agents are generally best placed to make efficient investment and usage decisions, once they are provided with the right policy settings and signals.

Managing the environmental externalities associated with water use, including through price (externality pricing) and non-price (capacity building, regulation) mechanisms, is also an important component of water management.

Draft NWI pricing principles for recovering capital expenditure, setting urban water tariffs, water planning and management charging and pricing for recycled water and stormwater re-use are being developed to promote national consistency and to improve market neutrality for water based trade and investment. However, the Commission considers that the processes to reach agreement on them have been too slow.



<b>Finding 8.1</b>	With the exception of the Northern Territory and Queensland, jurisdictions have demonstrated that they have achieved lower-bound pricing and that price setting processes are consistent with, or moving towards being consistent with upper bound pricing for metropolitan water storage and delivery. The Northern Territory has announced significant price increases designed to move towards lower-bound pricing by 2011–12. Queensland recently made a transparent decision to subsidise new water grid assets. The Commission notes that such a subsidy, although transparent, is inconsistent with Queensland's NWI commitments to implement upper-bound pricing in metropolitan areas.
<b>Finding 8.2</b>	Government grants for urban water infrastructure projects can frustrate cost-recovery objectives and distort commercial incentives for investment. By reducing the cost of water to urban water customers, government grants can distort consumer responses.
<b>Recommendation 8.1</b>	The Commission recommends that, consistent with the sound principles underlying the upper-bound pricing objective of the NWI, governments avoid making grants for conventional urban water infrastructure. Exceptions may be justifiable to encourage innovation, deal with externalities, or meet community service obligations.
<b>Finding 8.3</b>	There has not been sufficient progress in the movement towards consistent urban water pricing policies. However, draft national pricing principles have been developed which apply to both urban and rural water. These principles apply to recovery of capital expenditure, setting urban water tariffs, recovery of costs of water planning and management activities, and pricing for recycled water and stormwater reuse.
<b>Recommendation 8.2</b>	The Commission recommends that NWI parties move quickly to endorse the draft national NWI pricing principles at Ministerial Council level and implement those principles as soon as is practical.
<b>Finding 8.4</b>	Independent economic regulation is promoting transparency, rigour, and at least broad consistency in price review and price setting processes in Victoria, New South Wales and the ACT. While the Commission acknowledges some progress in other jurisdictions, such as South Australia's recent announcement that the role of the Essential Services Commission will be extended, South Australia, Tasmania, Western Australia and the Northern Territory do not yet benefit from fully independent economic regulation.
<b>Recommendation 8.3</b>	While recognising recent progress, the Commission recommends that more be done in Tasmania, South Australia, Western Australia, Queensland and the Northern Territory to establish and put into operation independent economic regulation to improve the efficiency, accountability, national consistency and transparency of water pricing across Australia.
<b>Finding 8.5</b>	The Commission has identified a number of pricing reforms that go beyond the requirements of the NWI, which have the potential to improve efficiency.
<b>Recommendation 8.4</b>	The Commission recommends that jurisdictions consider pricing reforms that go beyond NWI requirements, such as an end to inclining block tariffs, a move away from water charges based on property values where they still exist, administered scarcity pricing, and using more direct instruments than water charges to pursue social equity objectives.
<b>Finding 8.6</b>	As the Commission found in 2007, New South Wales and Victoria have the most developed policies for recycled water and stormwater pricing. However, there has been some further progress in other jurisdictions.
<b>Recommendation 8.5</b>	The Commission recommends that faster progress be made to adopt and implement draft principles for pricing recycled water and stormwater, given that most jurisdictions are developing recycled water and stormwater supply options as part of diversifying water supply portfolios.
<b>Finding 8.7</b>	Across all jurisdictions, progress has been mixed and slow in developing trade wastes pricing policies that encourage the most cost-effective methods of treating industrial wastes. However, several jurisdictions are in the process of undertaking such reviews, including New South Wales, Victoria, the ACT and Western Australia.

<b>Finding 8.8</b>	In a number of states, a water usage charge is not levied directly on all users, who therefore do not receive a price signal providing an incentive to use water prudently. For example in some states, tenants are not billed in full or provided with information on their water usage.
<b>Recommendation 8.6</b>	The Commission recommends that charges for water usage be applied directly to all users, where this is cost-effective. For example, the Commission considers that, across Australia, significant scope exists to bring building tenants into a transparent water charging environment. The current partial coverage of tenants is inconsistent with sound long-term water resource management principles and will ultimately need to be rectified.
<b>Finding 8.9</b>	The Commission observes that there is currently intensive activity in the energy sector to introduce smart metering. The Commission also notes that some states have moved to more frequent billing cycles to provide improved price signals to urban customers.
<b>Recommendation 8.7</b>	In the urban water sector, the Commission encourages governments to consider smart metering. The Commission also encourages moves to more frequent billing cycles where it facilitates more effective price signals to customers.
<b>Finding 8.10</b>	The Commonwealth and state governments are making major investments in irrigation renewal projects. While such investments are generally a positive contribution to better water management, government funding has the potential to distort water use and economically efficient investment decisions.
<b>Recommendation 8.8</b>	The Commission recommends that implications for future water charging should always be made transparent, especially to future users of the infrastructure, when irrigation infrastructure investment proposals are being developed. Investment should be consistent with NWI commitments relating to full cost recovery, and the draft NWI pricing principles on recovery of capital.
<b>Finding 8.11</b>	Progress has been made by most states in implementing best practice pricing in rural and regional areas. All jurisdictions have adopted consumption-based charging, and most government-owned rural water service providers have achieved lower-bound pricing or have transparent community service obligations in place to account for any revenue shortfall below the lower revenue bound. However the recent National Performance Report by the Commission and the Water Services Association of Australia found that the financial performance of regional and rural water utilities is highly variable and generally below that of metropolitan urban utilities.
<b>Finding 8.12</b>	Queensland, Victoria and the Commonwealth have implemented various fixed-charge drought relief measures. The impact of fixed charge drought relief is difficult to quantify. In principle, if those measures were to persist, they could lead to systematic subsidisation of water users, which might affect overall efficiency and distort patterns of adjustment.
<b>Finding 8.13</b>	Progress in meeting NWI commitments for cost recovery for water planning and management for both surface and groundwater has been very limited. Progress in this area is long overdue in Queensland, Western Australia, Victoria, South Australia and the Northern Territory. Further work is required to ensure that water planning and management activities undertaken by the MDBA are subject to a consistent and transparent cost-recovery framework.
<b>Finding 8.14</b>	The Commonwealth <i>Water Act 2007</i> gives insufficient powers to the Minister to progress water planning and management charge rules in the way envisaged in the NWI, as it requires a regulated water charge to be imposed for the water charge rules to apply. As the current application of charges in each state differs, the rules would not apply consistently to all activities or water users in the Murray–Darling Basin, making it difficult to achieve NWI and Basin water charging objectives and principles consistently across the basin.

<b>Recommendation 8.9</b>	The Commission recommends that draft NWI pricing principles for water planning and management be agreed and implemented quickly so that jurisdictions can advance NWI commitments to recover water planning and management costs. Recognising that the <i>Water Act 2007</i> gives insufficient power to the Minister to progress water planning and management charge rules in the Murray–Darling Basin as envisaged in the NWI, the Commission recommends that once agreed, the NWI pricing principles for water planning and management be implemented within the MDB.
<b>Finding 8.15</b>	Jurisdictions have developed and implemented a variety of urban demand-management programs to encourage water use efficiency and behavioural change, over and above the limited requirements of the NWI.
<b>Finding 8.16</b>	There have been significant reductions in per capita consumption and significant improvements have been made in reducing system leakage. However reductions in consumption are likely to be due to a variety of factors, including behaviour change, water use efficiency measures and water restrictions.
<b>Finding 8.17</b>	Jurisdictions have implemented a number of programs aimed at improving on-farm water use efficiency. However, a range of factors drive water use efficiency and innovation. Most importantly, the combination of prolonged drought, rising water prices, and opportunities for trade has led to significant private investment by farmers in order to use water more efficiently. Incentives linked to public benefits, information provision, and extension services for investment for water use efficiency and innovation have a role to play in promoting the objectives of the NWI.
<b>Recommendation 8.10</b>	While policies and programs that improve technical efficiency are worthwhile and are achieving results, the Commission encourages NWI parties to do more to develop policies and programs that will deliver multiple benefits beyond technical water use efficiency. The Commission encourages a rigorous economic assessment of the full benefits and costs (including external benefits and costs) of policies and programs prior to implementation.
<b>Recommendation 8.11</b>	The Commission recommends that the NRMCC performance indicators be refined to better reflect the important policy principle that partial measures of productivity, such as technical water use efficiency, may not necessarily be in the overall interests of the community or the environment. There are often costs associated with improving technical water use efficiency that need to be considered. Government intervention is best focused on addressing information, institutional or process failures, while market signals of the value of water provide the best incentive for private investment and innovation.
<b>Finding 8.18</b>	Some states have implemented or investigated the use of pricing and market-based instruments to address environmental externalities. All states have further work to do to explore the feasibility of such actions.
<b>Recommendation 8.12</b>	The Commission recommends that NWI parties renew collective and individual efforts to respond to NWI clause 73 (use of pricing and markets to deal with environmental externalities), given that well-designed externality pricing can be a powerful and enduring way of dealing with the environmental impacts of water provision and use.

## 8.2 Context for this assessment

The 2007 Biennial Assessment (NWC 2007) and 2008 Update (NWC 2008a) found that there had been significant progress with NWI actions relating to pricing, reuse, demand management, water-efficient technologies and managing environmental impacts of water use. This assessment builds on those previous assessments, and also takes into account recent developments and emerging issues. Since the NWI was signed, the need to value water appropriately and to use it wisely has become even more critical in the light of growing water scarcity due to drought and concern about the potential impacts of climate change.

As discussed in Chapter 11, urban areas have experienced dramatic changes in their supply–demand situation. A desire to reduce reliance on stringent water use restrictions has stimulated the development of more diverse portfolios of water supply sources. Substantial investments have been made by governments in water supply infrastructure (for example, desalination plants and networked grids) and demand-management programs (such as subsidies for water-efficient appliances and rainwater tanks).

There have also been significant changes to national policy settings impacting on urban water use. At its meeting on 29 November 2008, COAG adopted an enhanced national urban water reform framework to improve the security of urban water. The framework requires, among other things, that NWI parties investigate enhancements to pricing reform, including scarcity pricing and pricing to account for environmental externalities. It also requires that NWI parties examine the role of improved urban water metering and billing practices in the allocation, use and management of water.

The context for the rural sector has changed significantly. Developments in rural areas have included the following:

- + Higher prices in water markets reflect increasing water scarcity.
- + Under the *Water Act 2007*, the ACCC is required to advise the Commonwealth Water Minister on water charge rules for charges payable to infrastructure operators and bulk water operators, and for water planning and management in the Murray–Darling Basin.
- + Some jurisdictions have undertaken substantial investment in rural water infrastructure.

## 8.3 The Commission's assessment and findings

The assessment in this chapter<sup>25</sup> focuses on:

- + pricing arrangements for water storage and delivery, water planning and management, trade wastes, recycled water and stormwater
- + demand management and adoption of water-efficient technologies and practices
- + measures to address environmental externalities of water use.

As facilitating the appropriate level of reuse and utilisation of alternative and innovative water supply sources mainly affects urban areas, those aspects of water use efficiency and innovation are discussed in Chapter 11.

This chapter also considers Natural Resource Management Ministerial Council (NRMMC) performance indicators 8.1 through 8.10, which seek to measure progress in promoting water use efficiency and innovation.

<sup>25</sup> The issues covered in this chapter link closely with those discussed in other chapters, particularly Chapter 7 (water markets); Chapter 10 (structural adjustment); Chapter 2 (groundwater), for which cost recovery is a significant issue; and Chapter 11 (urban water). Institutional arrangements for urban water provision and rural water metering arrangements are also important for promoting water use efficiency and innovation; those arrangements are discussed not in this chapter but in Chapters 11 and 3, respectively.

### 8.3.1 Pricing policies that promote efficient use of and investment in water resources

#### Background: Terminology and relevant NWI clauses

Agreed outcomes and commitments to specific actions for best practice pricing and institutional arrangements are set out in NWI clauses 64–77.<sup>a</sup> These clauses require that parties implement water pricing and institutional arrangements that:

- promote economically efficient and sustainable use of water resources, water infrastructure assets, and government resources devoted to the management of water
- ensure sufficient revenue streams to allow efficient delivery of the required services
- facilitate the efficient functioning of water markets, including inter-jurisdictional water markets, and in both rural and urban settings
- give effect to the principles of user-pays and achieve pricing transparency in respect of water storage and delivery in irrigation systems and cost recovery for water planning and management
- avoid perverse or unintended pricing outcomes
- provide appropriate mechanisms for the release of unallocated water.

<sup>a</sup> Water pricing is also mentioned in other sections of the NWI, including clause 60 (which states that institutional arrangements to facilitate trade should include consistent pricing policies); and clause 90 (which states that improved pricing should be achieved for urban water).

Water charges convey important signals to customers and signal the viability of investment in new sources of supply. Getting water charging correct is therefore critical to ensuring that water is used wisely and that new sources of water supply are brought on line in a timely fashion.

The NWI requirements reflect the principle that, to send users appropriate signals that encourage efficient and sustainable use of water, the end price to water users should encompass:

- + the costs of investing in and operating and maintaining the infrastructure to produce, store, treat and deliver water
- + the price or value of the resource itself
- + the costs associated with planning and management of the resource
- + the otherwise unpriced costs (externalities) resulting from water production, extraction, use and disposal (such as environmental impacts).

It is important to note that both urban and rural water users have to pay charges relating to water storage and delivery infrastructure.

In addition to charging for water storage and delivery, rural (but generally not urban) water users also pay a price component for the value of the water resource itself. That component is signalled explicitly via the price at which allocations and entitlements are traded in water markets. This element of the total price gives water users a signal about the value of water—promoting both on-farm water use efficiency and trading of water to higher-valued uses. The extent to which the price of water in markets sends appropriate signals will depend on the extent to which those markets function efficiently. This is discussed in Chapter 7.

The following discussion examines the extent to which pricing policies relating to water storage and delivery, and water planning and management charges, promote water use efficiency and innovation. Externality pricing is considered as one of a suite of available instruments to address environmental impacts of water use in Section 8.3.4.

### 8.3.1.1 Metropolitan/urban water storage and delivery pricing

#### Background: Terminology and relevant NWI clauses

65. In accordance with NCP commitments, the States and Territories agree to bring into effect pricing policies for water storage and delivery in rural and urban systems that facilitate efficient water use and trade in water entitlements, including through the use of:

- i) consumption-based pricing;
- ii) full cost recovery for water services to ensure business viability and avoid monopoly rents, including recovery of environmental externalities, where feasible and practical; and
- iii) consistency in pricing policies across sectors and jurisdictions where entitlements are able to be traded.

NWI clause 66(i) requires metropolitan water providers to continue movement towards upper-bound pricing by 2008. Upper-bound pricing is defined as '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) (see Box 35 for further details).

#### Box 35: A note on upper and lower bound pricing

There are at least two different approaches to calculating the revenue requirement for capital investments:

- the annuity approach; and
- the Regulated Asset Base (RAB) approach.

The choice of approach depends in most cases, on whether prices are set at the lower or upper bound.

##### Annuity approach

The annuity approach forecasts asset replacement and growth costs over a fixed period and converts these to a future annualised charge (assumptions regarding rates of return on, and of, capital are implied within this process). The annuity approach is commonly applied to recover the costs of constructing and renewing non-financial assets over a medium to long time period. It does not directly seek to recover all of the forward capital expenditure associated with long-lived assets or a return on that capital. Depending on the choice of parameters, the annuity approach tends to be more aligned with lower bound pricing. The annuity approach can still provide for return on capital (over the longer term), but tends to result in a different revenue requirement and pricing profile.

##### RAB approach

The RAB approach includes an allowance for a return of capital (depreciation) and a return on capital.\* Under the RAB approach the 'building blocks' equations are as follows:

$$\begin{aligned} \text{Revenue requirement} = & \\ & \text{Benchmark operating expenditure (including operations, maintenance, administration costs)} \\ & + \\ & \text{Return on capital (RAB)} \\ & + \\ & \text{Return of capital (RAB) or depreciation} \end{aligned}$$

The RAB is then updated (or rolled forward) annually, to reflect additional capital expenditure, less asset disposals and regulatory depreciation

This approach is generally consistent with the NWI principle of upper bound pricing.

\* The 'return of capital' applied to the capital value invested reflects annual consumption of economic benefit or service capacity, and is referred to as depreciation. The 'return on capital' reflects the opportunity cost of the investment.

Source: NWI Steering Group on Water Charges 2007, p14.

## Full cost recovery

The 2007 Biennial Assessment found that, with the exception of the Northern Territory where a path towards upper-bound pricing was not yet in place, states had demonstrated that they had achieved lower-bound pricing and were on a path towards the upper bound for metropolitan water storage and delivery.

The Commission notes the following developments:

- + The Northern Territory Government has stated to the Commission that it has announced a three-year tariff path which will see urban water tariffs increase by 20% per annum from 1 July 2009. The government advises that the transitional pricing path should meet lower-bound pricing by 2011–12 and will enable the territory to develop a new pricing path aimed at achieving upper-bound pricing. However, it is not anticipated that upper-bound pricing will be achieved within the next five years.
- + Queensland has made a decision to seek a 4% (real pre-tax) rate of return on new water grid assets. This is an implicit subsidy for Queensland urban water consumers. The Commission notes that such a subsidy, although transparent, is inconsistent with Queensland's NWI commitments to implement upper-bound pricing in metropolitan areas. Queensland has stated that future assets constructed will be subject to upper-bound pricing.

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### ■ Finding 8.1

With the exception of the Northern Territory and Queensland, jurisdictions have demonstrated that they have achieved lower-bound pricing and that price setting processes are consistent with, or moving towards being consistent with upper bound pricing for metropolitan water storage and delivery. The Northern Territory has announced significant price increases designed to move towards lower-bound pricing by 2011–12. Queensland recently made a transparent decision to subsidise new water grid assets. The Commission notes that such a subsidy, although transparent, is inconsistent with Queensland's NWI commitments to implement upper-bound pricing in metropolitan areas.

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The NRMCC performance indicators relevant to urban water pricing (Box 36) seek to report on whether lower-bound and upper-bound pricing are being applied consistently, and to expose the rate of return being generated on the asset base for urban providers.

#### Box 36: NRMCC performance indicators relevant to urban pricing

The NRMCC indicators relevant to urban water (and rural) pricing include:

8.7 Consistency of pricing arrangements—lower bound

8.8 Consistency of pricing arrangements—upper bound, comprising 8.8(a)—rate of return being generated on asset base for rural providers and 8.8(b)—rate of return being generated on asset base for urban providers

Indicator 8.7 relates to a range of issues, including the recovery of planning and management costs, quantification of community service obligations, and processes for the removal or transparent reporting of subsidies. This chapter deals with these issues separately rather than through a single metric.

This chapter reports on the NRMCC indicator 8.8 (rate of return) for urban and rural water utilities, drawing on the Productivity Commission's *Financial performance of government trading enterprises, 2004–05 to 2006–07* (Productivity Commission 2008a); the National Water Commission's and Water Services Association of Australia's *National performance report 2007–08, Urban water utilities* (NWC and WSAA 2009); and the National Water Commission's *National performance report 2006–2007, Rural water service providers* (NWC 2008c).

Specific rate-of-return estimates from the Productivity Commission and the national performance reports (urban and rural) are not directly comparable due to differences in the method for calculating rates of return. There are also differences in the utilities covered in the reports and the period for which data is available. Including both datasets is intended to partly address incomplete coverage and data gaps in each dataset, particularly for the rural sector.



A Productivity Commission (2008a) report on the financial performance of government trading enterprises (GTEs) across Australia between 2004–05 and 2006–07 suggests that many water GTEs did not operate on a commercially viable basis (see Box 3). Of the five GTEs that did achieve the risk-free rate of return, four were metropolitan water GTEs from Victoria.<sup>26</sup> Rates of return on assets below commercial returns have the potential to:

- + deliver revenue streams that are insufficient for maintaining existing water infrastructure and required levels of service
- + dampen the price signal to customers, thereby encouraging overuse of water resources and water infrastructure assets
- + discourage potential market entrants, thereby foregoing the benefits of innovation, service delivery options and competition that market entry can provide.

However, care is required when interpreting these results due to differences in asset valuation methods and the effects of external factors such as water restrictions. This study highlights the importance of governments continuing to honour NWI commitments and ensuring efficient delivery of water services.

### Box 37: Financial performance of government trading enterprises, 2004–05 to 2006–07

In July 2008, the Productivity Commission released a report on the financial performance of GTEs (Productivity Commission 2008a). The report covered 24 water GTEs, which together controlled assets valued at \$53.7 billion and generated \$7.3 billion in total income in 2006–07. The report revealed that in 2006–07:

- the return on assets by water GTEs was 4.9%
- 19 of the 24 monitored GTEs earned less than the risk-free rate of return
- of the five GTEs that achieved the risk-free rate, three were metropolitan water GTEs in Victoria.

It should be noted that return on operating assets is affected by changes in asset values arising from asset revaluations, transfers or sales. For example, GTEs use different asset valuation methods. In the case of water GTEs, the approach to asset valuation and removal of contributed assets from asset bases for pricing purposes means that returns on assets may be higher than those reported in the Productivity Commission report.

It is also important to consider external factors in the operating environment, such as the effect of water restrictions on revenues.

Nevertheless, given the extent of investments in the urban and rural water sectors, it is vital that governments continue to honour NWI pricing commitments to ensure efficient delivery of water services.

### Government subsidies

A 2008 Productivity Commission paper on urban water reform described how significant government grants for water infrastructure in urban areas may frustrate cost-recovery objectives and distort commercial incentives for infrastructure investment (Productivity Commission 2008b, page 123):

*Subsidisation can frustrate cost recovery objectives and deter appropriate investments. There is little reason why urban (and rural) water investments should not 'pay their own way'. Subsidised water supply projects can reduce the costs of water and exacerbate the inefficient price signals already received by users—that is, signalling that there is no imperative to pay the full cost of water delivery, or more for the water resource when it is scarce.*

The paper went on to state that provision of subsidies and grants for urban water initiatives should be assessed carefully to ensure that they do not impede broad policy objectives or detract from efficiency and that, 'in the absence of a particular need to address policy-relevant market failures, the case for grants and subsidies for urban water projects appears weak'. The Commission shares the concerns of the Productivity Commission.

<sup>26</sup> The Water Services Association of Australia (WSAA) also produces estimates of return on assets, which are reported later in this chapter, to demonstrate that the water and sewerage businesses meet the requirements of National Competition Policy to achieve full cost recovery. The WSAA's approach to estimating the rate of return differs from that used by the Productivity Commission and, as a result, the measures are not directly comparable.

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### ■ Finding 8.2

Government grants for urban water infrastructure projects can frustrate cost-recovery objectives and distort commercial incentives for investment. By reducing the cost of water to urban water customers, government grants can distort consumer responses.

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### ■ Recommendation 8.1

The Commission recommends that, consistent with the sound principles underlying the upper-bound pricing objective of the NWI, governments avoid making grants for conventional urban water infrastructure. Exceptions may be justifiable to encourage innovation, deal with externalities, or meet community service obligations.

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## Consumption-based pricing

The Commission's 2007 Biennial Assessment found that all states had completed their commitments under the 1994 COAG Water Reform Framework, and had demonstrated that consumption-based pricing had been achieved in both rural and urban systems. Where consumption-based pricing had not been achieved, it had been demonstrated that the introduction of consumption-based pricing was not cost-effective. Consumption-based pricing is in place in almost all metropolitan areas through the use of two-part tariffs. In Tasmania, the *Water and Sewerage Industry Act 2008* includes pricing principles which provide for corporations to recover efficient costs of regulated services and require pricing based on a fixed cost and a variable cost component.

## Consistency in pricing policies

Draft national principles for recovering capital expenditure, setting urban water tariffs, recovering the costs of water planning and management activities, and pricing for recycled water and stormwater reuse have been developed through an expert interjurisdictional advisory group chaired by the Commission. The principles were developed to assist states to meet their NWI commitment to implement consistent pricing policies across sectors and jurisdictions.

The development of these principles represents a significant advance in this important NWI commitment to implement consistent approaches to water pricing. It is important that progress is now made to implement the principles quickly, particularly as water infrastructure investments are made across Australia.

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### ■ Finding 8.3

There has not been sufficient progress in the movement towards consistent urban water pricing policies. However, draft national pricing principles have been developed which apply to both urban and rural water. These principles apply to recovery of capital expenditure, setting urban water tariffs, recovery of costs of water planning and management activities, and pricing for recycled water and stormwater reuse.

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### ■ Recommendation 8.2

The Commission recommends that NWI parties move quickly to endorse the draft national NWI pricing principles at Ministerial Council level and implement those principles as soon as is practical.

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## Independent economic regulation

### Background: Terminology and relevant NWI clauses

77. The Parties agree to use independent bodies to:

- i) set or review prices, or price setting processes, for water storage and delivery by government water service providers, on a case-by-case basis, consistent with the principles in paragraphs 65 to 68 above;
- ii) publicly review and report on pricing in government and private water service providers to ensure that the principles in paragraphs 65 to 68 above are met.

- + In the ACT, the Independent Competition and Regulatory Commission (ICRC) is responsible for determining the tariffs that ACTEW Corporation (ACTEW) applies for the provision of water and wastewater services. Prices may be binding or discretionary, depending on the terms of referral to the ICRC.
- + In New South Wales, the Independent Pricing and Regulatory Tribunal (IPART) determines the maximum prices that can be charged for metropolitan water supply, wastewater and stormwater services supplied by declared public water authorities. Prices set by IPART are binding.
- + In the Northern Territory, the government sets prices and may seek advice from the economic regulator, the Utilities Commission. The Utilities Commission is responsible for monitoring and enforcing compliance with the charging determination of the regulatory Minister. The role of the Utilities Commission has recently been expanded to include independently reviewing Power and Water Corporation capital and asset management programs.
- + In Queensland, the new institutional reforms in south-east Queensland (SEQ) will result in structural separation of bulk water, bulk transport, and three vertically integrated distribution and retail entities. The Queensland Water Commission (QWC) is currently developing longer term arrangements for SEQ urban water supply. The QWC report, *Our water: Urban water supply arrangements in SEQ*, indicated that there would be an oversight role for the Queensland Competition Authority in relation to bulk pricing; however, the arrangements are yet to be finalised, including in relation to retail prices. As discussed in Chapter 11, the Queensland Government has advised that regulatory oversight arrangements for the bulk, distribution and retail entities are currently being developed as part of the reform process. It has also advised that the QWC is considering forms of pricing oversight arrangements for the urban water supply chain, with the possibility of eventually introducing third-party access for the distribution entity.
- + In South Australia, the Essential Services Commission of South Australia (ESCOSA) reviews the South Australian Government's process for setting prices to ensure that it is consistent with the NWI. Currently, water and wastewater services are not regulated services and ESCOSA has no other regulatory role in relation to them. Although, strictly speaking, this arrangement is consistent with South Australia's commitments under the NWI, the National Water Commission is of the view that further transparency and accountability could be brought to the process in South Australia by strengthening the role of ESCOSA to regulate water, wastewater and water planning and management charges. With this in mind, the Commission notes the *Water for good* plan released by South Australia on 29 June 2009. Under the plan, ESCOSA are to be appointed as the independent economic regulator for monopoly suppliers of urban and regional water and wastewater services in South Australia. The role will apply to SA Water's potable water and wastewater services in the first instance. A third-party access regime will also be developed (South Australian Government 2009).
- + As part of a range of industry reforms, Tasmania has recently established the Office of the Economic Regulator of Water and Sewerage (ERWS). Initially, the ERWS will provide advice to the Tasmanian Government on interim pricing arrangements and interim licensing. The ERWS also has powers and functions to regulate water and sewerage prices. It is expected that the ERWS's first formal price determination will commence on 1 July 2012. This provides positive evidence that Tasmania is meeting its commitment to strengthen independent economic regulation.
- + In Victoria, the Essential Services Commission makes binding price determinations for water and wastewater services and regulates standards and conditions of service.
- + Western Australia's Economic Regulation Authority (ERA) does not have a mandate to set water and wastewater charges, or an ongoing role in monitoring compliance with government pricing decisions. While the Treasurer of Western Australia gave written notice to the ERA in 2007 to undertake annual tariff inquiries regarding the Water Corporation, the Treasurer recently revoked that notice. After completing its inquiries, the ERA can make recommendations to the government. However, it is the Minister for Water who ultimately sets water and wastewater charges for the Water Corporation. Although this arrangement is not inconsistent with the NWI, the Commission is of the view that further transparency, accountability, rigour and national consistency could be brought to the process in Western Australia by strengthening the role of the ERA to enable it to set water, wastewater and water planning and management charges.



Googong water treatment plant, Australian Capital Territory

Photo courtesy of ACTEW Corporation

#### ■ Finding 8.4

Independent economic regulation is promoting transparency, rigour, and at least broad consistency in price review and price setting processes in Victoria, New South Wales and the ACT. While the Commission acknowledges some progress in other jurisdictions, such as South Australia's recent announcement that the role of the Essential Services Commission of South Australia will be extended, South Australia, Tasmania, Western Australia and the Northern Territory do not yet benefit from fully independent economic regulation.

#### ■ Recommendation 8.3

While recognising recent progress, the Commission recommends that more be done in Tasmania, South Australia, Western Australia, Queensland and the Northern Territory to establish and put into operation independent economic regulation to improve the efficiency, accountability, national consistency and transparency of water pricing across Australia.

### Community service obligations

In most jurisdictions, community service obligation (CSO) payments to metropolitan water businesses are largely transparent and are reported on publicly through annual reports and annual pricing reviews. This is consistent with the NWI.

The Commission considers periodic reviews of CSO payments by governments to be good practice. Such reviews will help ensure that CSO payments remain necessary and effective and do not unnecessarily hinder efficiency gains from further water reform. The Western Australian Government, for example, is reviewing and assessing the effectiveness of all current CSOs (including, but not limited to, those applying to water services) in achieving government objectives.

### Pricing reforms beyond the NWI

While good progress has generally been made to reform metropolitan pricing in line with NWI requirements, there is a good case for considering reforms that go beyond the specific requirements in the NWI but which may further promote water use efficiency and innovation.

A number of potential future reforms were canvassed in a recent National Water Commission Waterlines paper on approaches to urban water pricing (NWC 2008b). They include changes to some elements of the conventional two-part tariff structure commonly used in the urban water sector across Australia<sup>27</sup>, as well as more fundamental changes to the structure and institutional arrangements for setting urban water prices (see Box 38).

In the 2007 Biennial Assessment, the Commission recommended that NWI actions be enhanced to improve urban pricing and water supply security across Australia. Elements of the enhanced reform agenda included institutional and market arrangements, such as pricing regulation that encourages more flexible or market-driven pricing approaches to emerge in response to water scarcity.

<sup>27</sup> A two-part tariff is made up of a fixed (service availability) charge and a variable (usage-based) charge.

### Box 38: Pricing reforms beyond the NWI

In the Commission's view, further reforms canvassed in the National Water Commission Waterlines paper, *Approaches to urban water pricing* (2008b), which should be considered include the following.

#### *An end to inclining block tariffs*

In most jurisdictions, two or more blocks or tiers (up to 11) are incorporated into the variable charge levied on residential users so that the variable component of the charge increases as water consumption exceeds predetermined blocks or thresholds. This tariff structure is commonly referred to as an 'inclining block' tariff. Inclining block tariffs are inequitable, as they disadvantage larger households. They are also not likely to be directly effective in influencing consumption, as the cost impact of reaching higher tiers is often not evident until well after the event, particularly where billing is infrequent. Inclining block tariffs often result in a departure from marginal cost pricing. The Commission considers a two-part tariff, with the variable component set as a flat rate per kilolitre consumed, to be a more efficient and equitable tariff structure. It is also simpler for customers to understand and respond to. The Commission supports IPART's June 2008 decision to replace the inclining block tariff levied on Sydney Water's customers with a single usage charge.

#### *A move away from property values*

South Australia continues to use property values as a basis for setting the fixed (service availability) component of the two-part tariff for commercial customers. Property value-based charging frameworks are complex to administer, and it is costly to revalue properties on a regular basis. This practice provides a poor proxy for water usage, supply costs or capacity to pay, reduces transparency for customers (particularly regarding how the costs relate to their service requirements), and may not be easily adaptable to changing customer circumstances and to structural reforms such as third-party access. Other jurisdictions have moved away from this practice.

#### *Further consideration of scarcity pricing*

The Commission supports further consideration of administered scarcity pricing in urban areas on the basis that scarcity pricing may be a more efficient way of balancing supply and demand and could reduce the need for water restrictions. Sydney Water has suggested in its submission that COAG should consider a live pilot study of scarcity pricing in a large but contained urban area. The Commission supports such a pilot study. The Commission would also encourage exploration of other innovative ways to employ scarcity pricing as a policy tool.

#### *Using more direct instruments than water charges to pursue equity objectives*

Recognising that increasing water charges will lead to higher water bills for some businesses and households, the Commission acknowledges the prerogative of governments to offer some form of relief for targeted consumer groups. However, the Commission encourages governments to explore the feasibility of using more direct and less distortionary measures, rather than suppressing water charges, to address social equity objectives.

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### ■ Finding 8.5

The Commission has identified a number of pricing reforms that go beyond the requirements of the NWI, which have the potential to improve efficiency.

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### ■ Recommendation 8.4

The Commission recommends that jurisdictions consider pricing reforms that go beyond NWI requirements, such as an end to inclining block tariffs, a move away from water charges based on property values where they still exist, administered scarcity pricing, and using more direct instruments than water charges to pursue social equity objectives.

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### 8.3.1.2 Pricing for recycled water and stormwater

#### Background: Terminology and relevant NWI clauses

NWI clause 66(ii) requires NWI parties to develop 'pricing policies for recycled water and stormwater that are congruent with pricing policies for potable water, and stimulate efficient water use no matter what the source ...'

As noted earlier, an important aspect of success in achieving water use efficiency and innovation would be a cost-effective level of reuse and recycling and utilisation of innovative water supply sources.

The uptake of these sources raises a range of regulatory, planning and other issues which are considered further in Chapter 11. The focus here is on pricing and related incentives (or disincentives) to invest in recycled water and stormwater. In this regard, the NWI requires the development of pricing policies for recycled water and stormwater that are congruent with pricing policies for potable water, and stimulate efficient water use no matter what the source.

This does not necessarily mean that prices for recycled water and stormwater should be identical to prices for other potable water. Recycled water and stormwater reuse schemes need to be considered in a system-wide context, and prices should reflect avoided or deferred costs and externalities so that any net social benefits of recycled water and stormwater can be realised. Prices for recycled water and stormwater should also reflect underlying cost differences associated with providing products of different quality and fit for a range of different uses.

The 2007 Biennial Assessment found that progress had been made by some states (particularly New South Wales and Victoria) and nationally to develop pricing policies for recycled water and stormwater.

- + The ACT is currently investigating the potential market for the capture and use of stormwater and is examining a pricing regime subject to full cost-recovery principles as part of its urban waterways project.
- + New South Wales and Victoria have now developed pricing policies for recycled water and stormwater. In 2008, New South Wales announced the abolition of infrastructure levies payable to Sydney Water and Hunter Water. New South Wales has noted that developer charges for recycled water services to new developments may continue to be levied, but there would generally be case-by-case negotiations with customers guided by IPART guidelines.
- + Tasmania has advised that, due to significant reforms in the water and sewerage sector and the transition of ownership from individual councils to regionally based corporations, there have been no significant developments with regard to pricing policies for recycled water and stormwater.
- + Western Australia's independent economic regulator, the ERA, published its inquiry into the pricing of recycled water in Western Australia in February 2009.
- + The Commission notes that South Australia's *Water for Good* plan requires the development of state-based recycled water pricing principles (South Australian Government 2009).

Furthermore, all jurisdictions are contributing to the development of a set of national NWI pricing principles to guide price setting for recycled water and stormwater. The principles are being developed to assist jurisdictions to meet their NWI commitment to implement pricing policies for recycled water and stormwater that are congruent with pricing policies for potable water.

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#### ■ Finding 8.6

As the Commission found in 2007, New South Wales and Victoria have the most developed policies for recycled water and stormwater pricing. However, there has been some further progress in other jurisdictions.

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#### ■ Recommendation 8.5

The Commission recommends that faster progress be made to adopt and implement draft principles for pricing recycled water and stormwater, given that most jurisdictions are developing recycled water and stormwater supply options as part of diversifying water supply portfolios.

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### 8.3.1.3 Pricing for trade wastes

#### Background: Terminology and relevant NWI clauses

NWI clause 66(iii) requires NWI parties to review and develop 'pricing policies for trade wastes that encourage the most cost effective methods of treating industrial wastes, whether at the source or at downstream plants ...'

An increasing focus on minimising treated effluent discharges to the environment and on increasing the reuse of treated wastewater has heightened the importance of setting the right price signals for trade wastes.

In 2007, the Commission found that pricing policies for trade wastes had been reviewed and developed in South Australia and were well underway in New South Wales and Victoria. Review and development of pricing policies in other states had been delayed beyond the December 2006 completion date required by the NWI.

In the Commission's assessment, progress has been mixed and generally well behind the NWI target timeframes:

- + The ACT water utility, ACTEW, is currently finalising a trade waste policy, which will include pricing components.
- + In New South Wales, IPART, which regulates trade waste prices levied by Sydney Water, has indicated that it intends to conduct an extensive review of trade waste policies at its next pricing review (the most recent price review covered the period from 1 July 2008 to 30 June 2012). Sydney Water has agreed to participate in a comprehensive review of its trade waste charges in preparation for the next determination. Since the 2007 Biennial Assessment, New South Wales has developed the *2009 Liquid waste regulation guidelines* (DWE 2009). New South Wales has advised that the guidelines will, among other things, provide for full cost recovery by local water utilities in non-metropolitan New South Wales with respect to sewage and liquid waste.
- + Tasmania has developed trade waste guidelines which, among other things, cover pricing for trade wastes. Trade waste policies are currently being reviewed as part of reforms to Tasmania's urban water sector.
- + In Queensland, trade waste is being considered as part of the current reform process. Trade waste policies are expected to be consolidated at some point after the SEQ structural reforms are completed.
- + Following a review of the metropolitan retail water sector by the Victorian Competition and Efficiency Commission, which was released in July 2008, the Victorian Government agreed to finalise the trade waste review within 12 months, clarifying accountabilities and regulatory arrangements. Victoria is due to release its *Trade Waste Framework: Final Directions* at the end of August 2009.
- + In Western Australia, the ERA is currently considering trade waste pricing policies as part of its major inquiry into water and wastewater tariffs.

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#### ■ Finding 8.7

Across all jurisdictions, progress has been mixed and slow in developing trade wastes pricing policies that encourage the most cost-effective methods of treating industrial wastes. However, several jurisdictions are in the process of undertaking such reviews, including New South Wales, Victoria, the ACT and Western Australia.

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### 8.3.1.4 Water metering and billing

Improved water metering and billing in the urban sector has two potential benefits for water use efficiency and innovation:

- + providing more timely information to consumers regarding their consumption decisions and hence encouraging better responses to existing water pricing policies
- + enabling innovative approaches to urban water pricing and other market-based approaches that require more frequent price signals to customers to operate effectively.

Metering water to a high degree of accuracy is one of a suite of tools that can contribute to efficient and sustainable water management. However, it is not always practical or cost effective to measure all water use in all circumstances. Similarly, the benefits of adopting technology that increases the timeliness and/or precision of water metering should be compared with the associated costs. The Commission strongly supports improved metering and billing arrangements in the urban sector where they are cost-effective.

In relation to the billing and metering of all urban customers (and, particularly, increasing the extent to which tenants face price signals for volumetric usage), the Commission has found as follows:

- + In New South Wales, Sydney Water issues a bill for a rental property in the name of the landlord and/or property manager, who have liability to pay Sydney Water for all account charges (Sydney Water 2009). Sydney Water recently trialled different approaches to installing individual meters in multi-unit buildings to understand the costs and benefits of implementation. It will now consider using the technology in future multi-unit developments.
- + In South Australia, a landlord may, by agreement, pass any part or the whole of the charges for the supply of water to the tenant (including the water usage charge). That agreement may be included in an additional condition in the residential tenancy agreement (lease agreement) at the commencement of the tenancy. Sewerage charges and the River Murray levy are always the responsibility of the landlord (South Australian Government 2007).
- + In Queensland, new laws allow landlords to pass on the full water consumption costs to tenants provided minimum criteria have been met. These include that the rental premises is individually metered (or water is delivered via vehicle), the rental premises is 'water efficient', and the tenancy agreement states the tenant must pay for water consumption. This applies to new tenancy agreements or existing periodic tenancies and, from 1 April 2009, for pre-existing fixed-term agreements (signed before 1 April 2009) (Gold Coast Water 2008).
- + In Victoria, Melbourne residential tenants pay water usage and sewage disposal charges where the property has a separate water meter. The property owner is responsible for service charges on the property and maintenance of water supply and sewerage services (Yarra Valley Water 2009).
- + In Western Australia, the legislation under which the Water Corporation is licensed to operate holds the owner of a property liable for all service charges and water use charges. While landlords may require their tenants to pay the charges for water use, that arrangement is a private matter between the two parties (Water Corporation 2009).

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#### ■ Finding 8.8

In a number of states, a water usage charge is not levied directly on all users, who therefore do not receive a price signal providing an incentive to use water prudently. For example in some states, tenants are not billed in full or provided with information on their water usage.

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#### ■ Recommendation 8.6

The Commission recommends that charges for water usage be applied directly to all users, where this is cost-effective. For example, the Commission considers that, across Australia, significant scope exists to bring building tenants into a transparent water charging environment. The current partial coverage of tenants is inconsistent with sound long-term water resource management principles and will ultimately need to be rectified.

In addition, in the urban sector, the Commission encourages governments to consider 'smart' metering. The Commission observes that there is currently intensive activity in the energy sector to introduce smart metering. There is scope for the water sector to 'piggy back' on these processes. However, this opportunity will not be available indefinitely, and the Commission urges governments and utilities to explore the possibilities as a matter of urgency.

In Victoria, retailer South East Water is trialling new metering technology aimed at reducing both energy and water consumption in the home. Such investigations will provide a better understanding of the benefits and costs of smart metering and help to identify conditions under which smart metering will be most feasible. Recent trials of smart metering for water also include those undertaken by ACTEW (ACT), Sydney Water (NSW), and Wide Bay Water (Qld). Victoria is currently undertaking a Smart Metering Review, funded by the Victorian Water Trust and due for release in September 2009.



The Commission also encourages moves to more frequent billing cycles where more frequent billing allows more effective price signals to customers. In this regard, the Commission notes that South Australia is moving to quarterly billing.

The NWI requires the development of national guidelines for customers' water accounts that provide information on their water use relative to equivalent households in the community. The NRMCC released *National guidelines for residential customers' water accounts* in 2006 (NRMCC 2006). During the 2007 Biennial Assessment, parties were participating in the NWI working group process to further research to investigate the benefits of improved billing practices to water utilities.

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#### ■ Finding 8.9

The Commission observes that there is currently intensive activity in the energy sector to introduce smart metering. The Commission also notes that some states have moved to more frequent billing cycles to provide improved price signals to urban customers.

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#### ■ Recommendation 8.7

In the urban water sector, the Commission encourages governments to consider smart metering. The Commission also encourages moves to more frequent billing cycles where it facilitates more effective price signals to customers.

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Non-urban metering is discussed in Chapter 3 on water accounting.

### 8.3.1.5 Rural and regional urban water pricing

#### Background: Terminology and relevant NWI clauses

NWI clause 66(v) commits parties to 'achievement of lower bound pricing for all rural systems in line with existing NCP commitments' and 'continued movement towards upper bound pricing for all rural systems, where practicable'.

The NWI defines lower-bound pricing as 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 and dividends (if any), and make provision for future asset refurbishment and replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market outcome.

#### Rural (non-urban)

The Commission found the following for water storage and delivery services in non-urban areas:

- + All jurisdictions have adopted consumption-based charging.
- + Most government-owned rural water service providers have achieved lower-bound pricing or have transparent CSOs in place to account for any revenue shortfall below the lower revenue bound.
- + The approach to price setting by Harvey Water in Western Australia, State Water in New South Wales and all of Victoria's rural water providers is consistent with, or is moving to being consistent with upper bound pricing.
- + South Australia advises that it does not require adherence by private sector operators, such as irrigation trusts, to NWI water pricing objectives. However, it also notes that water charging of private rural water businesses in South Australia will be subject to any relevant water charge rules under the *Water Act 2007*.

Price-setting processes are generally transparent, involving either the use of an independent economic regulator (such as in Victoria and for State Water in New South Wales) or direct customer consultation (such as in Queensland and Western Australia).

The Commission notes that in rural areas (mainly irrigation services), Tasmania and Queensland continue to consider the practicality of moving rural schemes to upper-bound pricing. Queensland has reaffirmed its commitment to commercial reform of rural water supply, but is yet to make policy decisions on upper-bound pricing for all SunWater schemes. Currently, some SunWater schemes remain at or below lower bound.

The new role of the ACCC in overseeing water charge rules relating to bulk water services and services provided by irrigation operators in the Murray–Darling Basin is a major development since the 2007 Biennial Assessment.

As noted in Box 36, an indicator for improved rural pricing is rate of return (NRMCC performance indicator 8.8a). Table 26 reports returns on assets for rural water authorities from the *National performance report 2006–2007* (NWC 2008c). The results generally show a negative economic real rate of return for most water providers, both public and private. Although these figures raise questions as to whether water providers have reached lower bound, external factors such as low allocations are likely to have had a strong influence on financial performance in the reporting period.

**Table 26: Return on assets for rural water service providers, 2007–08**

Utility	Jurisdiction	Economic real rate of return, 2007–08 (%)	
Coleambally	NSW	–0.01%	(2006–07: 0.02%)
Murray Irrigation	NSW	not reported	
Murrumbidgee	NSW	–0.02%	(2006–07: –0.02%)
Statewater	NSW	0.04%	(2006–07: not reported)
Sunwater	Qld	–1.40%	(2006–07: not reported)
Central Irrigation Trust	SA	–0.64%	(2006–07: 0.003%)
FMIT	Vic.	–0.047%	(2006–07: –0.003%)
Goulburn Murray Water	Vic.	–0.01%	(2006–07: –1%)
Grampians Wimmera Mallee	Vic.	–0.02%	(2006–07: –0.20%)
Lower Murray Water	Vic.	–2.88%	(2006–07: not reported)
Southern Rural Water	Vic.	not reported (2006–07: 1%)	
Harvey Water	WA	–0.03%	(2006–07: –1.5%)
Ord Irrigation	WA	–0.02%	(2006–07: –1.20%)

Sources: NWC (2008c, 2009).

As noted above for urban water, government grants also have the potential to distort efficient investment in irrigation infrastructure. For example, government contributions to high-cost modern irrigation delivery infrastructure may create a liability in years to come when the system requires renewal or maintenance, and the cost might then be borne by customers. This is particularly important given the major spending on irrigation system renewal under Commonwealth and state programs, including the \$5.8 billion Sustainable Rural Water Use and Infrastructure Program (see Chapter 10 on irrigation renewal projects). In addition, in Tasmania, there have also been announcements that the government will provide low-interest loans for irrigators to invest in irrigation equipment. Such subsidies could also distort efficient levels of investment in irrigation assets.

#### ■ Finding 8.10

The Commonwealth and state governments are making major investments in irrigation renewal projects. While such investments are generally a positive contribution to better water management, government funding has the potential to distort water use and economically efficient investment decisions.

#### ■ Recommendation 8.8

The Commission recommends that implications for future water charging should always be made transparent, especially to future users of the infrastructure, when irrigation infrastructure investment proposals are being developed. Investment should be consistent with NWI commitments relating to full cost recovery, and the draft NWI pricing principles on recovery of capital.

## Regional urban water

Further progress is required in regional areas to ensure that pricing arrangements implemented by local councils and water authorities are consistent with the NWI. The Water Services Association of Australia noted in its submission that ‘little progress has been made to move regional cities and towns where water services are provided by local governments towards upper bound pricing as required by the NWI ...’

- + In New South Wales, the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-metropolitan New South Wales (Armstrong and Gellatly 2008) recently recommended that the regulation of local water utilities’ pricing be strengthened to require utilities to establish prices in accordance with approved business plans and financial plans, and that local water utility prices be approved by an independent (government) body.
- + In Queensland, the *Local Government Act 2003* requires local governments to undertake an assessment of the cost effectiveness of two-part tariffs for water services and requires full cost recovery for water and sewerage charges.
- + South Australia advised that the regional business segment will achieve the upper bound for regional water and wastewater businesses through the government’s statewide charging policy and the application of its CSO policy.
- + In Tasmania, pricing principles under the *Water and Sewerage Industry Act 2008* include requirements for two-part tariffs and location- or area-based pricing to reflect the efficient costs of servicing urban customers.
- + In Victoria, the pricing policies of the regional urban water authorities are subject to regulation by the Essential Services Commission, and must comply with pricing principles established in the Water Industry Regulatory Order.
- + Western Australia advised that, following an ERA inquiry into urban pricing in country areas, the government implemented measures to make usage charges more cost reflective, including by phasing in long-run marginal cost charges for commercial and higher volume residential use. Before 2008–09, Western Australia had statewide uniform tariffs.

According to the *National performance report 2007–08: Urban water utilities* (NWC and WSAA 2009), financial performance varied greatly across regional water authorities. Table 27 suggests that the average economic rate of return for smaller water providers was well below that of major (metropolitan) utilities in 2007–08.

**Table 27: Average return on assets for urban water service providers, 2007–08, by size**

Size	Sample	Economic real rate of return—water and sewerage (%)	
Major utilities (large)— Utilities with 100,000+ customers	11	3.46	
Major utilities (other)— Utilities with between 50,000 and 100,000 customers	8	1.99	
Non-major utilities (large)— Utilities with between 20,000 and 50,000 customers	15	2.73	(1.99 excluding Townsville)
Non-major utilities (other)— Utilities with between 10,000 and 20,000 customers	22	1.68	

Source: Adapted from NWC and WSAA (2009). Note that data presented in the above table has not, in all cases, been audited. It is important to consider external factors in the operating environment, such as the effect of water restrictions when interpreting these figures.

### ■ Finding 8.11

Progress has been made by most states in implementing best practice pricing in rural and regional areas. All jurisdictions have adopted consumption-based charging, and most government-owned rural water service providers have achieved lower-bound pricing or have transparent community service obligations in place to account for any revenue shortfall below the lower revenue bound. However the recent National Performance Report by the Commission and the Water Services Association of Australia found that the financial performance of regional and rural water utilities is highly variable and generally below that of metropolitan urban utilities.

### Fixed-charge drought relief measures

Ongoing drought conditions have prompted a number of governments to introduce fixed-charge drought relief measures to assist irrigators to cope with drought. Within the past two years, the Australian, Queensland and Victorian governments have administered such schemes.

While there are variations in the nature of these measures, relief generally takes the form of a grant (either one-off or ongoing), which is applied for by a water user and paid for by the government subject to eligibility criteria and program funding availability. Strict conditions on what the grant can be used for are generally put in place by the administering government.

In theory, fixed-charge drought relief has the potential to distort pricing signals and water market activity. In principle, under-recovering the costs of water provision from water users will lead to overconsumption. However, in practice, fixed-charge drought relief is unlikely to impact on consumption patterns, as grants are made when there is little or no water allocation available.

It is possible that fixed-charge drought relief may impact on water entitlement trade by providing an incentive for entitlement holders to hold on to entitlements which, in the absence of the relief, may have been sold. The potential for localised market distortions increases where a number of grants are provided within a particular catchment. However, the materiality of the impact of fixed-charge drought relief is difficult to quantify. Relief is generally in the form of time-limited relief to water users in drought-affected areas who meet strict eligibility criteria.

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#### ■ Finding 8.12

Queensland, Victoria and the Commonwealth have implemented various fixed-charge drought relief measures. The impact of fixed charge drought relief is difficult to quantify. In principle, if those measures were to persist, they could lead to systematic subsidisation of water users, which might affect overall efficiency and distort patterns of adjustment.

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## 8.3.2 Cost recovery for water planning and management

### Background: Terminology and relevant NWI clauses

NWI clauses 67–68 outline state and territory commitments to cost recovery for water planning and management. Specific commitments include bringing into effect consistent approaches to pricing and attributing costs of water planning and management by 2006 through identification of all costs associated with water planning and management and the proportion of costs that can be attributed to water access entitlement holders.

States and territories also agreed to report publicly on cost recovery for water planning and management as part of annual reporting requirements.

A range of water planning and management activities by governments are necessary to ensure that surface and groundwater resources are used sustainably. Water planning and management activities include (ACCC 2009):

- + collecting and analysing data to gain a better understanding of the levels of extractions as well as the potential implications of extraction for the water system, and managing that data
- + developing policies to manage the resource, including managing the interstate sharing of the resource
- + developing plans and strategies or frameworks to allocate water among users and the environment, and to remediate impacts associated with water use
- + implementing those plans, strategies and frameworks and monitoring compliance against the plans
- + undertaking capital works, such as the modification of weirs to achieve environmental outcomes
- + administering water entitlements, compliance, metering and trading systems.

Recovering the costs of water planning and management provides a signal to water users about the costs incurred as a result of their water-using activities. Cost recovery of water planning and management activities can encourage more economically efficient use of the water resource and encourage efficiency in the water planning and management activities undertaken by government.

The NWI requires states and territories to bring into effect consistent approaches to pricing, including attributing the costs of water planning and management. This commitment was originally meant to be delivered by 2006 but is yet to be completed.

As noted by the Commission in its previous assessments, jurisdictions are at different stages of meeting their NWI commitments to cost recovery for water planning and management. As noted previously, further progress in this area is still required in Queensland, Western Australia, Victoria and South Australia. Furthermore, cost-recovery arrangements in the ACT, South Australia and Victoria lack transparency in terms of the total costs being recovered, the link between charges and water planning and management activities, and the attribution of costs between water users and governments.

All parties have further work to do to meet NWI commitments to report publicly and annually the total cost of water planning and management and the proportion of that total attributed to water access entitlement holders. The development of a consistent framework for accounting for, attributing and reporting water planning management costs is required (refer to discussion below on the ACCC's proposed voluntary reporting framework).

The Commission finds that there has been insufficient independent economic oversight of water planning and management charges. Such oversight is critical to improve transparency and government accountability for water planning and management charging.

- + The ACT Government has advised that most water used in the ACT is for urban requirements and that the ACT has a charge (the 'water abstraction charge') that, among other things, captures the cost of water planning and management. However, in the Commission's view, the link between the water abstraction charge and the costs of water planning and management activities is not clear and needs to be made so.
- + New South Wales has made very good progress in recovering the costs of water planning and management. In 2006–07, New South Wales recovered an estimated 89% of the costs of water planning management attributable to water users. In 2009–10, the state expects to recover 98% of those costs. The independent oversight of water planning and management charges by IPART is, in the Commission's view, a good example of how transparency and government accountability for water planning and management activities can be achieved. Such transparency and accountability is critical—particularly from the point of view of water users who are being asked to pay these charges.
- + In Queensland, as noted by the ACCC, water planning and management activities are funded primarily through consolidated revenue, with a portion of costs being recovered through charges. It is estimated that the Queensland Government recovers less than 5% of water planning and management costs through charges (including transaction fees). The Department of Environment and Resource Management attempted to introduce charges to achieve greater cost recovery in 2006, but those measures were suspended indefinitely in March of that year.
- + In South Australia, cost recovery of water planning and water management activities predominantly occurs through a state-based levy and regional levies. The Save the River Murray levy is payable by SA Water customers, collected by SA Water, and paid into the Save the River Murray Fund. NRM boards in South Australia also have the power to charge a regional levy, which may recover the costs of some water planning and water management activities depending on the NRM plan, and a water levy on water access entitlement holders collected through the water licensing system administered by the Department of Water, Land and Biodiversity Conservation. The link between these levies and the costs of water planning and management activities is not clear. The attribution of costs between water users and governments is also unclear.
- + In Tasmania, water licence fees are payable for water taken under the authority of a licence issued under the *Water Management Act 1999*. Water licence fees were introduced in 2000, and following a review in 2005 which broadened the costs to be recouped to cover the full costs incurred by the department for providing services that directly related to the operation of the state's water licensing system, the government agreed to phase in the various fees over a period of up to five years to enable water users time to adjust to the increased fee levels. A third review of the water licence fees is currently underway.
- + The Commission is of the view that the arrangements for recovering the costs of water planning and management in Victoria lack transparency. Although some of the costs incurred by the Victorian Government in planning and managing water resources are recovered through the environmental contribution, there is no specific formula used to apportion costs between the government and water users. The Commission considers it good practice for the attribution of such shares of costs to be transparent and suggests that Victoria make them so.
- + In Western Australia, the Department of Water has attempted to introduce regulations to allow water licensing fees. These were gazetted twice and disallowed by Parliament in 2007 and 2008. The Commission notes that the Western Australian Government has referred an inquiry into cost recovery for water planning and management to the ERA. The Commission supports such a referral but is concerned about the continued delay in the introduction of these charges, and notes this as a failure of Western Australia to meet its NWI commitments in this area.

Under the *Water Act 2007*, the MDBA is preparing a basin-wide plan which will set out provisions for integrated and sustainable management of water resources in the Murray–Darling Basin. The Commission strongly supports the implementation of a transparent, NWI-consistent cost-recovery mechanism for the water planning and management activities undertaken by the MDBA. In accordance with the NWI, the approach to recovering these costs should be consistent with the approach used to recover the costs of water planning and management activities undertaken by other government agencies, so as to underpin market neutrality in water trade and investment.

Under the *Water Act 2007*, the ACCC is to provide advice to the Commonwealth Water Minister on water planning and management charge rules to apply in the MDB. Under the Act, the rules must contribute to the basin water charging objectives and principles, which are based on commitments made by parties to the NWI. The ACCC released its draft rules and draft advice on water planning and management charge rules (ACCC 2009b) in May 2009. The ACCC's final advice was provided to the Minister in July 2009.

The ACCC's position paper on draft water charge rules for water planning and management charges (ACCC 2009a, page 16) found that processes for recovering and reporting water planning and management charges in the MDB are often inconsistent or deficient:

*States apply very different frameworks for funding water planning and water management activities. The costs of water planning and water management activities and funding arrangements are not consistently transparent across the Basin. There also appears to be inconsistency across the Basin (and within Basin states) as to whether the charges imposed for water planning and management costs are specifically linked to the costs of activities, although a lack of transparency of funding arrangements prevents a more thorough assessment.*

The ACCC also found that the available information about water planning and water management activities in the MDB was not sufficient or provided in a way that promotes transparency. It considered that this lack of transparency was of concern because water market participants are unlikely to be fully informed when making decisions in the water market and also because it impedes the development of the most effective water charge rules for water planning and management.

The ACCC has recommended an approach designed to improve the transparency of water planning and management activities, costs and charges through:

- + water charge rules that require publication of prescribed information about charges for water planning and management activities, supplemented by
- + a voluntary reporting framework to be adopted by jurisdictions, requiring them to report annually to the ACCC information about water planning and management activities, costs, and revenue collected through charges.

This framework may present an avenue to progress the NWI commitments on water planning and management, particularly for reporting commitments. The Commission urges states and territories to adopt the ACCC's proposed reporting framework.

In its submission to the ACCC, the Commission noted that it supports the ACCC's objective of improving transparency for water planning and management charges.

However, the *Water Act 2007* gives insufficient powers to the Minister to progress water planning and management charge rules in the way envisaged in the NWI.<sup>28</sup> As the ACCC (2009a) notes:

*Because the scope of the Minister's powers to make rules is limited to making rules where charges for water planning and management activities are applied, and the application of charges in each state differs, the rules would not apply consistently to all activities or water users in the Basin ... In conclusion, the legal framework in the Water Act and the present inconsistency of approaches makes it difficult to apply rules that will contribute to achieving the Basin water charging objectives and principles consistently across the Basin.*

This is an unfortunate outcome that is inconsistent with the NWI objective of achieving national consistency in approaches to pricing and attributing costs of water planning and management.

The Commission notes that draft national pricing principles for water planning and management have been developed by NWI parties and the Commission. The principles were developed to assist NWI parties to meet their NWI commitment to implement consistent water planning and management charging policies. Given the limitations of the *Water Act 2007*, it is even more important that progress is made to adopt and implement the principles quickly, so that all jurisdictions can advance NWI commitments to recover water planning and management costs appropriately.

<sup>28</sup> According to the ACCC, section 92 of the *Water Act 2007* requires 'a regulated water charge to be imposed for the water charge rules to apply'.

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#### ■ Finding 8.13

Progress in meeting NWI commitments for cost recovery for water planning and management for both surface and groundwater has been very limited. Progress in this area is long overdue in Queensland, Western Australia, Victoria, South Australia and the Northern Territory. Further work is required to ensure that water planning and management activities undertaken by the MDBA are subject to a consistent and transparent cost-recovery framework.

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#### ■ Finding 8.14

The Commonwealth *Water Act 2007* gives insufficient powers to the Minister to progress water planning and management charge rules in the way envisaged in the NWI, as it requires a regulated water charge to be imposed for the water charge rules to apply. As the current application of charges in each state differs, the rules would not apply consistently to all activities or water users in the Murray–Darling Basin, making it difficult to achieve NWI and Basin water charging objectives and principles consistently across the basin.

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#### ■ Recommendation 8.9

The Commission recommends that draft NWI pricing principles for water planning and management be agreed and implemented quickly so that jurisdictions can advance NWI commitments to recover water planning and management costs. Recognising that the *Water Act 2007* gives insufficient power to the Minister to progress water planning and management charge rules in the Murray–Darling Basin as envisaged in the NWI, the Commission recommends that once agreed, the NWI national pricing principles for water planning and management be implemented within the MDB.

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### 8.3.3 Adoption of demand-management programs and water-efficient technologies

Demand-management programs and water-efficient technologies can contribute to efficient water use and innovation in both the urban and rural water sectors, provided that the benefits of such initiatives outweigh the costs.

#### 8.3.3.1 Urban sector

A range of government programs and initiatives have been implemented to improve water use efficiency and innovation.

##### Background: Terminology and relevant NWI clauses

NWI clause 91 outlines agreed actions for states and territories in regard to urban demand management by 2006. These include introducing legislation to implement the Water Efficiency Labelling and Standards Scheme (WELS); reviewing the effectiveness of water restrictions; developing, prioritising and implementing, where cost effective, management responses to water supply and discharge system losses; and implementation of a 'Smart Water Mark' for household gardens.

As noted in the 2007 Biennial Assessment, there has been significant progress in relation to demand management actions, supported through national coordination. As a result of prolonged drought and other factors, jurisdictions have further developed and promoted demand-management and water use efficiency measures.

In its submission, the Water Services Association of Australia noted that every major urban centre has adopted a public campaign to encourage water conservation behaviour in Australian households. In particular, the association noted the following:

- + The ACT runs two allied programs concurrently: *Think water, act water* (now called *Switch your thinking*), managed by the ACT government; and *Save water for life*, managed by ACTEW, the water utility.
- + In New South Wales, Sydney Water has adopted a range of household and business water conservation programs through the *Every drop counts* program.
- + Queensland has established a regional program called the *South East Queensland water strategy*.
- + In South Australia, Adelaide has established a program called *Water proofing Adelaide*.<sup>29</sup>

<sup>29</sup> South Australia has also just released its *Water for good* strategy, which includes a number of demand-management measures.



- + In Victoria, Melbourne has developed a range of programs under the *Our water, our future* plan and the Central Region Sustainable Water Strategy.
- + In Western Australia, Perth has adopted a program called *Security through diversity*.

Specific activities include:

- + *Subsidies for water-efficient appliances.* For example, since 2008 the South Australian Government has had a home rebate scheme which is a \$24 million water saving rebates package. The program reimburses homeowners for low-flow showerheads, water-wise garden products, dual flush toilets, water-efficient washing machines, rainwater tanks, and home water audits. The Queensland Government's Home Waterwise Rebate Scheme commenced in July 2006 and concluded in December 2008. Some 650,000 appliances were purchased, with a rebate value of nearly \$330 million. Appliances for which subsidies were provided included rainwater tanks (including plumbed-in tanks), washing machines, showerheads, dual flush toilets, greywater systems (above and below ground) and pool covers.
- + *Conservation programs.* For example, Sydney Water has distributed do-it-yourself water-saving kits to almost 198,800 households.
- + *Planning.* For example, the Western Australian Department of Water is developing water conservation plans with local government authorities.

Demand-management actions have included the following:

- + All states have now enacted legislation corresponding to the Commonwealth *Water Efficiency Labelling and Standards Act 2005* to ensure that the scheme applies consistently across Australia and to confer regulatory powers on the Australian Government (see Box 39).
- + An initial review of temporary water restrictions and associated public education strategies has been coordinated by the Commission (with the support of NWI parties), focusing on larger urban centres with over 50,000 connections.
- + The Smart Approved Water Mark is a water saving labelling project that accredits outdoor products and services that reduce water use around the home. The scheme received funding support in 2006 through the Australian Government's Water Smart Australia Program. The scheme has since accredited 138 outdoor water saving products and 13 water saving services. Further funding has been provided from the Water Smart Australia Program to assist the scheme to become financially self-sufficient by 30 June 2011.

The implementation of cost-effective management responses to supply and discharge system losses (including leakage, excess pressure, overflows and other maintenance losses) continues to be implemented by the urban water industry.

#### **Box 39: The Water Efficiency Labelling and Standards Scheme**

The Water Efficiency Labelling and Standards Scheme (WELS), introduced in July 2006, has played an important role in the suite of options recently implemented by government agencies and water utilities to address water scarcity. WELS influences water consumption by providing consumers with information about the water efficiency of all washing machines, dishwashers, urinals, taps and showers sold in Australia—thus enabling consumers to take account of water efficiency as a factor in their purchasing decisions. An assessment of the cost-effectiveness of WELS in contributing to the overarching objective of water security found:

- that WELS is producing substantial water savings (10,000 megalitres per year over the first five years—a projected 800 GL in total by 2020–21, up from earlier estimates of 610 GL)
- that WELS is one of the most cost-effective urban water options, costing between \$0.05 and \$0.20 per kL, compared to \$1.26 to \$3.58 per kL for new water storages
- that large water, energy and cost savings are being delivered for consumers over the period from 2005–06 to 2020–21
- significant reductions in greenhouse gas emissions, mainly from reduced hot water use (more than an estimated 6 million tonnes of avoided emissions by 2020–21).

### ■ Finding 8.15

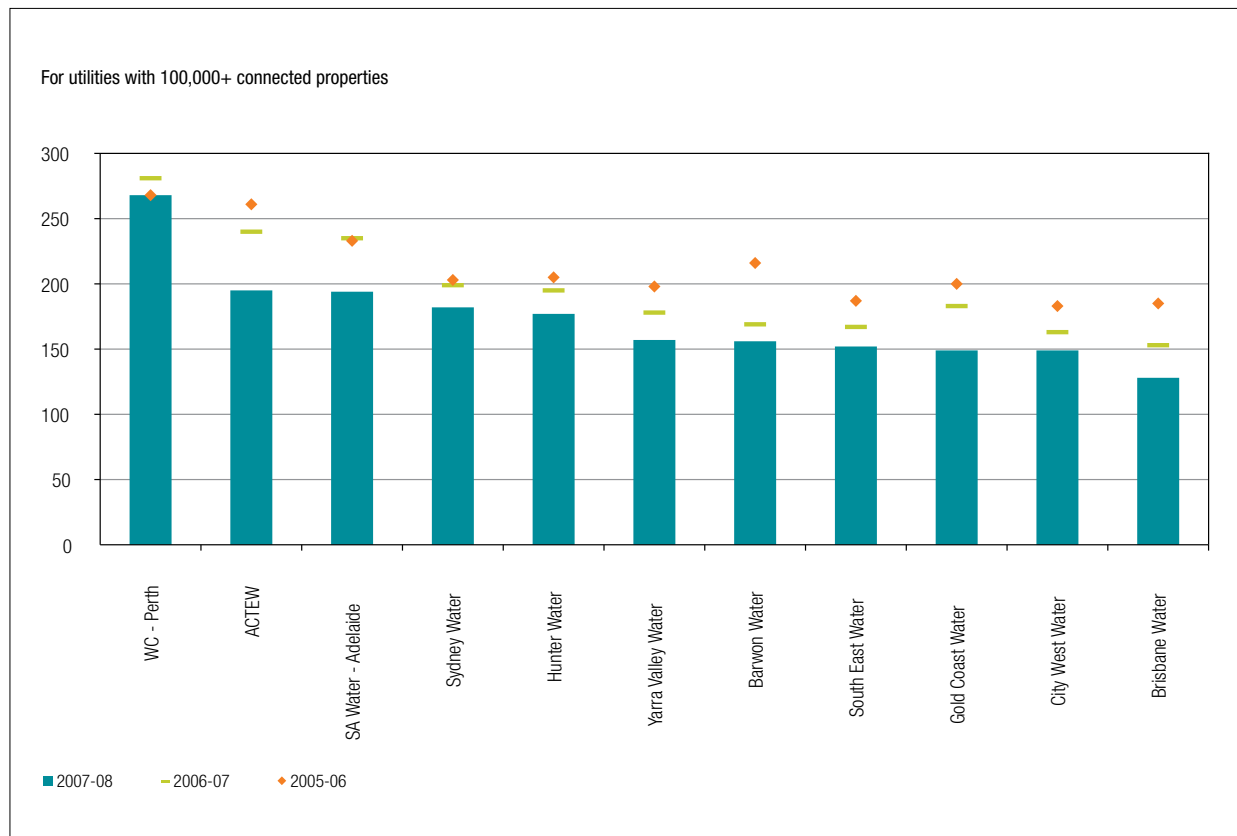
Jurisdictions have developed and implemented a variety of urban demand-management programs to encourage water use efficiency and behavioural change, over and above the limited requirements of the NWI.

To date, the main basis for determining the success of demand-management and water use efficiency programs has been improvements in technical measures of water use. These include:

- + reducing annual household or per capita water use
- + reducing water losses in distribution systems
- + increasing uptake of alternative supply sources.

Data from NWC and WSSA (2009) indicates that average annual residential water supply (kL per property) by major urban water utilities fell from 2005–06 to 2007–08 (Figure 8). Data provided by New South Wales reveals that the downward trend in per capita consumption has continued in that state. These changes in water use are likely to reflect a combination of factors, including water restrictions, price increases and demand-management programs. A similar trend was evident among smaller urban water utilities.

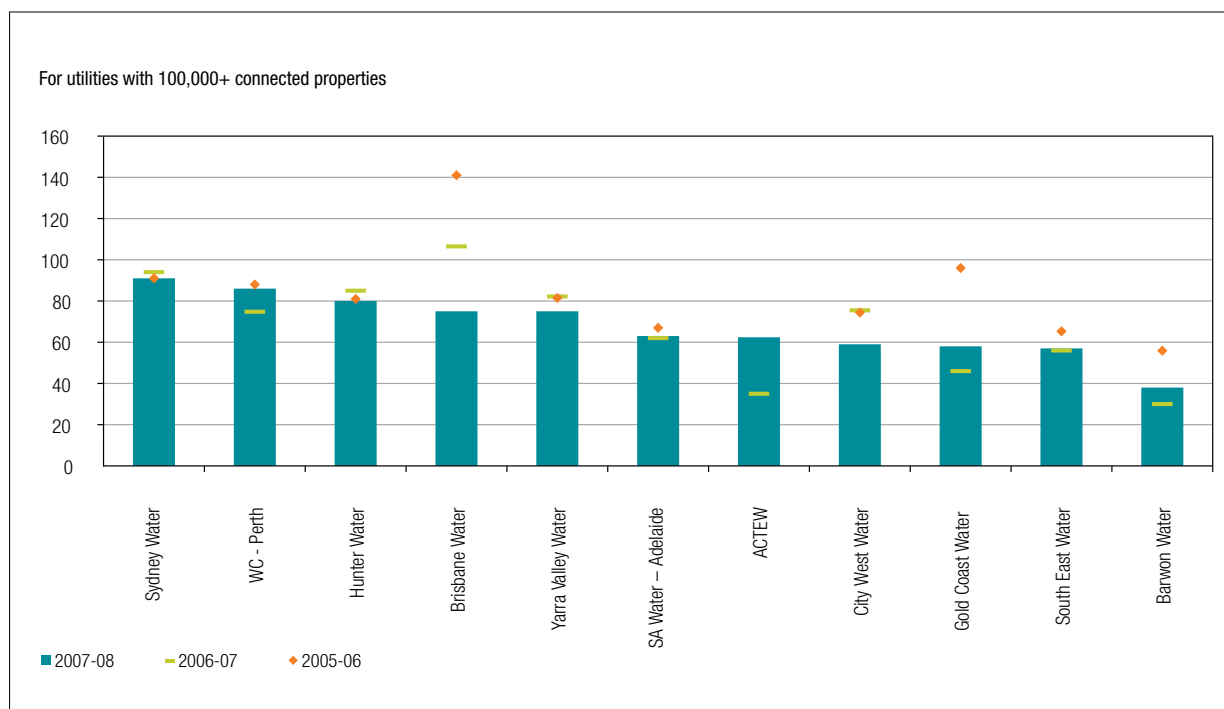
**Figure 8: Average annual residential water supplied by major utilities, kL per property**



Source: NWC and WSAA (2009).

The Water Services Association of Australia notes in its submission (WSAA 2009) that significant improvements in managing leakage are being made in many of Australia's cities. The improvements underscore the importance of recovering the costs of water service provision to provide water utilities with sufficient revenue to continue to improve service delivery and manage leakage. Figure 8 shows that real losses (litres per service connection per day) for major utilities with more than 100,000 connected properties were generally steady or fell between 2005–06 and 2007–08.

**Figure 9: Real losses for major utilities (litres per service connection per day)**



Source: NWC and WSAA (2009).

While technical water-use measures provide insight into the effectiveness of demand management and water use efficiency technology, it is important to keep in mind that the fundamental objective of the NWI is to optimise economic, social and environmental outcomes.<sup>30</sup> This is particularly important, given that indicators of technical water use efficiency do not consider both benefits and costs of each option (which include indirect costs, in the case of water restrictions); nor do they reveal the net benefits of alternative options in balancing water demand and supply (that is, demand management versus new supply).

The NRMCC performance indicators currently incorporate measures of technical water use efficiency (see Box 40).

#### Box 40: NRMCC performance indicators relevant to urban water use efficiency

The NRMCC indicators directly relevant to urban water use efficiency are:

- 8.4 Household water use per annum
- 8.5 Percentage of water supplied to users, by source
- 8.6 Percentage of water losses in distribution systems

The NRMCC also includes an indicator that is related to operational efficiency:

- 8.9 Operating cost per ML of water delivered

As this indicator measures outputs (benefits) in terms of ML, it has close links to technical measures of urban water use efficiency.

While this chapter reports on some of these (or similar) indicators, technical water use efficiency measures can often be misleading because they do not take into account the full range of costs and benefits from demand management and other efforts to reduce water use or losses.

<sup>30</sup> Technical or productive efficiency relates to the process of converting inputs to an output, and requires the maximum outputs from the minimum set of inputs. Economic efficiency is concerned with obtaining the optimal mix of outputs through efficient allocation of all of society's resources over time. For example, a greywater system may reduce the volume of potable water used in a household (and might be technically efficient), but the costs of the system and the use of other resources, such as energy, need to be considered in assessing its economic efficiency.

In the Commission's view, the merits of demand management, water restrictions policies and water use efficiency technology depend on the extent to which they provide net benefits over alternatives (including supply augmentation). Technical water use efficiency should not be the primary goal, as it often comes at a significant cost. While demand management certainly has an important part to play, the Commission considers improved supply to be no less critical to delivering secure, sustainable urban water into the future (see Chapter 11).

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#### ■ Finding 8.16

There have been significant reductions in per capita consumption and significant improvements have been made in reducing system leakage. However reductions in consumption are likely to be due to a variety of factors, including behaviour change, water use efficiency measures and water restrictions.

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#### 8.3.3.2 Rural sector

A range of government programs and initiatives have been implemented to improve water use efficiency and promote innovation in the rural sector. For example:

- + In New South Wales, almost 6,000 of the state's 12,000 irrigators have been trained in best practice irrigation management practices and technologies.
- + In Queensland, performance-based financial incentives are being employed in the dairy industry to deliver efficiency gains in irrigation systems and effluent management. Practical training in the operation of centre pivot and lateral move systems is also being provided to irrigators and others to ensure that the efficiency benefits of those systems are realised. Queensland's Rural Water Use Efficiency Program Stage 3 finishes in June 2009. The South East Queensland Irrigation Futures program is continuing with funding of \$1.5 million per year.
- + In 2007, South Australia launched the Irrigation Toolkit, which provides River Murray irrigators with access to free electronic information (such as crop information, water budgeting tools and salinity management information) to manage their allocations and businesses through drought.

These initiatives are resulting in significant improvements in water use efficiency at the farm level. For example, the New South Wales Department of Primary Industries reports that 70% of the state's cotton growers made changes to improve irrigation practices between 2002 and 2007: 46% improved application systems, 37% improved water scheduling, and 15% invested in on-farm water monitoring. The Commission is in no doubt that water pricing and trading policies are contributing to these efficiency gains.

A range of factors drives water use efficiency and innovation in the rural sector, including:

- + drought and opportunities to trade water, which increase the value of available water and the benefits from more efficient water use
- + environmental benefits, such as the public and private benefits of reducing irrigation salinity
- + on-farm benefits, such as labour savings from modern water technology.

A number of jurisdictions have also invested significantly in projects to improve irrigation system efficiency by reducing losses (see Section 10.3.3.3).

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#### ■ Finding 8.17

Jurisdictions have implemented a number of programs aimed at improving on-farm water use efficiency. However, a range of factors drive water use efficiency and innovation. Most importantly, the combination of prolonged drought, rising water prices, and opportunities for trade has led to significant private investment by farmers in order to use water more efficiently. Incentives linked to public benefits, information provision, and extension services for investment for water use efficiency and innovation have a role to play in promoting the objectives of the NWI.

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Given the variety of factors that drive water use efficiency in the rural sector, there are a number of potential indicators for measuring water use efficiency. As noted above, however, care is required to prevent indicators of technical (physical) water use efficiency obscuring broader and more meaningful measures of economic, social and environmental outcomes (see Box 41).

#### Box 41: Water use efficiency indicators

There are a number of disadvantages of existing approaches to measuring water use efficiency, including the following:

**Focus on irrigation technology.** These measures include rates of adoption for particular irrigation methods. Technical water use efficiency measures have little regard for the full range of benefits and costs. For example, in some circumstances the cost of lining irrigation channels may outweigh the benefits from water saved and may have uncoded third-party effects.

**Limited insights.** Measures based on gross value of production at the state level per ML of water are likely to reflect the irrigation industry profile in the state, making cross-jurisdictional comparisons less relevant. Even at the industry level, gross margin per ML only includes supplemented water and not rainwater, so in dry years the productivity of irrigation water appears to fall.

**Questionable rationale.** Measures of the total water used in the production of a good or service (such as the number of litres of water embodied in a kilogram of wheat or rice produced), which are often referred to as 'virtual water' or 'embodied water', cannot provide a useful benchmark for choosing between alternative uses of water.

**Impracticality.** Data limitations make calculating some indicators infeasible. For example, although some submissions provided information on general trends in irrigated agricultural production, others (including South Australia's) highlighted the difficulty of using available data to estimate the value of agricultural production that results from irrigation.

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#### ■ Recommendation 8.10

While policies and programs that improve technical efficiency are worthwhile and are achieving results, the Commission encourages NWI parties to do more to develop policies and programs that will deliver multiple benefits beyond technical water use efficiency. The Commission encourages a rigorous economic assessment of the full benefits and costs (including external benefits and costs) of policies and programs prior to implementation.

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The disadvantages of technical efficiency indicators are relevant to the NRMCC performance indicators (Box 42).

#### Box 42: NRMCC performance indicators relevant to rural water use efficiency

The NRMCC indicators relevant to rural water use efficiency are:

- 8.1 Rate of use of more efficient irrigation systems
- 8.2 Gross value of irrigated agricultural production by state per ML
- 8.3 Water application rates for irrigated agriculture
- 8.6 Percentage of water losses in distribution systems

As for urban water, the NRMCC also includes an indicator related to operational efficiency:

- 8.9 Operating cost per ML of water delivered

This has close links to technical measures of water use efficiency.

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#### ■ Recommendation 8.11

The Commission recommends that the NRMCC performance indicators be refined to better reflect the important policy principle that partial measures of productivity, such as technical water use efficiency, may not necessarily be in the overall interests of the community or the environment. There are often costs associated with improving technical water use efficiency that need to be considered. Government intervention is best focused on addressing information, institutional or process failures, while market signals of the value of water provide the best incentive for private investment and innovation.

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### 8.3.4 Management of environmental impacts of water use

Management of environmental externalities is important in promoting economically efficient and sustainable use of water resources. Failure to internalise the external effects of water use decisions can work against these and other planned NWI outcomes. For example, in some circumstances, initiatives to introduce more water-efficient production technologies may exacerbate environmental problems by reducing return flows to the environment.

#### Background: Terminology and relevant NWI clauses

Under NWI clause 73, jurisdictions agreed to manage environmental externalities through a range of regulatory measures and to examine and, where found feasible, implement pricing that includes externalities. Other relevant NWI clauses include clause 65 (which requires recovery of environmental externalities) and clause 61 (which includes a study to assess the feasibility of establishing market mechanisms, such as tradeable salinity and pollution credits, to provide incentives for investment in water-use efficiency and farm management strategies and for dealing with environmental externalities).

All states manage environmental externalities through a range of mechanisms. Non-market approaches include:

- + direct actions to mitigate or ameliorate environmental impacts, such as salt interception schemes in the southern MDB, providing environmental flows, and environmental rehabilitation works
- + regulating water use, such as water use approvals under the *Water Management Act 1999* in Tasmania to achieve sustainable development and water use (other states have similar processes)
- + planning, such as salinity zoning policies in water allocation plans in South Australia.

Cost recovery for these types of activities lags behind NWI commitments in a number of states.

Some states have also implemented or investigated the use of pricing and market-based instruments to address environmental externalities:

- + The Australian Capital Territory water abstraction charge is a statutory fee set by the ACT government and paid by those licensed to take ACT water, including ACTEW Corporation. The fee has several components, including recovery of water supply costs (for example, catchment maintenance and government expenditure), estimated values for the scarcity value of water in competing uses, and environmental costs from the flow of water downstream.
- + The New South Wales Government has advised that IPART determinations take some environmental externalities into account.
- + In 2004, Queensland commissioned the Australian Bureau of Agricultural and Resource Economics to examine the feasibility of using market-based mechanisms, including pricing to account for environmental externalities.
- + Western Australia's ERA investigated options for addressing externalities through pricing as part of its inquiry into recycled water and tariffs. The ERA recommended that externalities be considered on a case-by-case basis for each recycled water project.

All states have further work to do to explore the feasibility of using market-based mechanisms, including pricing, to manage environmental externalities. While the ACT has introduced a charge that is intended, in part, to cover externality costs, the Commission considers that there is scope to improve the transparency of this charge.

The Commission notes that coordinated, national action in this area is being scoped. This work is particularly important in the current environment, in which a combination of factors, including water usage for consumptive purposes, is threatening critical environmental assets—a classic example of an externality.

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#### ■ Finding 8.18

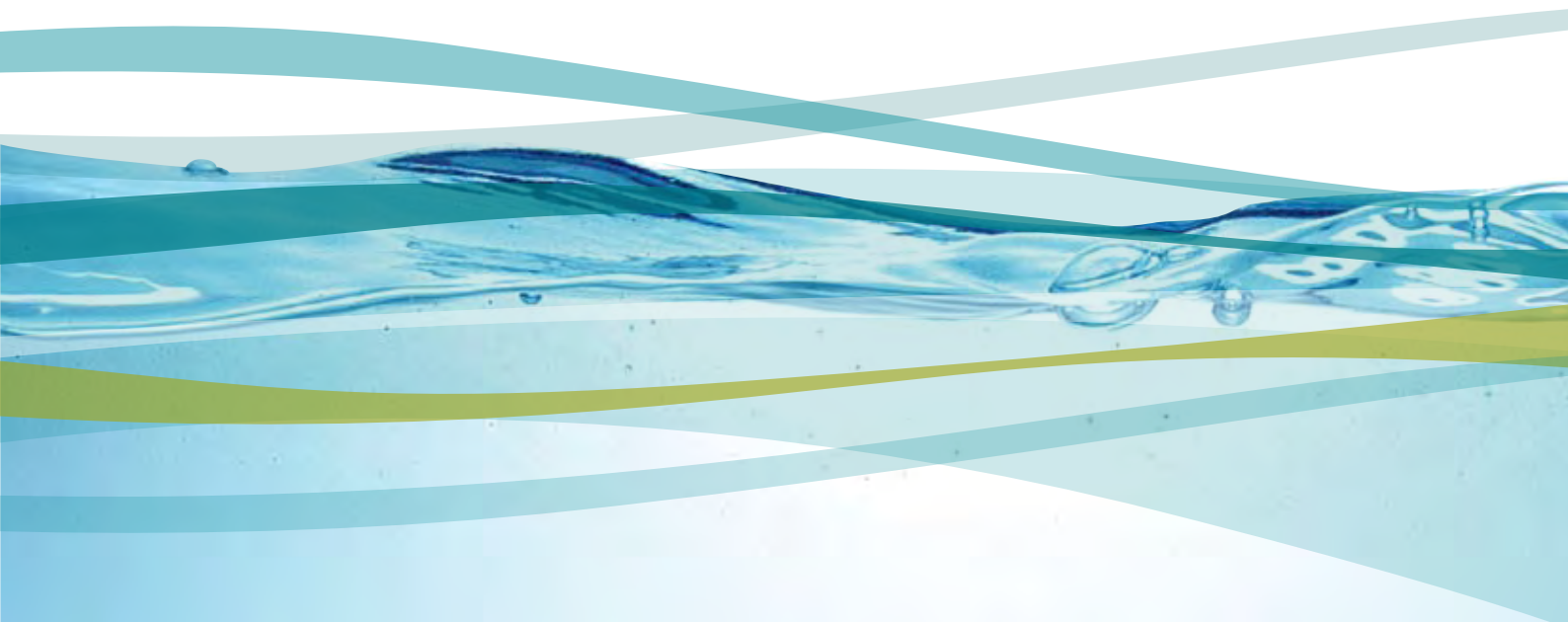
Some states have implemented or investigated the use of pricing and market-based instruments to address environmental externalities. All states have further work to do to explore the feasibility of such actions.

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#### ■ Recommendation 8.12

The Commission recommends that NWI parties renew collective and individual efforts to respond to NWI clause 73 (use of pricing and markets to deal with environmental externalities), given that well-designed externality pricing can be a powerful and enduring way of dealing with the environmental impacts of water provision and use.

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# 9

## Risk assignment



## 9.1 Overview

The NWI risk assignment framework defines how the risks of reduced or less reliable water allocations are to be shared between water access entitlement holders and governments.

It is intended to provide water access entitlement holders with greater planning and investment certainty over how changes in water availability will be dealt with, and thus contribute to a robust, transparent and sustainable water planning framework in the long term.

The NWI risk assignment framework requires jurisdictions to adopt specific NWI risk assignment provisions (clauses 48–50) or an alternative approach (clause 51).

The Commission considers that a vision for success in this area entails the following outcomes:

1. Risk assignment provisions (either the specific NWI provisions or an alternative) will **be clearly established**.
2. Risk assignment provisions will be **implementable and effective** in providing certainty to entitlement holders and underpinning planning, investment and adjustment decisions.
3. Risk assignment provisions and processes will be **clearly articulated and widely understood** by entitlement holders and the community.

Under NWI clause 46, the NWI risk assignment framework only applies once NWI-compliant water plans are in place and overallocation has been addressed. However, as discussed in Chapter 5, there is significant uncertainty about the definition and classification of overallocation, particularly in the Murray–Darling Basin. The Commission considers that this is contributing to uncertainty in the irrigation community in the MDB and across governments about the commencement of risk assignment provisions and how they relate to the establishment of and transition to new sustainable diversion limits under the new Basin Plan.

It is also not clear how easily governments will be able to implement the provisions of NWI clauses 48–50 in practice, given that multiple factors are likely to reduce future water availability for allocation to water access entitlements.

There are limited guidelines for assessing whether alternative approaches to risk assignment developed under clause 51 of the NWI meet the overarching objective of providing certainty and security to entitlement holders, and limited understanding about how clause 51 risk assignment provisions will align with the new institutional arrangements in the MDB.

In the Commission's view, there is a need to clarify these ambiguities and uncertainties, and to ensure that risk assignment provisions and the methods and processes for their effective implementation are clearly defined and understood. Communication to water access entitlement holders about risk assignment provisions, methods and processes will be critical, especially in the light of the new Basin Plan, with its associated transitional arrangements, and the significant structural adjustment expected in the irrigation sector (see Chapter 10).

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### Finding 9.1

The specific risk assignment provisions of clauses 48–50 of the NWI have been adopted only in New South Wales, and by the Commonwealth in the Murray–Darling Basin. Queensland and the ACT have stated that they intend to amend legislation to adopt the NWI provisions as a result of recent changes to the Commonwealth *Water Act 2007*. Other jurisdictions have adopted (or intend to adopt) alternative risk assignment approaches in accordance with clause 51 of the NWI or have not yet decided their approach.

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### Finding 9.2

The consultation process for the 2009 Biennial Assessment has reinforced that risk assignment is considered by stakeholders to be extremely important. However, there is significant confusion and uncertainty about the mechanics and implementation of the NWI risk assignment framework, and thus its practicality. That uncertainty is caused in part by the current lack of clarity about the transition arrangements in the MDB Intergovernmental Agreement and Commonwealth *Water Act 2007* for jurisdictions that have adopted the specific NWI risk assignment provisions and those jurisdictions with alternative approaches.

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### Finding 9.3

There is widespread debate and uncertainty about the best approach to risk assignment and limited guidance in the NWI upon which the Commission can assess the relative merits of either the specific NWI risk assignment provisions or alternative provisions developed under clause 51. In the Commission's view, it is important to address that uncertainty in order to provide water access entitlement holders with greater planning and investment certainty over how changes in water availability will be dealt with.

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<b>Finding 9.4</b>	Stakeholders have raised the need for a nationally consistent approach to risk assignment, particularly as a result of the MDB Intergovernmental Agreement and new institutional arrangements for the MDB. While there are potential benefits in a nationally consistent approach, there are likely to be significant questions about its feasibility, given the divergence in approaches across the jurisdictions.
<b>Recommendation 9.1</b>	The Commission recommends that all jurisdictions (including the Commonwealth) clarify the specific processes that will be used in implementing risk assignment provisions. Jurisdictions should develop and implement communication strategies and disseminate easily accessible written guidance covering all elements of the risk assignment framework, including case study examples of how risk assignment would apply under various circumstances.

## 9.2 Context for this assessment

### Background: Terminology and relevant NWI clauses

46. The following risk assignment framework is intended to apply to any future reductions in the availability of water for consumptive use, that are additional to those identified for the purpose of addressing known overallocation and/or overuse in accordance with pathways agreed under the provisions in paragraphs 41 to 45 above.
47. The Parties agree that an effective risk assignment framework occurs in the context that: the new share-based water access entitlements framework has been established; water plans have been transparently developed to determine water allocation for the entitlements; regular reporting of progress with implementing plans is occurring; and a pathway for dealing with known overallocation and/or overuse has been agreed.
48. Water access entitlement holders are to bear the risks of any reduction or less reliable water allocation, under their water access entitlements, arising from reductions to the consumptive pool as a result of:
  - (i) seasonal or long-term changes in climate; and
  - (ii) periodic natural events such as bushfires and drought.
49. The risks of any reduction or less reliable water allocation under a water access entitlement, arising as a result of bona fide improvements in the knowledge of water systems' capacity to sustain particular extraction levels are to be borne by users up to 2014. Risks arising under comprehensive water plans commencing or renewed after 2014 are to be shared over each ten year period in the following way:
  - (i) water access entitlement holders to bear the first 3% reduction in water allocation under a water access entitlement;
  - (ii) State/Territory governments and the Commonwealth Government to share one-third and two-thirds respectively reductions in water allocation under water access entitlements of between 3% and 6%; and
  - (iii) State/Territory and Commonwealth governments to equally share reductions in water allocation under water access entitlements greater than 6%.
50. Governments are to bear the risks of any reduction or less reliable water allocation that is not previously provided for, arising from changes in government policy (for example, new environmental objectives). In such cases, governments may recover this water in accordance with the principles for assessing the most efficient and cost effective measures for water recovery (paragraph 79 (ii) (a) refers).
51. Alternatively, the Parties agree that where affected parties, including water access entitlement holders, environmental stakeholders and the relevant government agree, on a voluntary basis, to a different risk sharing formula to that proposed in paragraphs 48–50 above, that this will be an acceptable approach.

Clause 46 of the NWI recognised that once water plans were in place and overallocation addressed, there might be instances in the future where changes in the water available for allocation to water access entitlements were required. Such risks may arise from changes in water management decisions based on new information or shifting societal preferences expressed through governments, or from exogenous natural events and factors, such as drought, climate change and bushfire. As stated, the NWI gives jurisdictions the choice of adopting clauses 48–50 (hereafter referred to as the ‘specific NWI risk assignment provisions’) or clause 51 (hereafter referred to as an ‘alternative risk assignment approach’).

The key feature of the specific NWI risk assignment provisions is that they explicitly assign risks arising from ‘changes in government policy’ and a proportion of changes resulting from ‘bona fide improvements in the knowledge of water systems’ capacity to sustain particular extraction levels’ (also referred to as ‘new knowledge’) to governments. In the past, state-based water legislation has generally given ministers powers to alter the properties of water entitlements without compensation, or has been silent on the matter.

Where adopted, the specific NWI risk assignment provisions may therefore provide an additional degree of security for entitlement holders, under certain conditions. The National Farmers’ Federation (NFF 2009) submitted that:

*An essential element going forward is an agreed framework that provides the clarity and transparency suggested. To do otherwise is to undermine the security and yield of water entitlements and to undermine investment by entitlement holders.*

Similarly, the Australian Bankers’ Association (2009) submission noted that changes to potential water allocations will affect the collateral value of water access entitlements.

The 2007 Biennial Assessment and 2008 Update assessed progress in applying the risk assignment framework (NWC 2007, 2008). Given the early stage of work on risk assignment, the assessment was not detailed. However, the Commission found that states were, at that time, in the process of implementing the NWI risk assignment framework or alternative risk management approaches.

There have been a number of further developments in relation to the NWI risk assignment provisions over the past two years which apply to MDB jurisdictions, as discussed in the following sections.

## 9.2.1 The *Water Act 2007* and 2008 Murray–Darling Basin Agreement

Division 4 of the Commonwealth *Water Act 2007* (see Box 43) defines the allocation of risks in relation to reductions in water availability in the Murray–Darling Basin in a manner that is largely in accordance with the specific NWI risk assignment provisions.

### **Box 43: Commonwealth Water Act, Part 2, Division 4, Allocation of risks in relation to reductions in water availability**

Subdivision A applies to ‘risks arising from reductions in diversion limits’. The simplified outline provided in section 74 states:

‘When the long-term average sustainable diversion limit for the water resources of a water resource plan area (or for a particular part of those water resources) is reduced, the Basin Plan identifies the Commonwealth’s share (if any) of the reduction.

Note 1: The Commonwealth’s share includes reductions attributable to changes in Commonwealth Government policy and may also include some part of reductions attributable to improvements in knowledge about the environmentally sustainable level of take for the water resources of a water resource plan area.

Note 2: See section 75.

‘The Commonwealth: (a) endeavours to manage the impact of the Commonwealth’s share of the reduction on the holders of water access entitlements; and (b) may take steps to ensure that the holders of water access entitlements do not suffer a reduction in their water allocations as a result of the Commonwealth’s share of the reduction.

Note: See section 76.

‘If, despite the Commonwealth’s efforts, the water allocation of a holder of a water access entitlement is reduced and the reduction is reasonably attributable to the Commonwealth’s share of the reduction in the long-term average sustainable diversion limit, the holder may be entitled to a payment under section 77.’

There are two important changes for MDB jurisdictions as a result of this Act.

First, under the NWI, risks relating to future reductions in water allocations due to ‘new knowledge’ (clause 49) were shared as follows:

- + Until 2014, the risks were to be borne by users.
- + After 2014, the risks were to be shared in accordance with Table 28 as set out on the next page.

**Table 28: Risk assignment under the Commonwealth *Water Act 2007* prior to its amendment**

Reduction due to new knowledge over 10-year period	Water access entitlement holder share	State share	Commonwealth share
<b>0 to 3%</b>	All of the reduction	Nil	Nil
<b>3 to 6%</b>	All of the reduction to 3%	1/3 of any reduction from 3 to 6%	2/3 of any reduction from 3 to 6%
<b>More than 6%</b>	All of the reduction to 3%	1/3 of any reduction from 3 to 6%, plus half of any reduction from 6% and above	2/3 of any reduction from 3 to 6%, plus half of any reduction from 6% and above

However, the *Water Act 2007* was recently amended to give effect to the Intergovernmental Agreement on Murray–Darling Basin Reform of 3 July 2008. In the MDB IGA, the Commonwealth agreed to take on a greater share of the ‘new knowledge’ risk sharing obligations. Specifically, the provisions of the amended *Water Act 2007* provide for the Commonwealth to bear the risks of any reductions in entitlements greater than 3% arising out of new knowledge that reduces the consumptive pool (see Table 29).

**Table 29: Risk assignment under the Commonwealth *Water Act 2007* after amendment**

Reduction due to new knowledge over 10-year period	Water access entitlement holder share	State share	Commonwealth share
<b>0 to 3%</b>	All of the reduction to 3%	Nil	Nil
<b>More than 3%</b>	All of the reduction to 3%	Nil	100% of any reduction from 3% and above

To effect this increase in the Commonwealth’s share of risk for any reductions, the Minister is required to make a determination (under section 74A of the *Water Act 2007*) that a basin state has applied the risk sharing arrangements in the NWI (clauses 48 to 50).

Basin states are required to effect these changes by 30 June 2009. The Minister has the capacity to extend that date to cover a situation in which, despite its ‘best endeavours’, a basin state is unable to pass the required legislation before 30 June 2009. If a basin state does not implement the risk management framework outlined in clauses 48 to 50 of the NWI, the Minister will be unable to make a determination that it has met its obligations. In that situation, the Commonwealth’s risk sharing arrangements for new knowledge will remain as outlined in Table 28.

Second, the MDB IGA (see Box 44) brings forward the introduction of Division 4 of the *Water Act 2007* to when transitional and interim water resource plans expire (prior to 2014). This is reflected in section 78 of the *Water Act 2007* as amended (Box 45). This is a different arrangement from that described in clause 46 of the NWI.

**Box 44: Intergovernmental Agreement on Murray–Darling Basin Reform 2008, Part 10.1, Risk Assignment Framework—Assignment of risks in relation to reductions in diversion limits**

10.1.1. Part 2, Division 4 of the Water Act sets out the allocation of risks in relation to reductions in water availability, reflecting the National Water Initiative. Under this Part of the Intergovernmental Agreement, the architecture of the National Water Initiative and the Water Act remain unchanged. The only change is that the Commonwealth takes on the liabilities of the Basin States in relation to new knowledge components that exceed three per cent of the relevant diversion limit and from an earlier date as set out in this Part of the Intergovernmental Agreement.

10.1.2. The Basin States who choose to apply the National Water Initiative risk assignment framework, amended by this Agreement, agree to use their best endeavours to amend their legislation by 30 June 2009 to prescribe the State's responsibility, if any, for risk management within the Basin. These provisions would apply only on the expiry of transitional water resource plans. The provisions outlined in this clause will not change the rights of entitlement holders as provided for under the National Water Initiative. The provisions simply provide for the transfer of responsibility in respect to compensation associated with changes due to improvements in knowledge (as outlined in clause 49 of the NWI) from the State Governments to the Commonwealth Government.

10.1.3. The Commonwealth undertakes to use its best endeavours to enact legislation to amend Division 4 of Part 2 of the Water Act so that:

In respect of those Basin States who choose to apply the National Water Initiative risk assignment framework:

- a) the Commonwealth's share of a reduction in a long-term average sustainable diversion limit includes, in any 10 year period, all of the new knowledge components of the reductions that exceed three percent of the relevant diversion limit; and
- b) for a water resource plan area in the Murray–Darling Basin with a transitional or interim water resource plan, the Commonwealth will take responsibility for its share of the new knowledge component of a reduction in the long-term average sustainable diversion limit for the water resources of that plan area arising after the transitional or interim water resource plan ceases to have effect.

**Box 45: Transitional arrangements in section 78 of the Commonwealth *Water Act 2007***

78. Applying Subdivision when transitional or interim water resource plan ends

- (1) This section applies if a transitional water resource plan, or an interim water resource plan, for a water resource plan area is in effect when the Basin Plan first takes effect.
- (2) The Basin Plan must specify the long-term average limit on the quantity of water that can be taken from the water resources of the water resource plan area that the Authority is satisfied will be applicable immediately before the transitional water resource plan, or interim water resource plan, ceases to have effect.
- (3) For the purposes of applying this Subdivision:
  - (a) the long-term average sustainable diversion limit for the water resources of the water resource plan area is taken to be reduced when the transitional water resource plan, or interim water resource plan, ceases to have effect if:
    - (i) the long-term average limit specified under subsection (2); exceeds
    - (ii) the long-term average sustainable diversion limit for the water resources of the water resource plan area that is specified in the Basin Plan; and
  - (b) the amount of the reduction is the amount of the excess; and
  - (c) the Basin Plan must specify the amounts referred to in paragraphs 75(1)(a), (b), (c) and (d) in relation to the reduction.

## 9.2.2 The Basin Plan: A Concept Statement (2009)

In June 2009, the MDBA released *The Basin Plan: A concept statement* (MDBA 2009). The statement provides an overview of the approach to developing the Basin Plan, at an early stage in the plan's development. The concept statement includes the discussion on risk assignment as extracted in Box 46.

### Box 46: Discussion on risk assignment in *The Basin Plan: A concept statement* (MDBA 2009)

Governments have agreed that the risk of any future reductions in the availability of water will be shared according to a framework set out in the National Water Initiative (2004), as amended by the Intergovernmental Agreement on Murray–Darling Basin Reform (2008).

Broadly, these agreements mean that the risk of any reduction in size or reliability of a water allocation will be borne as follows:

- by water entitlement holders, if the reduction is the result of seasonal or long-term changes in climate, or of periodic natural events such as bushfires and drought
- by a government, if the reduction is the result of changes in that government's policy; and
- by water entitlement holders and governments (according to a specific formula), if the reduction results from improvements in knowledge about the environmentally sustainable level of take of water.

## 9.3 The Commission's assessment and findings

### 9.3.1 Progress in adopting a risk assignment framework

Jurisdictions are required to adopt risk assignment provisions relating to treatment of changes in future water availability, once overallocation has been addressed and water plans are in place, either in the form of the specific NWI risk assignment provisions (clauses 48–50), or an alternative approach (clause 51).

The states have provided information to the Commission which describes the risk assignment provisions adopted in their jurisdiction, and/or provides an indication of progress and direction, in instances where risk assignment provisions are yet to be finalised in legislation or are in the process of revision/development. That information, supplemented by information drawn from reviews undertaken for the Commission (DLA Philips Fox 2009; Lawlab 2009) is presented in Table 30.

Table 30: Jurisdictional status and progress in adopting the NWI risk assignment framework in water legislation

State	Status and progress in adopting a risk assignment approach
ACT	Assignment of risk arising from future changes in the availability of water for the consumptive pool is not addressed in the Water Resources Act. The ACT has stated that it will adopt the NWI risk assignment framework in legislation later in 2009.
NSW	<p><u>Water resource areas outside the MDB</u></p> <p>New South Wales has legislated for the NWI risk assignment framework, which will apply from 2014 onwards as required under the NWI. The NSW Act assigns the risk of reduced allocations due to climate change, bushfires and drought to water access entitlement holders (section 48). Until 2014, the risks of any reduction or less reliable water allocation under a water access entitlement arising as a result of bona fide improvements in the knowledge of water systems' capacity to sustain particular extraction levels are to be borne by users. Under the Act, risks arising under plans adopted after 2014 are assigned proportionately according to the framework established in clauses 46 to 50 of the NWI risk assignment framework.</p> <p><u>Water resource areas within the MDB</u></p> <p>New South Wales has implemented further legislative changes required for the MDB in accordance with the MDB IGA 2008. The enhanced Commonwealth risk sharing arrangement for new knowledge (see Table 29) will apply to transitional water plans that expire after the Basin Plan takes effect.</p>

State	Status and progress in adopting a risk assignment approach
<b>NT</b>	The Northern Territory Act does not clarify the assignment of risk arising from future changes in the availability of water for the consumptive pool. It simply provides for licences to be issued, except in exceptional circumstances, for a period of not more than 10 years (section 45(4)). As licence terms are only 10 years, all risk falls to the consumptive user. Risks are, however, clearly enunciated within individual water allocation plans. The Northern Territory Government has advised that risk is associated primarily with climatic factors outside of the control of government and consequently risk is borne by the water users.
<b>Qld</b>	<p>Under the Queensland Act, a holder of a water access entitlement is entitled to 'reasonable compensation' if a change made within 10 years of the plan being approved reduces the value of the allocation. The Act does not clarify the assignment of risk process in accordance with the NWI.</p> <p>Queensland has stated that it will make its best endeavours to amend legislation to adopt the NWI risk assignment framework by 30 June 2009. However, by July 2009, no amendments appeared to have been made.</p>
<b>SA</b>	South Australia has adopted an alternative risk assignment framework, as per paragraph 51 of the NWI and as set out in South Australia's accredited NWI implementation plan (2006). The <i>Natural Resources Management Act</i> enables the Minister to reduce water allocations of licences where the Minister considers it necessary or desirable to do so (section 156). South Australia has noted that licensees are closely involved in the process of considering reductions to water allocations.
<b>Tas.</b>	In accordance with Tasmania's NWI implementation plan, the development of a risk assignment framework will commence in 2011 for the post-2014 arrangements.
<b>Vic.</b>	Victoria has adopted an alternative risk assignment framework, as per paragraph 51 of the NWI. The approach was developed as part of the Victorian Government (2004) <i>Our Water Our Future</i> White Paper process in consultation with stakeholders. Relevant amendments to the <i>Water Act 1989</i> were made.
<b>WA</b>	The Western Australian Act does not establish a risk assignment framework for any future reductions in the availability of water for consumptive use. The Western Australian Government is currently drafting a strategic policy that will outline how the state assigns risks for future reductions to water allocations (see Box 47 below).
<b>Commonwealth</b>	The Commonwealth has adopted the specific NWI risk assignment provisions, including recent amendments in the <i>Water Act 2007</i> which apply to MDB jurisdictions (see 'Context for this assessment' above).

#### ■ Finding 9.1

The specific risk assignment provisions of clauses 48–50 of the NWI have been adopted only in New South Wales, and by the Commonwealth in the Murray–Darling Basin. Queensland and the ACT have stated that they intend to amend legislation to adopt the NWI provisions as a result of recent changes to the Commonwealth *Water Act 2007*. Other jurisdictions have adopted (or intend to adopt) alternative risk assignment approaches in accordance with clause 51 of the NWI or have not yet decided their approach.



#### **Box 47: Case study on the development of a risk assignment framework in Western Australia**

In May 2007, the then Water Resources Cabinet Sub-Committee approved the investigation and development of a risk assignment framework for Western Australia consistent with clause 51 of the NWI. This allowed the state to look at alternatives to the prescriptive framework provided in clauses 46 to 50 of the NWI. Consultants were engaged to prepare advice on options for a risk assignment framework for Western Australia.

The final report was presented to the Department of Water in March 2008 and gave three options for addressing risk assignment. Two of the options involved interpretations of clauses 46 to 50 of the NWI, while the third option suggested applying an alternative framework under the provisions of clause 51. The consultants worked with the department in consulting both the water law reform external reference group and two advisory groups established by the Department of Water to provide comment and advice on legislative and related issues. Feedback from stakeholders indicated general support for an alternative framework. However, stakeholders wanted a greater understanding of related issues, such as the nature of the consumptive pool, before they were willing to commit to one of the three options.

The possible approaches to risk assignment outlined in the report placed a strong emphasis on ensuring that water planning and allocation processes are explicit and comprehensive in their recognition of risks. The report acknowledged that, while some risks are unavoidable, the imperative is to undertake a process that minimises exposure to those risks. There is, therefore, a clear link between initiatives that develop Western Australia's risk assignment framework and addressing overallocation and overuse.

The department is currently drafting a strategic policy that will outline how Western Australia assigns risks for future reductions to water allocations.

Source: Government of Western Australia (2008)

### **9.3.2 Clarity and practicality of risk assignment approaches**

In general, it is important to assess whether the risk assignment framework in any particular jurisdiction provides the best approach for contributing to the overall objectives of the NWI, particularly in regard to providing clarity and certainty for water access entitlement holders, and whether it is well understood by water access entitlement holders.

As risk assignment frameworks and approaches are currently evolving, particularly in the MDB, it was not possible to undertake a complete and comprehensive review of risk assignment across Australia as part of the biennial assessment or to come to definitive conclusions in this regard. The following assessment therefore outlines factors affecting the clarity and practical implementation of the specific risk assignment provisions, and alternative frameworks. The assessment is based on issues raised in the consultation and stakeholder engagement process associated with the biennial assessment.

#### **9.3.2.1 Specific NWI risk assignment provisions (clauses 48–50)**

The NWI provides no guidance on the rationale underpinning the specific NWI risk assignment provisions (clauses 48–50), and they are yet to be applied in practice in any jurisdiction. The provisions have been the subject of extensive debate, both in the development of the NWI and since that time. For example, the National Farmers' Federation submitted that 'there is now a wide variation on what the specific clauses mean and how these may be implemented'.

Current debate focuses on:

- + the meaning and interpretation of the specific NWI risk assignment provisions
- + the practicality of implementing the specific NWI risk assignment provisions, including in the presence of multiple risks to water availability and significant uncertainty
- + the coverage and commencement of those provisions in relation to the Basin Plan
- + matters relating to compensation.

In each of these areas, it is important to consider the implications of the Commonwealth *Water Act 2007* and the MDB IGA.

## Meaning of NWI clauses 46–50

There has been much debate about the meaning of the NWI clauses 46–50, and particularly the specific NWI risk assignment provisions in clauses 48–50. Uncertainty and divergence in opinion regarding the meaning of the clauses frequently concern:

- + the meaning of ‘bona fide improvements in knowledge’
- + the meaning of ‘allocation’ and the implications of the specification of environmental entitlements and purchase of irrigation entitlements to be used to achieve environmental objectives.

### *Interpretation of the ‘new knowledge’ clause*

Clause 49 refers to ‘bona fide improvements in the knowledge of water systems’ capacity to sustain particular extraction levels’. However, there is no definition of what constitutes ‘bona fide improvements’ in knowledge.

The Commission’s view is that this clause must be taken to mean genuine and properly based improvements in knowledge, with ‘knowledge’ being information based on credible, and preferably peer-reviewed, science which is broadly accepted, allowing judgments to be made regarding the ability of water systems to sustain particular extraction levels. Knowledge, in this context, cannot be taken to be knowledge claimed by a single group or in the mind of one or a small number of persons. On the other hand, it does not have to be universally accepted, for example by all environmental and irrigator groups, but would be knowledge accepted, for example, by relevant governments or by a panel reviewing a water plan on the basis of formal submissions, cross-examination of witnesses or other proper review process.

### *Interpretation of reductions in water availability and implications of the Commonwealth buyback program*

#### **Background: Terminology**

The ‘consumptive pool’ is defined in Schedule B(i) of the NWI as being ‘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’.

‘Consumptive use’ is defined as ‘use of water for private benefit consumptive purposes including irrigation, industry, urban and stock and domestic use’.

Two NWI clauses refer to reductions or reduced reliability of water allocations as a trigger for the risk assignment provisions:

- + clause 49 refers to ‘risks of any reduction or less reliable water allocation under a water access entitlement’
- + clause 46 states that ‘the following risk assignment framework is intended to apply to any future reductions in the availability of water for consumptive use’.

Under the NWI, ‘water allocations’ are defined in the NWI as ‘the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan’. Therefore, changes to ‘water allocations’ expected to be made to water access entitlements can occur via two distinct mechanisms:

- + changes to size of the consumptive pool from which water is allocated
- + changes to the allocation rules and formulas established in the relevant water plan, such that a reduced volume of water is allocated for a determined consumptive pool.

There has been some confusion about the best definition of risks of reduced water availability (i.e. clause 46 or 49), particularly in the context of considering the impacts of environmental water purchases. The NWI was drafted when environmental water was provided mainly through rules-based provisions rather than through entitlements with the same legal standing as consumptive entitlements, and when purchases were limited. However, now environmental water purchases are being used to help meet environmental objectives. This means that the consumptive pool of water may be reduced when the purchased water is used to achieve environmental objectives. However, the act of buying back water for the environment does not alter the volume of water that is expected to be allocated to remaining irrigation entitlements.<sup>31</sup> It follows that buybacks do not pose risks to the future allocation of water under a water access entitlement—since sellers are compensated through the entitlement sale and expected allocations to remaining entitlement holders remain unchanged.

The Commission therefore considers that, given the introduction of buyback and other water recovery measures, when interpreting the risk assignment provisions of the NWI, focus should be placed on the risk of reduced water allocation to a water access entitlement (clause 49), rather than the risk of reduced availability for water for consumptive use (clause 46). In other words, it is the Commission’s view that the

<sup>31</sup> As long as the characteristics of entitlements that are bought back remain consistent with their original form.

establishment and/or purchase of environmental entitlements which might be excluded from the consumptive pool means that the concept of 'consumptive use' or 'consumptive pool' is not an appropriate one for determining compensation under NWI risk assignment provisions.

In general, this discussion highlights that great care must be taken in assessing the impacts of water recovery measures (such as infrastructure upgrades) on the expected allocations to water access entitlements. Transparent and independently audited approaches are likely to be beneficial.

### Practical implementation of NWI provisions

A major area of concern expressed by jurisdictions and stakeholders is the practical implementation of specific risk assignment provisions, including the ability to make evidence-based determinations about the relative contributions of different underlying causes of reductions in the expected allocations to water access entitlements. In particular, the risk assignment framework requires that 'changes in government policy' be distinguished from changes required as a result of 'new knowledge'. It also requires specifying the percentage reduction due to each cause in order to share the risk between different governments and entitlement holders, where multiple risks are present.

In practice, attributing percentage reductions to different risks is likely to be a challenging task. For example, in information provided to the Commission, New South Wales noted that the need to consider climatic, hydrologic and socio-economic variability makes it difficult to attribute changes in water availability to any one particular risk factor.

Raising similar issues, the National Farmers' Federation submitted that the Murray–Darling Basin Plan was an example where risk assignment could be deemed to be classified under any one of the clauses (see Box 48).

#### **Box 48: Example of uncertainty associated with the specific NWI risk assignment provisions (from submission by the National Farmers' Federation, 2009)**

*As an example, the new Basin Plan could fall under any of the clauses 48–50. This could be clause 50 for a change to government policy (which it is, with legislative changes occurring in 2008—four years after the NWI was signed). The Basin Plan, although commencing before the end of the transitional water sharing plans, will not become effective until 2014 hence could fit into clause 49 for risks arising from new knowledge. Likewise, it could be perceived that the Basin Plan is a result of climate ...*

*The issue for the NFF is that the entitlement holder ought to have clarity and transparency about how risk assignment will be triggered, and what specific events trigger what clauses ...*

From NFF (2009), pages 16 and 17

Other states, which have not adopted the specific NWI risk assignment provisions, have also raised concerns during consultation about their ability to implement those provisions in practice.

As a minimum, the Commission believes that applying the specific NWI risk assignment provisions requires water plans to be rigorous in the presentation of all relevant assumptions so that changes to those assumptions can be clearly identified and related to the risk assignment provisions (see Box 49). The reason this is so important is that interpretations that are not based on robust and transparent methods might be subject to appeal or legal challenge, which would be costly and would likely undermine confidence in water management. Rigorously presenting assumptions provides a baseline from which changes to assumptions (and the reason for those changes) can be determined.

Further work is required, particularly by the MDBA and by jurisdictions that adopt the specific NWI provisions, to determine how those decisions might be made, and what tools would be used. It is also important to clarify who will be responsible for making decisions in relation to the magnitude of reductions and on the category of risk, when those decisions will be made, and how they will be communicated.

#### **Box 49: Requirements for implementing the NWI risk assignment framework**

Applying the NWI risk assignment framework requires a benchmark to which future changes can be compared. In particular, it will be critical to document the scientific knowledge and assumptions regarding the understanding of the resource (that is, the size and distribution of water), the desired environmental outcomes that the water plan is expected to achieve, and the link between the water required and allocated to achieve the planned environmental outcomes. It will also be important to identify and understand the role of other influences that could affect the achievement of the planned environmental outcomes. In essence, this means that water plans must be extremely rigorous in documenting the knowledge and range of assumptions that underpin water planning decisions, in order to provide a sound basis for the application of the risk assignment framework.

## Commencement of risk assignment provisions, particularly in the MDB

Clause 46 states that the risk assignment framework only applies to any future reductions in the availability of water for consumptive use, beyond any reductions for the purposes of addressing known overallocation or overuse in accordance with previous sections of the NWI. The Commission therefore considers that the starting point for application of the risk assignment framework is the point at which overallocation or overuse has been addressed under the steps set out in clauses 41 to 45. In this way, the NWI risk assignment framework is unrelated to, and separable from, the impact of (and any related assistance for<sup>32</sup>) reducing the consumptive pool of water to bring levels of extraction within sustainable limits.

However, as discussed in Chapter 5, there is significant debate about the issue of overallocation, which has led to uncertainty about the commencement of the risk assignment provisions, particularly in the MDB where the new Basin Plan is expected to lead to reductions in sustainable diversion limits. Transitional arrangements have been brought into place as a result of the MDB IGA and the amendments to the Commonwealth *Water Act 2007*. As stated previously, the MDB IGA brings forward the introduction of Division 4 of the Water Act to when transitional and interim water resource plans within the Basin expire (prior to 2014), as reflected in section 78 of the Act as amended. The Commission understands that this alters the commencement of risk assignment as defined in clause 46 of the NWI; however, further clarification of these arrangements during consultation on the development of the new Basin Plan is clearly required.

## Compensation and triggers

By assigning risks to governments, the NWI provisions imply but do not explicitly state, that compensation will be paid to water access entitlement holders, in relevant cases. Sections 77 and 83 of the *Water Act 2007* describe Commonwealth compensation arrangements in more detail than the NWI provisions. However, further work is required to define the details of compensation arrangements across all jurisdictions (particularly those outside the MDB), including the methodology for determining the value of reductions in water allocations to water access entitlements, to whom water access entitlement holders would apply for compensation, whether separate applications would need to be made to the Commonwealth and state governments (in cases where risks are being shared by both), and when such payments would be made.

In addition, the NWI does not clarify when the risk assignment is to be applied (for example, at the end of plans) or who can trigger an assessment.

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### ■ Finding 9.2

The consultation process for the 2009 Biennial Assessment has reinforced that risk assignment is considered by stakeholders to be extremely important. However, there is significant confusion and uncertainty about the mechanics and implementation of the specific NWI risk assignment provisions, and thus its practicality. That uncertainty is caused in part by the current lack of clarity about the transition arrangements in the MDB Intergovernmental Agreement and Commonwealth *Water Act 2007* for jurisdictions that have adopted the specific NWI risk assignment provisions and those jurisdictions with alternative approaches.

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### 9.3.2.2 Alternative risk assignment approaches (clause 51)

As described above, several jurisdictions have developed alternative frameworks provided for under clause 51 of the NWI, and other jurisdictions are considering developing alternative frameworks (see Box 47). In these cases, a number of matters have been brought to the attention of the Commission. They are discussed in the following sections.

## Legal requirements

Despite the clear avenue for alternative approaches, there has been debate about whether NWI parties are allowed to develop alternative frameworks. However, there appears to be no requirement in the NWI that jurisdictions adopt the specific NWI risk assignment provisions (clauses 48–50), and the Commission has no reason to believe that the MDB IGA 2008 and the Commonwealth *Water Act 2007* have any further effect on this requirement.

For the MDB, the *Water Act 2007* clearly sets out the Commonwealth's risk sharing obligations in the original NWI Agreement, and the Commonwealth's enhanced risk sharing arrangements arising from the 2008 MDB IGA. For the Commonwealth to take on an increased risk share (and at an earlier date), states must legislate to adopt the specific risk management framework (clauses 48–50) of the NWI.

<sup>32</sup> Under NWI clause 97. See Chapter 10 for a discussion of adjustment associated with addressing overallocation.

## Voluntary nature of alternative frameworks

The main NWI requirement for acceptance of an alternative risk assignment approach is that it must be agreed, on a voluntary basis, by affected parties, including water access entitlement holders, environmental stakeholders and the relevant government.

Victoria, for example, has stated that the alternative approach that it has adopted was agreed in consultation with stakeholders during the 2004 *Our Water Our Future* White Paper process and then later passed into legislation through amendments to the Victorian *Water Act 1989*.

The Commission considers that the NWI requirement for 'voluntary' agreement is difficult to assess and enforce. For example, it would be impractical for jurisdictions to require the agreement of *all* individual water access entitlement holders.

The Commission also notes that the absence, in the relevant NWI clauses, of any reference to other NWI parties to the agreement suggests that state or territory governments can introduce a different risk sharing formula, without the agreement of other state governments and/or the Commonwealth.

### 9.3.2.3 Determining the best framework to meet the NWI objectives

In moving beyond mere compliance, the main issue of interest to the Commission is what approach or approaches will best advance the objectives of the NWI. The NWI itself provides no rationale for the specific NWI provisions and little guidance on the characteristics of acceptable alternative approaches. However, this matter is of increasing importance in the overall water reform agenda, and is therefore of interest to the Commission. The following outlines some of the factors that the Commission believes should be considered in relation to risk assignment.

#### Assessing alternative approaches

In principle, the Commission agrees with the submission from the Western Australian Government to the biennial assessment that 'economic and public policy principles suggest that risks should be assigned to those best placed to manage them'. To this end, the Commission sees some merit in assigning risks associated with government policy change to government as per the specific NWI provisions. If entitlement holders bear the risk of government policy change, they may underinvest in water-related assets, for fear that the security and reliability of their entitlements may be reduced.

Any risk assignment framework should not create perverse incentives that undermine the objectives of the NWI. For example, as the Western Australian Government's submission points out, further definition of the types of policy change that the government should be responsible for may be desirable. In particular, the Commission is concerned that the absence of limits to the liability of governments for changes in government policy under the specific NWI provisions may mean that governments do not make necessary changes to water availability as a result of financial or budgetary considerations.

The polarised debate about the merits of the specific NWI risk assignment provisions and the alternative approaches developed in some states seems to stem from questions about whether it is possible in practice to adequately distinguish reductions in water available for allocation to water access entitlements due to government policy, new knowledge and other climatic factors, particularly in an environment of ongoing uncertainty over the impacts of climate change on water-dependent ecosystems.

The Commission believes that the selection of the best possible risk assignment framework should consider the ability for governments to implement the provisions in practice. The Commission believes that it must be clearly stated and should be able to be implemented effectively using robust and transparent methods. In some cases, the time and resources involved in distinguishing the 'causes' of reductions in water availability may outweigh the benefits in terms of additional security for entitlement holders. This is particularly true if the processes and methods used to apportion risks are called into question. The Commission considers that the worst outcome for all parties would be a situation in which risk assignment decisions made in the future were called into question by water access entitlement holders or others and there were debates (particularly legal debates) over compensation.

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#### ■ Finding 9.3

There is widespread debate and uncertainty about the best approach to risk assignment and limited guidance in the NWI upon which the Commission can assess the relative merits of either the specific NWI risk assignment provisions or alternative provisions developed under clause 51. In the Commission's view, it is important to address that uncertainty in order to provide water access entitlement holders with greater planning and investment certainty over how changes in water availability will be dealt with.

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## Debate about the desirability of national consistency

The Commission has also observed debate about the desirability of national consistency in the approach to risk assignment. This issue was raised in the stakeholder forum held on 7 May 2009. The Commission believes that there would be advantages in being able to demonstrate that the same agreed risk assignment principles, process and methods apply across Australia. Consistency would promote understanding and acceptance, which is likely to be most important in the MDB where the Commonwealth *Water Act 2007* and 2008 MDB IGA apply.

Without that consistency, it has been argued to the Commission that there are potential implications for water trading, structural adjustment and competitive neutrality. For example, different risk assignment frameworks may lead to different incentives for trading of water access entitlements in connected water systems that cross state borders. However, the differential adjustment impacts of alternative risk assignment frameworks may not necessarily be inefficient, if water access entitlement holders understand the tenure and compensability of their product in advance.

Furthermore, there may be instances where applying the same risk assignment provisions across all systems may not be the best approach. For example, the Western Australian Government's submission notes:

*... given the vast differences in water systems and levels of investigation and understanding across Australia, it is highly unlikely that a uniquely correct framework could be applied to all jurisdictions.*

The Commission notes that there is no common approach to risk assignment in states that have adopted alternative arrangements. For example, the Commission understands that South Australia's approach retains the ability for the government, in collaboration with the community, to make planned changes to the expected allocation of water to water access entitlements. On the other hand, Victoria's approach seeks to limit the potential for government to change the expected allocation to water access entitlements to accommodate reduced water availability for consumptive use. Instead, its approach would be to purchase entitlements and/or to invest in water savings projects to reduce system losses, where deemed necessary. Victoria has argued that this approach maximises security for water access entitlement holders.

These examples demonstrate the challenges in assessing the relative merits of risk assignment provisions, and the extent to which national consistency should be pursued. Given the divergences in legislative and policy frameworks across the country, the cost of adopting a uniform approach may also be prohibitive. However, the Commission considers that some of the debate about risk assignment provisions relates to different interpretations. By clarifying those differences and encouraging joint understanding, it may be possible to identify a common set of principles, and to clarify where significant differences in approach exist.

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### ■ Finding 9.4

Stakeholders have raised the need for a nationally consistent approach to risk assignment, particularly as a result of the MDB Intergovernmental Agreement and new institutional arrangements for the MDB. While there are potential benefits in a nationally consistent approach, there are likely to be significant questions about its feasibility, given the divergence in approaches across the jurisdictions.

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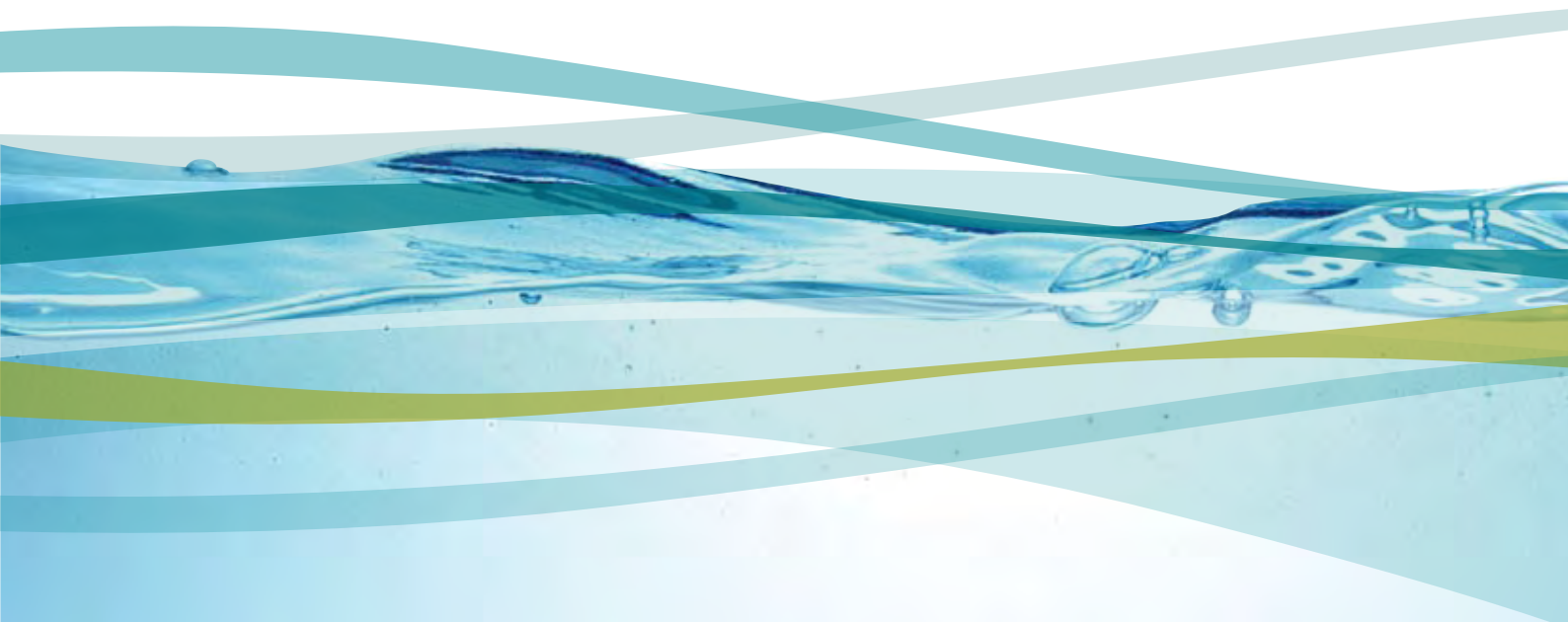
Overall, the Commission believes that the irrigation community has limited understanding of what will happen in relation to risk assignment, when it will happen, and who will be making which decisions. While it is important for governments to clarify when and how the risk assignment provisions do apply, it is equally important to clarify the circumstances where they do not apply, including where overallocation is yet to be addressed and where water plans are not yet in place. This will help water access entitlement holders better understand all possible changes to the security and reliability of their entitlements, and to make planning and investment decisions with confidence (see Chapter 5 on overallocation and Chapter 10 on adjustment).

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### ■ Recommendation 9.1

The Commission recommends that all jurisdictions (including the Commonwealth) clarify the specific processes that will be used in implementing risk assignment provisions. Jurisdictions should develop and implement communication strategies and disseminate easily accessible written guidance covering all elements of the risk assignment framework, including case study examples of how risk assignment would apply under various circumstances.

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# 10

## Structural adjustment and water reform



## 10.1 Overview

Structural adjustment is the continuing process of change in the size, composition and characteristics of industries, which occurs naturally in response to a range of market, technological and environmental factors, as well as in response to government policy reforms. Adjustment should be seen as a necessary and positive phenomenon bringing opportunities for innovation and improved productivity.

Successful adjustment is necessary for successful water reform. For that reason governments should pay attention to the pressures and processes of adjustment. However this does not mean that special adjustment programs are either necessary or desirable. On the contrary, too many supposedly pro-adjustment programs and policies have, in the past, delayed, distorted or derailed adjustment processes—to the long-run cost of the communities involved.

Across much of Australia, and in particular in the MDB, future reductions in water availability, combined with other factors such as commodity prices, exchange rates and social trends, will contribute to ongoing adjustment in the irrigation sector and irrigation-dependent communities. The reductions in water availability for irrigation in the MDB are expected to result from a combination of factors including drought, climate change and establishing sustainable diversion limits for surface and groundwater systems. For broad planning purposes, it is important to understand that these reductions are likely to be very significant. While irrigation industries and communities have been responding to the many and varied forces of change for decades, reduced water availability will add to these pressures.

Water reforms outlined in the NWI aim for more environmentally, economically and socially sustainable water management. Water markets play a critical role in this transition to sustainability by giving entitlement holders the opportunity to make their own adjustment, investment and production decisions. By removing barriers to trade and other policies which otherwise impede the natural and continuing process of adjustment, governments can facilitate this necessary and positive process. Water trade and environmental water purchase programs should be allowed to proceed in a timely, agreed and coordinated way, unencumbered by artificial trade barriers. At a time of drought and declining market conditions, irrigators need more options and flexibility rather than less.

Success in this area would see the following outcomes:

1. There will be **no artificial barriers or impediments** to the ability of well-designed and fully functioning water **markets to facilitate efficient adjustment** of individual water access entitlement holders.
2. Where governments believe there might be a case for intervention to manage broader community and indirect impacts of adjustment, the merits of the case and the design of suitable measures will be **rigorously screened through a consistent framework that aims to minimise distortions to other policy objectives and the natural process of autonomous adjustment**.
3. Water policy, water reform and water programs will be **clearly articulated and signalled** in advance to give irrigation industries and communities confidence and time to adjust.
4. Adjustment processes and the specific communities and industries under most adjustment pressure **will be well understood** through monitoring, assessment, and effective communication.

This chapter assesses performance in addressing the NWI objective of addressing future adjustment issues that may impact on water users and communities (NWI clause 23(ix)). The assessment focuses mainly on the irrigation sector in the MDB, where the Commission considers that adjustment challenges will be most significant. It is expected that many of the lessons highlighted in this chapter will also be relevant to other regions, particularly as a result of the impacts of climate change on water resource availability and global agriculture more generally.

In summary, the Commission has found that measures to address concerns about the localised community impacts of adjustment are too frequently given effect by means of state government restrictions to water trading, thereby undermining the ability of water markets to facilitate adjustment by individual irrigators. This causes confusion, distorts smooth adjustment, adds unnecessary cost, and undermines confidence in water management across Australia.

In the Commission's view, maintaining an open attitude to continuing structural adjustment is essential to successful water reform. However, this does not mean that additional financial assistance is either warranted or beneficial. In fact, governments can impede the natural process of adjustment when they try to slow down the process or influence the outcomes, so a considered approach is required.

<b>Finding 10.1</b>	Water-dependent communities have been dealing with adjustment pressures for many years as a consequence of changes in commodity prices, exchange rates and social trends. The combination of future expectations of reduced total water availability, and the national imperative to provide a greater share of the available water for the environment, particularly in the MDB, means that the irrigation sector faces significant additional adjustment pressures in the years ahead. For example, the Commission estimates that in the order of 30% less water could be available for irrigated agriculture in northern Victoria in the years ahead. <sup>33</sup>
<b>Recommendation 10.1</b>	Acknowledging the Commonwealth's valuable work to date through the CSIRO, the Commission recommends further work outside the MDB to quantify and localise the extent of changes to future water availability for consumptive use as a result of climate change and efforts to move to sustainable levels of extraction, as is currently being done for the development of the new Basin Plan within the MDB. The findings of work on the impacts of climate change should be progressively refined and updated as guidance for necessary adjustment decisions by farmers, families and communities.
<b>Finding 10.2</b>	Water markets play a critical role in facilitating structural adjustment by providing entitlement holders with flexible opportunities to make their own business adjustment decisions. Artificial barriers to water trade impede flexible adjustment decisions by individual entitlement holders. Barriers to water trade have also hindered efforts to address overallocation, and facilitate adjustment, through the Commonwealth buyback program. Such purchases assist adjustment by reducing the gap between current diversion levels and new lower sustainable diversion limits that can be anticipated in the new Basin Plan.
<b>Recommendation 10.2</b>	The Commission recommends that all artificial barriers to inter-regional/inter-district trade be removed in a coordinated manner. In parallel, the Commission recommends that communication efforts continue to be made to improve the transparency of the Commonwealth buybacks and their links with the transition to sustainable diversion limits under the new Basin Plan, so building community understanding and support and enabling more informed decision making by entitlement holders. For example, the Commission recommends that the Murray–Darling Basin Authority progressively issue guidance on the way that environmental objectives are likely to be pursued, locally and across the MDB (see Recommendations 7.1 and 4.3).
<b>Finding 10.3</b>	Water trade and environmental purchase programs can facilitate the necessary and positive process of adjustment as a consequence of shifts in irrigation water availability. Entitlement holders receive direct financial returns from their sales. However, sales of entitlements do not provide direct financial resources to non-entitlement holders (such as local businesses). While non-irrigators may benefit indirectly from the sale of entitlements, the distribution of those benefits through communities will vary. This does not mean that effective buybacks or water trade should be delayed or constrained in any way, or that separate financial assistance is warranted.
<b>Finding 10.4</b>	A variety of national, state and region-specific additional structural adjustment measures are in place across rural Australia. There is a risk that they may be uncoordinated, ineffective and/or counter-productive, particularly where they attempt to artificially constrain adjustment.
<b>Recommendation 10.3</b>	Governments should consider the adjustment implications of their policies and programs, with the aim of ensuring that distortions are minimised wherever possible. The Commission considers that where governments are concerned about the outcomes of adjustment processes, the merits of the case for any intervention, and the design of any measures, should be rigorously screened through a consistent framework to ensure that they do not impede the outcomes of reforms.

<sup>33</sup> The Commission stresses that this estimate is intended to be indicative only, and that to obtain an accurate estimate a much more rigorous analysis would be required. As discussed in detail in section 10.2.2, a number of caveats apply and various simplifying assumptions were made. Importantly, this figure is not an estimate of the reductions that might eventuate as a result of the new Basin Plan, which will aim to address past overallocation as well as the impacts of climate change.

<b>Finding 10.5</b>	There is evidence of a great deal of uncertainty in the community in regard to the implications of further water reform for Australia's irrigation sector. Businesses, investors and communities have submitted to the Commission that they need to be fully informed about the future direction, priorities and timing of water reform. They argue that reform processes will be important factors to be taken into account in their long-term decision making. The Commission acknowledges that the Commonwealth is making considerable efforts to provide such information and to develop new consultative mechanisms for a two-way flow of information.
<b>Finding 10.6</b>	Water users and irrigation-dependent communities have argued that they require a clearer articulation of government intentions with respect to water buyback programs and the management of environmental water.
<b>Finding 10.7</b>	There is a risk of overinvestment in infrastructure system renewal if the likely extent of future structural adjustment is not adequately recognised. Careful attention should be given to the potential synergies and conflicts between the Commonwealth buyback and infrastructure renewal programs and their appropriate sequencing. This is not an argument for delay in buybacks. On the contrary, the Commission considers that progress with buybacks will improve clarity about longer term levels of water availability, thus enabling more cost-effective infrastructure investments.
<b>Finding 10.8</b>	Diverging environmental purchase programs from the most cost-effective water purchasing strategy by offering price premiums for water entitlements in targeted areas prior to investments in irrigation system renewal, or only allowing purchases from such targeted areas, is unlikely to be effective in practice and risks distorting water market outcomes. If environmental purchasers pay above the market price, less water will be recovered for the environment.
<b>Recommendation 10.4</b>	<p>The Commission recognises that there are opportunities now available to minimise the risk of over-investment in irrigation renewals and accelerate buyback in particular areas in ways that do not distort the water market in the same way that paying a premium price for environmental purchases, or other conditions, might.</p> <p>For example, individuals or groups of irrigators could be encouraged to cease, reduce or alter access to irrigation infrastructure prior to renewal, thus reducing costs and increasing water savings. The same irrigators might then choose to sell some or all of their entitlements to the Commonwealth, at market price.</p> <p>There are a number of other instruments currently operating at regional scales that might also encourage efficient and sustainable outcomes, including:</p> <ul style="list-style-type: none"> <li>– salinity credits and impact zones such as are already in operation in the Sunraysia region to provide financial incentives to reduce irrigation in high-impact areas</li> <li>– other price or market-based instruments for environmental outcomes (e.g. the Victorian Bushtender/Ecotender program).</li> </ul> <p>Within the Basin in the context of the Water for the Future Irrigator-led Group Proposals program, further consideration should be given to the feasibility of expanding or tailoring the use of these instruments in this context.</p>
<b>Finding 10.9</b>	Despite considerable recent and valuable work to improve understanding of structural adjustment, the Commission considers that there is insufficient understanding of the processes and causes of structural adjustment and a paucity of data at the necessary spatial and temporal scales to enable effective monitoring of adjustment. The Commission is concerned about this lack of understanding, as the success of the overall national water reform process will ultimately depend on how well the adjustment process proceeds in irrigation-dependent communities.
<b>Recommendation 10.5</b>	The Commission supports further efforts to improve understanding of structural adjustment. Addressing current deficiencies in the availability of data to monitor and assess adjustment, including separating out the relative importance of water reform from other factors driving change, is required.

## 10.2 Context for this assessment

### Background: Terminology and relevant NWI clauses

Clause 23(ix) commits NWI parties to 'addressing future adjustment issues that may impact on water users and communities'.

Structural adjustment is the ongoing process of change in the size, composition and characteristics of industries and their workforces across all sectors of a national or regional economy (Productivity Commission 2001). Structural adjustment occurs naturally in response to a range of market, technological and environmental factors, as well as in response to government policy reforms.

Structural adjustment should be seen as a necessary and positive phenomenon bringing opportunities for innovation and development. In fact, the economic performance and productivity of the Australian economy and the health and prosperity of all Australians relies on responding effectively to continually changing circumstances. However, while the economy as a whole benefits in the long term from smooth adjustment, the Commission recognises that the process of change can be difficult and costly for some individuals and communities.

Australia's irrigation farm businesses, industries and communities have been adjusting constantly and extremely successfully to a range of interrelated factors over many decades, including:

- + seasonal water availability
- + technological development
- + demographic and social change
- + increasing community concerns in relation to environmental sustainability
- + market fluctuations in input costs, commodity prices, the exchange rate and interest rates
- + government policies.

Over the past decade, in particular, the composition of output from the irrigation sector has been dramatically affected by ongoing drought and fluctuating global market conditions. Market forces will continue to be of paramount importance in determining the viability of different irrigation-reliant activities.

In the coming decade and beyond, best available evidence suggests that significant further adjustment within the irrigation sector is likely to occur as the irrigation sector in much of Australia is confronted with significantly less water available for productive use.

Key factors affecting the future availability of water for irrigation, particularly in the MDB, are:

- + **Prolonged drought:** even with good rains, catchments are dry and storages low, so the outlook for higher water allocations in the immediate future is poor.
- + **The impact of climate change on water resources:** while it is known that climate change is occurring, the exact impacts on water resources are difficult to predict. However, best current projections suggest reduced water availability, especially in the southern MDB.
- + **The need to address overallocation and overuse:** ensuring the sustainability of nationally and internationally important environmental assets in the MDB, such as the Coorong, the Lower Lakes and river red gum forests, is a critical national public policy objective.

A range of government initiatives has been established to address these challenges and help communities in the Murray–Darling Basin cope with these adjustment pressures. For example, water markets and trading reforms are enabling adjustment and have assisted existing industries to manage change, including prolonged drought. In addition, the Australian Government's Water for the Future program seeks to facilitate adjustment. It includes:

- + the Commonwealth's \$3.1 billion Restoring the Balance in the Murray–Darling Basin water entitlement purchasing program (to purchase water from willing sellers)
- + significant investment in regional communities through the environmental water purchases program and the \$5.8 billion Sustainable Rural Water Use and Infrastructure Program
- + agreement to develop a new Basin Plan and a sustainable diversion limit on total MDB extractions (see Chapter 1).

It is also important to note that a number of other state and Commonwealth policies, such as drought relief policies, also have an effect on adjustment outcomes.

## 10.2.1 Understanding the adjustment impacts of buyback programs

By purchasing entitlements from willing sellers, the water buyback program provides water entitlement holders with significant financial capacity, which helps facilitate adjustment. Such financial assistance may be absent in a scenario where allocations to entitlements are otherwise reduced through conventional planning mechanisms (depending on the application of any risk assignment framework—see Chapter 9). As stated in information provided to the Commission by the Commonwealth:

*The Australian Government's \$3.1 billion water buyback program (Restoring the Balance in the Murray–Darling Basin) provides direct benefits to irrigators, paying market prices to willing sellers for the water they offer for sale. It is a focused form of adjustment, which at the same time is helping to restore the health of the river system. Selling water entitlements enables individual businesses to adjust to new water sharing arrangements on their own terms, with the buyback program providing an additional selling option for irrigators and access to a potential capital injection to facilitate adjustment to lower water availability and drought.*

The Commission supports this statement noting that buybacks and market reforms provide important opportunities to improve the prospects of individual irrigators and that viable irrigators are essential to sustainable irrigation communities. Similarly, over the long term, buybacks will yield important environmental benefits. Buybacks are thus a key pathway to both economic and environmental sustainability.

However, the buyback program does not provide direct financial assistance to non-entitlement holders in irrigation-dependent communities (for example, suppliers of inputs to irrigated agriculture, or others dependent on local and regional economic activity). Non-irrigators and communities may benefit indirectly from the proceeds of entitlement sales, but the distribution of those benefits throughout the local business community will shift (for example, from irrigation equipment suppliers to other local businesses).

## 10.2.2 Understanding the magnitude of the reductions in water availability for consumptive use

The potential magnitude of adjustment required as a result of factors affecting water availability for consumptive use is significant. While the Commission is not in a position to make a definitive statement on the quantum of future changes to water availability, the Commission considers it important to draw attention to the potential significance of those changes by way of the following illustrative example. The example considers the cumulative impacts on future water availability of expected buybacks of entitlements as well as the projected impacts of climate change.

In northern Victoria, the long-term (1891–92 through 2006–07) average of water diversions for consumptive use is approximately 1,700 GL in the River Murray and 1,640 GL in the Goulburn River system, giving a total of 3,340 GL (DSE 2008). The Victorian Government has recently announced an agreement with the Commonwealth under which the Commonwealth would acquire at least 460 GL of entitlements from the Victorian MDB over the next five years. This includes up to 300 GL that will be exempt from Victoria's 4% annual limit on inter-district trade if purchased from irrigators in designated areas, plus at least 160 GL available through standard market purchases (Premier of Victoria 2009).

Combined with the potential impacts of climate change, the reduction in water availability for irrigation in northern Victoria is significant. The CSIRO Sustainable Yields Study (2008, page 5) found that:

*The impacts of climate change by 2030 are uncertain; however, surface water availability across the entire MDB is more likely to decline than to increase. A decline in the south of the MDB is more likely than in the north. In the south of the MDB, a very substantial decline is possible. In the north of the MDB, significant increases are possible. The median decline for the entire MDB is 11 per cent—9 per cent in the north of the MDB and 13 per cent in the south of the MDB ...*

*The median water availability decline would reduce total surface water use by 4 per cent under current water sharing arrangements but would further reduce flow at the Murray mouth by 24 per cent to be 30 per cent of the total without-development outflow. In volumetric terms, the majority of the impact of climate change would be borne by the environment rather than by consumptive water users.*

*The relative impact of climate change on surface water use would be much greater in dry years. Under the median 2030 climate, diversions in driest years would fall by more than 10 per cent in most New South Wales regions, around 20 per cent in the Murrumbidgee and Murray regions and from around 35 to over 50 per cent in the Victorian regions ...*

While, as noted in the extract above, the impacts of a reduction in average surface water availability are likely to be borne disproportionately by the environment rather than by consumptive users, this is under *current* water sharing arrangements. It is expected that under *future* water sharing arrangements, reductions in surface water availability will be borne more equally by the environment and consumptive users.

If it is assumed that such future water sharing arrangements are implemented, then a 13% reduction in average surface water availability could result in a 13% reduction in water available for irrigated agriculture. The combined impact of buyback and climate change on

long-term average surface water available for irrigation in northern Victoria might be in the order of 900 GL or approximately 27%.<sup>34</sup> Furthermore, irrigators would need to take into account not only the *average* reduction but also the potential for much more significant reductions in dry years.

The Commission stresses that the above figures are intended to be indicative only, and that to obtain an accurate estimate a much more rigorous analysis would be required. However, even if the exact figures remain uncertain, it is clear that the extent of adjustment as a result of reduced water availability is significant. Irrigators will need to adapt to significantly less water and increasing climate variability. The above figures are not an estimate of the reductions that might eventuate as a result of the new Basin Plan, which will aim to address past overallocation as well as the impacts of climate change.

Of course, a 27% reduction in available water does not mean a 27% reduction in gross economic product—particularly where water trading can flexibly reallocate available water. In economic terms, it is important to consider the alternative use (for example, a production shift to more water-efficient cropping or a shift to dryland agricultural production instead of irrigated agriculture). Government programs to improve irrigation efficiency will also reduce the impacts of reduced water availability.

Nevertheless, there is no doubt that the impacts on some local and regional economies are likely to be significant. In this context, it is important to note that the local and regional effects would be much worse if overallocation and climate change were to be addressed without the financial resources provided by the buyback program. The buyback program will deliver economic as well as environmental benefits during the transition to sustainable diversion limits.

The above analysis suggests that for broad indicative planning purposes, it may not be unreasonable to assume that in the order of 30% less water might be available for irrigated agriculture in northern Victoria in the years ahead. This is reflected in Finding 10.1 in section 10.3. The Commission notes in Recommendation 10.1 that further work will be undertaken as part of the new Basin Plan to quantify more precisely and locally the extent of changes to future water availability. Similar work on the impacts of climate change is required outside the MDB.

### 10.2.3 Adjustment under the NWI

In 2004, the NWI parties recognised that structural adjustment can have significant socioeconomic impacts on communities and that government policy can influence the rate and costs of adjustment. The Commission's 2007 Biennial Assessment and subsequent 2008 Update recommended that the agreed actions under the NWI be expanded to include the development of national principles for the design of adjustment programs, to guide governments' involvement in addressing adjustment issues in rural and regional areas (NWC 2007, 2008).

With a significant increase in adjustment pressure both now and into the future, this assessment seeks to highlight the public policy response to adjustment pressures. While the discussion focuses on the irrigation sector in the MDB, it is recognised that climate change and global economic factors could also have a significant impact on other water-dependent regions, industries and local communities across Australia.

## 10.3 The Commission's assessment and findings

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### ■ Finding 10.1

Water-dependent communities have been dealing with adjustment pressures for many years as a consequence of changes in commodity prices, exchange rates and social trends. The combination of future expectations of reduced total water availability, and the national imperative to provide a greater share of the available water for the environment, particularly in the MDB, means that the irrigation sector faces significant additional adjustment pressures in the years ahead. For example, the Commission estimates that in the order of 30% less water could be available for irrigated agriculture in northern Victoria in the years ahead.

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### ■ Recommendation 10.1

Acknowledging the Commonwealth's valuable work to date through the CSIRO, the Commission recommends further work outside the MDB to quantify and localise the extent of changes to future water availability for consumptive use as a result of climate change and efforts to move to sustainable levels of extraction, as is currently being done for the development of the new Basin Plan within the MDB. The findings of work on the impacts of climate change should be progressively refined and updated as guidance for necessary adjustment decisions by farmers, families and communities.

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<sup>34</sup> Comprising a 460 GL reduction resulting from buyback of entitlements, plus a reduction of 13% of 3,340 GL, or approximately 440 GL.



### 10.3.1 Removal of water market impediments to adjustment

Water markets play a critical role in facilitating structural adjustment by individual irrigators by moving water from less profitable to more profitable uses. This results in greater productivity and output, thereby increasing the overall wealth of the nation in response to changing circumstances. Evidence presented in Chapter 8 demonstrates that water market and trading reforms agreed under the NWI provide flexibility for individual irrigators to manage risk, especially drought. For example, a Commission co-funded study by Frontier Economics et al (2007) on the economic and social impacts of trade in northern Victoria concluded that:

- + without trade, the dairy industry would have fared much worse than it did over the past 10 years of drought
- + in situations where dairy enterprises left the industry, permanent water trade enabled them to leave with more money in their pockets than they otherwise would have had
- + without trade, many horticultural enterprises in the Goulburn system would not have survived the extraordinarily low seasonal allocations.

At a broader level, Peterson et al (2004) found that water trading nearly halved the impact of a 20% reduction in water allocations on gross regional incomes, from -1.04% to -0.52%.

The Commission's view is that advances in water market reform are facilitating adjustment by irrigators in response to drought and other factors. *Allocation trade* has helped irrigators cope with recent seasonal water shortages, but ensuring the long-term viability of irrigated agriculture in the face of ongoing reductions in water availability requires longer term adaptation. For this, *entitlement trade* is just as important. As found in Chapter 8, more needs to be done to improve water trading arrangements, particularly in relation to barriers to entitlement trade. In effect, government-imposed barriers to trade are government-imposed barriers to adjustment, and thus threats to national water reform as a whole.

In particular, the removal of interdistrict trade limits is important not only in enabling autonomous structural adjustment, but in enabling market-based measures such as the Commonwealth's environmental water purchasing program to address overallocation neutrally and cost-effectively. This is because, when annual limits such as the 4% rule are reached, the pattern of water recovery and therefore adjustment will be distorted. It is also critical to recognise that buyback programs financially compensate willing sellers at a price they agree to, providing them with much-needed financial capacity to change their farm business operations.

The Commission acknowledges that the development of water markets has enabled or catalysed change that was not previously possible, and that this has in some cases caused concern and localised positive and negative social and economic impacts (for example, economic impacts on suppliers of inputs to irrigated agriculture and social impacts on the viability of small communities and the provision of community services). Such concerns were one of the reasons for the initial adoption of the 4% annual limit on interdistrict trade in entitlements agreed under the NWI, as a means of slowing the pace of adjustment. However, in the Commission's view, even if trade barriers are indirectly protecting some individuals in some communities, this is only delaying adjustment and comes at a significant cost, in both the short and the long term, to individual water users seeking their own adjustment opportunities (see also McColl and Young 2005). Recognition of those costs was an important reason for restricting the duration of the 4% limit in the NWI until it could be reviewed by NWI parties in 2009.

Victoria has very recently announced a bilateral agreement with the Commonwealth to maintain the 4% rule. Under the agreement, and subject to a review of progress on the modernisation project, Victoria has agreed to begin to phase out the 4% cap on water entitlement trades from irrigation districts from July 2011, with a view to removing the cap entirely by 2014. The agreement allows exemptions to the 4% limit to enable the buyback program to purchase at least 300 GL of water entitlements over and above the 4% limit over the next five years, subject to those purchases occurring in targeted regions associated with the irrigation renewal program. While recognising this as progress—of a sort—in a difficult matter, the Commission is disappointed that the 4% rule will continue to inhibit autonomous adjustment by individual irrigators. The details of this agreement and how it is implemented will also be important in determining adjustment outcomes, as well as the cost-effectiveness implications for the buyback program.

In short, it is the Commission's view that the water trade and the buyback processes should be allowed to proceed in a timely and unencumbered manner through the elimination of all artificial trade barriers. Distorting the market for water is very much a second-best policy.



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## ■ Finding 10.2

Water markets play a critical role in facilitating structural adjustment by providing entitlement holders with flexible opportunities to make their own business adjustment decisions. Artificial barriers to water trade impede flexible adjustment decisions by individual entitlement holders. Barriers to water trade have also hindered efforts to address overallocation, and facilitate adjustment, through the Commonwealth buyback program. Such purchases assist adjustment by reducing the gap between current diversion levels and new lower sustainable diversion limits that can be anticipated in the new Basin Plan.

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## ■ Recommendation 10.2

The Commission recommends that all artificial barriers to inter-regional/inter-district trade be removed in a coordinated manner. In parallel, the Commission recommends that communication efforts continue to be made to improve the transparency of the Commonwealth buybacks and their links with the transition to sustainable diversion limits under the new Basin Plan, so building community understanding and support and enabling more informed decision making by entitlement holders. For example, the Commission recommends that the Murray–Darling Basin Authority progressively issue guidance on the way that environmental objectives are likely to be pursued, locally and across the MDB (see Recommendations 7.1 and 4.3).

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### 10.3.2 Assessing the case for adjustment assistance

#### Background: Terminology and relevant NWI clauses

Clause 97(ii) of the NWI commits the Commonwealth to discussing assistance to affected regions on a case-by-case basis with NWI parties, noting that the Australian Government reserves the right to initiate projects on its own behalf.

As stated above, the irrigation and rural sector has demonstrated considerable capacity to adapt to economic pressures by altering operations to improve productivity and maintain profitability over many decades. However, the Commission recognises the justifiable community concerns about the social impact of adjustment catalysed by water trade out of local regions, particularly in communities that are heavily dependent on irrigated agriculture.

Given the demonstrable benefits of water trade, instead of inhibiting or distorting water trade or slowing down critical water reform and the protection of nationally and internationally important environmental assets, the Commission recommends that a consistent and transparent approach be adopted to rigorously screen claims for additional structural adjustment assistance measures to manage the localised impacts of change.

In considering adjustment issues, the Commission believes that it is important to:

- + clearly define the role of government in the adjustment process so that it does not distort autonomous adjustment by individuals
- + understand the counterproductive impacts of utilising water trade barriers to manage broader community adjustment issues
- + determine when and where additional adjustment assistance may be warranted (and, importantly, when it is not)
- + subject to the above, determine which adjustment assistance measures might be most appropriate
- + determine how they can be designed and implemented effectively and tailored to particular circumstances in particular regions, if indeed there is a case for intervention.

The Commission considers that much can be learnt from experience in other industries experiencing significant structural adjustment (see Productivity Commission 2001) and from existing reviews of rural assistance programs (see McColl and Young 2005). Previous adjustment assistance has been argued on the basis of addressing equity concerns, expediting structural adjustment and reducing the costs of adjustment. However, in the rural sector and in many other industries, government adjustment assistance has often created additional uncertainty, distorted market outcomes, rewarded those who do not require assistance, and deferred important decisions (see McColl and Young 2005). Therefore, while the process of adjustment is clearly an important issue facing the water reform agenda, that does not mean that providing additional adjustment assistance, particularly financial assistance, is good policy.

For its part, the Commission has identified a number of Commonwealth and state adjustment assistance measures which may influence the process of structural change in the MDB and has found that:

- + some programs are targeted at particular issues, while others are much broader rural assistance measures
- + programs include financial and non-financial measures (or a mix of both).

As an example of a targeted non-financial measure, South Australian Government agencies in collaboration with local governments are currently working to better align land-use planning policies and regulations to better facilitate industry and community adjustment. Financial measures have also been used in South Australia as part of the infrastructure rehabilitation program in the Lower Lakes and in New South Wales in addressing overallocated groundwater systems. The Commonwealth's Small Block Irrigators Exit Grant Package is another example of adjustment assistance employing a mix of targeted financial incentives (see Box 50).

#### **Box 50: The Commonwealth Small Block Irrigators Exit Grant Package**

The Small Block Irrigators Exit Grant Package is focused on agricultural producers seeking to sell their entitlements and cease irrigation in the MDB. Recent changes increased the maximum eligible farm size from 15 to 40 hectares. The program includes a taxable exit grant of up to \$150,000; up to \$10,000 for advice and training, including skill development, direction setting, succession planning and business advice; and up to \$20,000 for removal of permanent plantings and infrastructure related to irrigated production.

The Commission is concerned that there is a risk that the growing number of small programs might send contradictory signals to landholders, as some programs are aimed at facilitating change, while others appear to attempt to resist or delay change. For example, the Commission is concerned that subsidising infrastructure renewals and access, such as Victoria's approach of paying users' fixed access fees in times of low allocations, is an inappropriate long-term strategy, as it moves away from efficient price signals and provides a disincentive for private agents to manage risk appropriately (see further discussion below). In addition, where adjustment programs differ across jurisdictions (particularly within the MDB), they could distort the pattern of adjustment that would occur under a more consistent and coordinated approach.

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#### **■ Finding 10.3**

Water trade and environmental purchase programs can facilitate the necessary and positive process of adjustment as a consequence of shifts in irrigation water availability. Entitlement holders receive direct financial returns from their sales. However, sales of entitlements do not provide direct financial resources to non-entitlement holders (such as local businesses). While non-irrigators may benefit indirectly from the sale of entitlements, the distribution of those benefits through communities will vary. This does not mean that effective buybacks or water trade should be delayed or constrained in any way, or that separate financial assistance is warranted.

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#### **■ Finding 10.4**

A variety of national, state and region-specific additional structural adjustment measures are in place across rural Australia. There is a risk that they may be uncoordinated, ineffective and/or counterproductive, particularly where they attempt to artificially constrain adjustment.

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#### **■ Recommendation 10.3**

Governments should consider the adjustment implications of their policies and programs, with the aim of ensuring that distortions are minimised wherever possible. The Commission considers that where governments are concerned about the outcomes of adjustment processes, the merits of the case for any intervention, and the design of any measures, should be rigorously screened through a consistent framework to ensure that they do not impede the outcomes of reforms.

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### 10.3.3 Providing certainty and confidence through clear and coordinated water policy

#### Background: Terminology and relevant NWI clauses

Clause 5 of the NWI states that it is the objective of the parties to 'provide greater certainty for investment and the environment, and underpin the capacity of Australia's water management regimes to deal with change responsively and fairly'.

#### 10.3.3.1 Providing certainty about the water reform agenda

#### Background: Terminology and relevant NWI clauses

Clause 93 of the NWI relates to outcomes required in relation to community partnerships and adjustment. It states that 'parties agree that the outcome is to engage water users and other stakeholders in achieving the objectives of this Agreement by: (i) improving certainty and building confidence in reform processes; (ii) transparency in decision making; and (iii) ensuring sound information is available to all sectors at key decision points.'

The Commission considers that the NWI continues to provide the blueprint for water reform and that implementation of the NWI in a clear, coordinated and purposeful manner provides the irrigation sector with its best chance of successfully making the transition to a sustainable future with less water available. However, in the Commission's view, there is a great deal of uncertainty in the community as to what water reform may mean for Australia's irrigation sector in the future. There is a risk that lack of clarity about the intentions of governments with respect to water reform may stifle investment and adjustment in some irrigation-dependent regions.<sup>35</sup>

To build greater levels of confidence, the Commission considers that individuals and communities should continue to be engaged in water planning processes. Governments' policy and investment decisions would thus become better informed by local knowledge. For example, water service providers and irrigators are well placed to advise governments on priorities in infrastructure refurbishment, provided that they are required to pay the costs of the refurbishment. Environment Victoria (2009) notes in its submission that:

*Through the Torrumbarry Reconfiguration & Asset Modernisation Strategy (TRAMS), Goulburn Murray Water has developed a strategy for redesigning the Torrumbarry Irrigation Area in northern Victoria with a view to retaining irrigation in the future but in a more targeted way than at present ... TRAMS shows how communities can plan for large scale change from the bottom up if given the appropriate information and the opportunity to do so.*

Moreover, deliberate, transparent information and consultation strategies can ensure that the confidence of water users and communities in the water reform process is maintained. As the National Farmers Federation (NFF 2009) notes in its submission:

*practical implementation of the reforms will only succeed if water users and their communities have some involvement and ownership of the reforms.*

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#### ■ Finding 10.5

There is evidence of a great deal of uncertainty in the community in regard to the implications of further water reform for Australia's irrigation sector. Businesses, investors and communities have submitted to the Commission that they need to be fully informed about the future direction, priorities and timing of water reform. They argue that reform processes will be important factors to be taken into account in their long-term decision making. The Commission acknowledges that the Commonwealth is making considerable efforts to provide such information and to develop new consultative mechanisms for a two-way flow of information.

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<sup>35</sup> As described, for example, in 'Water buybacks dampen rural investment', Australian Financial Review, page 8, Tuesday 4 August 2009

### 10.3.3.2 Providing clarity and improving confidence in policies to move towards sustainable levels of extraction

The Commission is firmly of the view that overallocation has been, and remains, the fundamental national water policy challenge, and that there is little evidence to suggest that it has yet been adequately addressed (see Chapter 5). However the Commission recognises the significant breakthroughs associated with the 2008 MDB IGA and the Commonwealth *Water Act 2007* and the important role of recovering water for the environment. The Commission recognises that a key part of the Commonwealth's focus in relation to both buyback and investment in irrigation system renewals has been to facilitate a smoother transition now, in anticipation of the new Basin Plan and the expected requirement to move to a lower sustainable diversion limit in the near future. This strategy has benefits for the environment and for communities in both the short and the long term.

However, uncertainty surrounding the adjustment implications of buyback programs is a challenge for the water reform agenda (as also discussed in chapter 4). Several submissions suggested that some irrigation-dependent communities and industries are uncertain as to how much water governments are attempting to recover through water buyback programs and over what timeframe that recovery is likely to occur. For example, the submission by Goulburn–Murray Water stated:

*The widely held perception is that there has been minimal discussion between government, community or industry about the volume of entitlements sought and the time frame over which water would be recovered—especially before decisions are made.*

The NFF noted in its submission (NFF 2009, page 7) that, in relation to water buybacks:

*the Federal Government in particular, is highly reluctant to engage with stakeholders unless the Minister authorises the information for public release. Again, this information tends to be very general and non-specific.*

The submission by the Queensland Farmers' Federation also called for 'full and effective community and industry engagement' to ensure that water buyback programs are delivered successfully. The submission (QFF 2009, page 14) also noted that:

*The future development and well being of rural communities must also be addressed in the planning and implementation of the buyback program. Action must be taken to improve the resilience of communities and industries based upon adequate analysis of the impacts of the buyback program.*

Most recently, the New South Wales Government's response to the Commonwealth's recent \$303 million purchase of 240 GL of water entitlements from the Twynam Agricultural Group, which operates eight properties on the Lachlan, Macquarie, Murrumbidgee and Gwydir rivers in New South Wales, highlighted adjustment concerns. Immediately following the Commonwealth announcement of the purchase in May 2009, the New South Wales Minister for Water responded that 'NSW will act swiftly to balance water buyback across Murray–Darling Basin states, including an embargo on future trades of environmental water until a better balance can be struck ...' (Costa 2009).

This reaction highlights:

- + uncertainty associated with the buyback program
- + debate over the equitable distribution of purchases across the MDB
- + concerns about the adjustment impacts
- + barriers to water trade being used by states to attempt to constrain adjustment.

The Commission recognises that the Commonwealth established the Water Recovery and Environmental Use Stakeholder Reference Panel to provide input to the review of its 2007–08 water purchasing program, and that a new panel established on 16 June 2009 will provide ongoing input into the *Restoring the Balance in the Murray–Darling Basin* program. The panel members represent a broad cross-section of Murray–Darling Basin stakeholders including irrigators, environmentalists, water experts and the general community. The panel will facilitate the mutual exchange of information on the water recovery program and provide a forum for consultation and open discussion. In particular, the panel will:

- + Consider arrangements for the water purchase mechanisms developed under the *Restoring the Balance in the Murray–Darling Basin* program. This will include the socioeconomic impact of water purchasing and the environmental benefits of water purchases and how best to disseminate information on the program to the public.
- + Provide stakeholder views on the proposed arrangements for managing the water entitlements that the Australian Government buys for the environment (Australian Government 2009).

The Commission stresses the importance of the panel and its work, noting that stakeholders consulted in the preparation of this assessment are seeking clear articulation of the Australian Government's intentions with respect to water recovery programs and plans for the management of environmental water, how they complement the shift towards the new sustainable diversion limits, and how they may affect the security of entitlements, adjustment and risk assignment under the Basin Plan.

The Commission encourages further efforts to provide this type of clarification, including through the stakeholder panels. Outlining this vision does not require the revealing of sensitive market information, but it will be important to provide a clearer idea of the timing and magnitude of the buyback, and confidence to stakeholders that the entitlement mix being pursued contributes to environmental outcomes cost-effectively.

In this regard, the Commission also supports the announcement of a Productivity Commission review into alternative market mechanisms that the Commonwealth could use to diversify its purchase of water entitlements in the Murray–Darling Basin. However, given the urgency of this matter, that review should not be used to defer action in the short term to remedy stakeholder concerns.

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#### ■ Finding 10.6

Water users and irrigation-dependent communities have argued that they require a clearer articulation of government intentions with respect to water buyback programs and the management of environmental water.

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### 10.3.3.3 Adjustment impacts of irrigation renewal and development

#### Irrigation infrastructure renewal projects

The Commonwealth's Sustainable Rural Water Use and Infrastructure Program has committed to expenditure of \$5.8 billion on investments aimed at upgrading irrigation systems. The states are also investing in similar projects, such as the Northern Victoria Irrigation Renewal Project, for which the Victorian Government has announced Stage 1 funding of \$1 billion.

However, there has been debate about the merits of these investments, including in relation to the rationale for government investment, the recovery of ongoing costs associated with gifted assets, and the basis for the calculations of water savings and performance under low-inflow scenarios. There have also been questions about whether particular projects adequately consider the likely extent of adjustment, given the potential impacts of climate change on water availability.

Cox and Warner (2009, page 3) state:

*The proposal to spend \$6 billion over 10 years 'investing in key rural water projects that save water by upgrading outdated, leaky irrigation systems' would seem to be unnecessary if we were confident that water trading would result in the correct market price for water. Individual irrigators or groups of irrigators would then find it worthwhile to make much of this investment themselves. Indeed, we would argue that irrigators are likely to make better investment decisions using their own money and based on market criteria than political or administrative decision-makers who typically have little knowledge and spend public money. There is evidence of much private investment to improve water use efficiency in recent years.*

In highlighting concerns about the policy basis for investments in technical water use efficiency, the submission by Crase et al (2009, page 1) states that:

*We also have serious reservations about the on-going liabilities of water use efficiency projects. It would appear that the public investments in communal irrigation infrastructure cannot be included as part of the price determinations undertaken by economic regulators. The consequence of these arrangements could be that insufficient revenue is collected from water users to cover the replacement of those assets. Moreover, our understanding is that much of this infrastructure—like flume gates—has a considerably shorter life span than more rudimentary technologies. This may well result in additional calls on the public purse in the short and medium term to replace irrigation assets (yet again).*

The Commission is concerned about the matters discussed above, particularly in the current circumstances in which there is significant uncertainty about the viability of many farm enterprises due to high debt levels as a result of ongoing drought, and poor commodity prices in key industries such as dairy and wine.

In addition, there are a number of associated policy uncertainties that are impeding irrigators' decision-making. As well as insufficient information about the future cost of irrigation delivery services after system renewal, there is only limited detail in relation to the cost-sharing arrangements and implementation timetable for the National Framework for Non-Urban Water Metering (see Section 3.3.4). While the jurisdictions are working on these matters, progress has been slow and this is impeding necessary and desirable adjustment, as irrigators are not able to make fully informed adjustment decisions. It is important that such information gaps do not become a pretext for delays in decision making.

The Commission notes that the Commonwealth is required to undertake due diligence assessments prior to funding of any infrastructure project under the Sustainable Rural Water Use and Infrastructure Program, and urges the Commonwealth to develop and implement a robust assessment methodology and to publish the results. The Commission supports adopting the principles in Box 51.

#### **Box 51: NWC principles for pricing treatment of government subsidies for investment in irrigation assets**

In the Commission's view, principles for government subsidies of irrigation assets should aim to ensure the following:

- Government contributions to investments are proportionate to the value of the public benefits produced by the investments, and the public benefits are clearly and transparently estimated.
- In instances where government provides capital funding for investments that produce private benefits, the full costs (including a return on capital) are recovered from the beneficiaries over the life of the project using consistent methods.
- Water users should be fully informed in regard to immediate and future implications for water charges and should be engaged in the decision-making process.

#### **New irrigation developments**

The Commission notes that new irrigation development is planned to commence in some areas of Australia, particularly in Tasmania, where an additional 250,000 megalitres per year of irrigation water has been earmarked to underpin projected growth in agriculture and to improve the resilience of the industry in the face of drought and climate change. This represents around a 50% increase on existing irrigation supplies.

Following on from the recently completed Meander Dam, the Tasmanian Government has committed \$80 million to progress large-scale irrigation development in the state. This funding, added to \$140 million committed by the Australian Government, means that key projects identified through the SMART Farming Water Initiative can now be progressed under the aegis of the Tasmanian Irrigation Development Board (Tasmanian Government 2009).

Based on advice by the Tasmanian Government, these initiatives have demonstrated some of the positive aspects of the principles outlined above by:

- + testing the economic viability and environmental sustainability of the projects transparently and independently, and requiring irrigators to pay for entitlements
- + ensuring that growers face the full ongoing costs of the projects.

Continued rigour in water planning and a principled approach to irrigation development will be essential to ensure that these developments do not repeat past mistakes of government-driven irrigation development in other parts of Australia. For example, given significant recent drops in commodity prices, including for irrigated agricultural products, care needs to be taken to ensure that governments are not artificially inducing oversupply of particular products.

#### **10.3.3.4 Coordination of buyback and irrigation renewal investments**

The Commission argues that careful attention should be given to the potential synergies and conflicts between the Commonwealth buyback program and investments in irrigation system renewal. Considering the extent of investment in these programs and given the likely extent of adjustment, their coordinated implementation is a critical success factor for the overall water reform agenda in the immediate future.

There is a perception among some stakeholders that rural water infrastructure refurbishment and water buyback programs are not being sequenced to optimise social, environmental and economic outcomes. In other words, there is a perceived risk that some of this investment will be wasted on unnecessary or 'white elephant' infrastructure projects at a time when all governments are focused on ensuring that expenditure on infrastructure improves national productivity in the long term.

The Commission notes that the Irrigation Modernisation Planning Assistance Program aims to help communities to coordinate the water purchasing and infrastructure investment programs (see Box 52).

#### **Box 52: Irrigation Modernisation Planning Assistance Program**

The Irrigation Modernisation Planning Assistance program provides funding of up to \$500,000 to irrigation water providers to develop modernisation plans for their districts. Modernisation plans outline how to achieve long-term improvements in irrigation water use efficiency, and assess options for adapting to a future with less water.

Under Round 1 of the program, grants totalling \$4.6 million were provided for 14 projects, which commenced in mid-2008. These projects are nearing completion. On 26 February 2009 the Australian Government announced that under Round 2, funding of \$604,000 would be provided to 5 projects. These projects will help irrigation water providers to obtain independent professional expertise and facilitate workshops to assist with modernisation planning.

Further funding will be made available to irrigation water providers through the Irrigation Modernisation Planning Assistance program. Revised guidelines are currently being finalised ahead of a call for further applications.

Source: DEWHA (2009)

It is the Commission's view that, wherever possible, it is important to allow the buyback program to run its course before investment in infrastructure renewal. As a minimum, the pattern of adjustment arising from the buyback program (in combination with climate change and market forces) should be carefully observed and included as guidance on where it might be more or less viable to invest in system renewals. This will help ensure that the investments in long-lived irrigation assets are 'right-sized', and will result in access fees that are affordable for remaining customers in the long term.

Where buyback and renewal must be implemented at the same time, the Commission considers that a risk minimising approach would be to undertake a phased implementation. For example, given that these infrastructure projects will go ahead, it may be possible to initially invest only in infrastructure that is highly likely to be required in the future (for example, main channels). Once this first phase of infrastructure is in place, much of the uncertainty surrounding any impacts of buybacks is likely to have been resolved. It would then be possible to invest in upgrading remaining infrastructure with more confidence that it will be required and viable into the long term.

South Australia's submission provides evidence of the effectiveness of this type of strategy (South Australian Government 2009):

*Adjustment across the Lower Murray Reclaimed Irrigation Areas was a precursor to infrastructure rehabilitation and a combination of exit packages and financial incentives was applied on a systematic basis. This process is now nearing completion and has seen a reduction of 20% in the area irrigated, with a consolidation and expansion of individual holdings.*

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#### **■ Finding 10.7**

There is a risk of overinvestment in infrastructure system renewal if the likely extent of future structural adjustment is not adequately recognised. Careful attention should be given to the potential synergies and conflicts between the Commonwealth buyback and infrastructure renewal programs and their appropriate sequencing. This is not an argument for delay in buybacks. On the contrary, the Commission considers that progress with buybacks will improve clarity about longer term levels of water availability, thus enabling more cost-effective infrastructure investments.

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While supporting a coordinated approach to buyback and infrastructure renewal, including the concept of group proposals for asset rationalisation, the Commission would not support proposals to alter the buyback program by targeting particular irrigation sub-districts or by offering price premiums in targeted areas. The Australian Bureau of Agricultural and Resource Economics (ABARE 2007) and others support the use of open market purchases and (to a lesser extent) broad-based auctions (tenders) to ensure cost effectiveness, efficiency and avoidance of strategic behaviour and information asymmetry in large-scale buyback programs. For its part, the Commission believes there are significant costs and risks of diverging significantly from an optimal mechanism for cost-effective buyback, namely:

- + reductions in the cost effectiveness of the buyback program (that is, less water will be procured for the environment)
- + water market distortions and strategic behaviour such as hold-out and collusion
- + failure to lock in expected benefits due to separation of water entitlements and delivery rights.



In relation to the last point, it is important to think about these issues in an unbundled market where irrigators can sell water without necessarily changing their demand for irrigation services. Unless otherwise controlled, under a targeted buyback scheme, an irrigator in a price premium or targeted zone might sell their entitlement to the Commonwealth, then purchase more water on the market in areas not subject to a price premium. Therefore, a targeted price premium approach potentially creates a persistent price distortion and actually provides an incentive for 'targeted' irrigators to buy more water from 'untargeted' irrigators and extract some profit before selling on to the Commonwealth buyback program. On the other hand, a targeted buyback approach that requires irrigators to sell their water entitlements and relinquish their infrastructure access rights would essentially amount to a rebundling of land and water in contravention of the NWI unbundling reforms and commitments to refrain from adding new barriers to trade.

Furthermore, if a government agency attempts to select 'viable areas' and then focuses buybacks elsewhere, there is a risk that the parameters used will be open to distortion. The Commission believes that there are no simple indicators (for example, region, farm size, soil type) that satisfactorily explains farm profitability and that there are profitable farmers in all districts at a range of farm scales. Individual irrigators and investors are better placed to make this assessment, rather than governments 'picking winners'. Finally, selecting 'viable' areas and focusing buyback elsewhere essentially amounts to trying to achieve multiple objectives with a single blunt instrument.

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#### ■ Finding 10.8

Diverging environmental purchase programs from the most cost-effective water purchasing strategy by offering price premiums for water entitlements in targeted areas prior to investments in irrigation system renewal, or only allowing purchases from such targeted areas, is unlikely to be effective in practice and risks distorting water market outcomes. If environmental purchasers pay above the market price, less water will be recovered for the environment.

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In developing a coordinated policy response, the Commission suggests that it is important to:

- + consider the objectives of each program and the extent to which they are aligned
- + develop specific instruments to achieve each specific objective
- + ensure that government actions and policies are coordinated and clearly communicated to irrigators, so that they can make informed and rational decisions
- + consider which public agencies are best placed to lead the development of the coordinated approach, and who is best placed to interact with irrigators.

The Commission recommends that governments consider adapting a range of instruments as outlined in the example in Box 53.

### Box 53: Mechanisms to facilitate adjustment prior to irrigation infrastructure renewal

In the context of the Water for the Future Irrigator-led Group Proposals Program, in order to facilitate and expedite adjustment, the Commission supports efforts to present irrigators with opportunities that are coordinated with the buyback program. The individual elements should be voluntary and should reflect the true costs of operating in specific areas and the full benefits of land and water use change. For example, the following separate instruments can provide incentives for beneficial outcomes prior to any irrigation infrastructure renewal:

- *Encouragement of asset rationalisation before system renewal.* Cost savings to be made from irrigation infrastructure renewal requirements (e.g. smaller channels, no new meters) could be used to encourage irrigators to participate in efficient asset rationalisation. These savings would vary depending on where an irrigator is in the system and whether individuals or groups of irrigators on particular channels agree to rationalisation prior to renewal.
- *Buyback of entitlements to improve environmental outcomes.* The buyback program or other buyer could purchase water entitlements at market price, using nondistorting mechanisms to achieve environmental objectives.
- *Expanding salinity impact zones and providing credits for land-use change.*<sup>a</sup> Salinity impact zones, such as those in the Victorian Sunraysia region, could be expanded and salinity credits could be provided to irrigators who shift to dryland farming and thus reduce accessions to groundwater and connected waterways. These benefits could be secured by linking incentives with changes in land and water use licence conditions.
- *Other price or market-based instruments for environmental outcomes.* It may be possible to leverage existing grants, financial instruments and markets aimed at encouraging land-use change. This might include programs aimed at native vegetation and biodiversity protection.

The potential for multiple beneficial outcomes increases where a particular irrigator is offered such opportunities in a coordinated manner prior to any system renewal. In the Commission's view, most of the necessary instruments already exist or can be readily refined, so there is no reason why such an approach could not achieve results quickly and effectively. The aim should be to facilitate the voluntary movement of some farmers out of intensive irrigation, while ensuring that those who remain are not left with an inefficient and unaffordable system.

<sup>a</sup> NSW noted in its response to the exposure draft of the Biennial assessment that: ... expansion of salinity impact zoning in the New South Wales, Victoria and South Australia Mallee has been under consideration by the jurisdictions through the Murray–Darling Basin Commission (now MDBA) Basin Salinity Management Strategy and Schedule B to the MDB IGA. Considerable difficulty in developing regional groundwater models is now being overcome, such that they can be used across the landscape to describe and map low to high salinity impact zones. While Victoria moved down this path some years back, South Australia and New South Wales are actively pursuing this work to enable assessment of new development proposals, ultimately resulting in the application of salinity zoning as a planning instrument.

### ■ Recommendation 10.4

The Commission recognises that there are opportunities now available to minimise the risk of over-investment in irrigation renewals and accelerate buyback in particular areas in ways that do not distort the water market in the same way that paying a premium price for environmental purchases, or other conditions, might.

For example, individuals or groups of irrigators could be encouraged to cease, reduce or alter access to irrigation infrastructure prior to renewal, thus reducing costs and increasing water savings. The same irrigators might then choose to sell some or all of their entitlements to the Commonwealth, at market price.

There are a number of other instruments currently operating at regional scales that might also encourage efficient and sustainable outcomes, including:

- salinity credits and impact zones such as are already in operation in the Sunraysia region to provide financial incentives to reduce irrigation in high-impact areas
- other price or market-based instruments for environmental outcomes (e.g. the Victorian Bushtender/Ecotender program).

Within the Basin in the context of the Water for the Future Irrigator-led Group Proposals program, further consideration should be given to the feasibility of expanding or tailoring the use of these instruments in this context.

### 10.3.3.5 Providing information and building capacity to change

The adaptive capacity of communities and industries plays a key role in determining the costs of adjustment. Equipping communities with the knowledge and tools to manage change contributes to building adaptive capacity and ensuring that adjustment is smooth and effective. In this regard, the Commission recognises that efforts made outside the direct realm of the water reform agenda are important in providing water users and communities with the information and tools they need to adjust to reductions in water availability smoothly and effectively.

For example, providing water users and communities with timely access to best available information on the impacts of climate change on rainfall and runoff patterns and water allocations is an important role for government. This will require building on CSIRO's recent forecasts of future water availability in and outside the MDB under different climate change scenarios as the scientific evidence base and modelling capacity increases (see Box 54). Such climate change scenarios will also be critical in the development of the new Basin Plan.

#### Box 54: CSIRO 2008 forecast of future water availability

Across Australia, CSIRO's 2008 forecasts of future water availability under varying climate change scenarios underscore the potential for climate change to exacerbate structural adjustment. Within the MDB, CSIRO notes that 'the impacts of climate change by 2030 are uncertain; however, surface water availability across the entire MDB is more likely to decline than to increase. A decline in the south of the MDB is more likely than in the north' (CSIRO 2008).

In addition, in a future with less water available for consumptive use, it is likely that some irrigators will cease irrigation and revert to dryland agriculture, while others might only irrigate on a more opportunistic basis during relatively wet seasons. In the Commission's view, it is important that landholders are provided with best available information on the land-use options and land management practices available to them to help ensure that they make profitable and sustainable choices that contribute positively to local and regional economies as they move out of intensive irrigation, or invest to increase the technical and productive efficiency of their water use. In this regard, there is a wealth of knowledge that can be drawn upon within local communities, industry and government agencies. Governments should work through expanded extension services and outreach efforts by agencies to make such information readily accessible to assist irrigators to consider their land and water use options in association with infrastructure renewal programs (see above).

In this regard, it is regrettable that government-provided agricultural extension services have been in long-term decline and have not been directed to address issues that are well suited to government involvement. The Commission encourages governments to recommit to tailored extension and advisory services to help individuals understand and respond appropriately to the adjustment pressures they face.

The Commission has identified some existing examples of programs designed to facilitate structural adjustment away from irrigated agriculture. For example, as Environment Victoria notes in its submission (2009, page 5):

*North Central CMA has developed an innovative 'New Dryland' program to assist transition away from irrigation. It is targeted towards mixed farmers and those who irrigate opportunistically and is based on the premise that what farmers most need to effect change is knowledge and confidence ...*

In the future, the Commission believes that governments can also pursue the further development of market-based instruments to provide incentives for land-use change that produces positive environmental benefits, such as protection and enhancement of biodiversity, carbon sequestration, and salinity management.

### 10.3.3.6 Monitoring adjustment and the impacts of NWI reforms

#### Background: Terminology and relevant NWI clauses

Clause 63(vi) of the NWI requires that the Commission monitor and report on the impacts of water trade in the southern Murray–Darling Basin, and advise the relevant parties (the Commonwealth, New South Wales, Victoria and South Australia) on any issues arising.

In the Commission's view, despite considerable recent and valuable work to improve understanding of structural adjustment, there is insufficient understanding among policymakers and the community of the process and importance of structural adjustment, the drivers of adjustment, the relative influence of water policy on adjustment, and the appropriate policy responses.

The South Australian Government's submission to the Commission was one of only a few that adequately acknowledged the combination of factors driving adjustment in the MDB (South Australian Government 2009):

*The major adjustment issues affecting irrigation industries (specifically along the River Murray) are related to the prolonged drought, consequent reductions in annual water allocations and declining industry sector market conditions, specifically for wine grapes and dairy.*

The Commission has a program of work in train on monitoring the impacts of water trade, and is co-funding a number of case studies on the social and economic impacts of water trade (see Box 55). The Commission has also developed a framework to fulfil its role under the NWI and to enable repeatable monitoring of the impacts of water trade, and has consulted widely with irrigation communities and government agencies across the basin prior to its implementation. The Commission will release its report on the impacts of water trade in the southern MDB later this year.

#### **Box 55: Case studies on the social and economic impacts of water trading in the Victorian Murray Valley**

Case studies on the economic and social impacts of water trade demonstrated the benefits of water markets and trade as essential tools to flexibly manage the impacts of drought and low seasonal allocations. Water policy reform and the development of water markets are therefore not the only drivers of adjustment, but their role as catalysts for change is vital.

The case studies found that the movement of water entitlements out of an irrigation district causes deep concern in some communities where people perceive that the viability of their town is under threat. However, they also found that many people recognised the need for some irrigators to sell their water entitlements to manage the financial impacts of the drought and demonstrated the importance of considering trade in both entitlements and allocations. Importantly, the case studies found that the movement of water into new areas, such as Robinvale in the Sunraysia region of Victoria, also creates challenges in servicing those communities adequately as they grow rapidly (for example, with housing, health and community services, and roads).

Source: Frontier Economics et al (2007).

The Commission reiterates its recommendation from the 2008 Update that greater resources and emphasis should be devoted to monitoring and independent assessment of the success or otherwise of the reform measures adopted and to identify where additional work and resources are required.

The Commission supports the recommendation in the New South Wales Government's submission to this assessment (New South Wales Government 2009) that:

*... the states be consulted on the design of the monitoring programs (nature of the monitoring program, funding and reporting requirements) and that such programs be coordinated with state programs to meet the needs of both the Commonwealth and the states.*

The Commission is acutely aware of the challenges in separating and monitoring structural adjustment associated with water reform, compared with other market and social drivers of adjustment. South Australia's submission (South Australian Government 2009) supports the Commission's finding that isolating the role of water policy in the adjustment process will remain a challenge for monitoring efforts:

*Monitoring of drought impacts along the River Murray have been undertaken by PIRSA and, to the extent that NWI reforms related to water trading for example are involved, there may be some influence but it is likely to be small and difficult to differentiate.*

Importantly, the Commission's previous work has been further constrained by the paucity of data, including of social and economic outcome data available at appropriate temporal and spatial scales. Considering the importance of managing adjustment issues, the Commission believes that resources need to continue to be devoted to enable better data to be gathered and analysed.

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#### **Finding 10.9**

Despite considerable recent and valuable work to improve understanding of structural adjustment, the Commission considers that there is insufficient understanding of the processes and causes of structural adjustment and a paucity of data at the necessary spatial and temporal scales to enable effective monitoring of adjustment. The Commission is concerned about this lack of understanding, as the success of the overall national water reform process will ultimately depend on how well the adjustment process proceeds in irrigation-dependent communities.

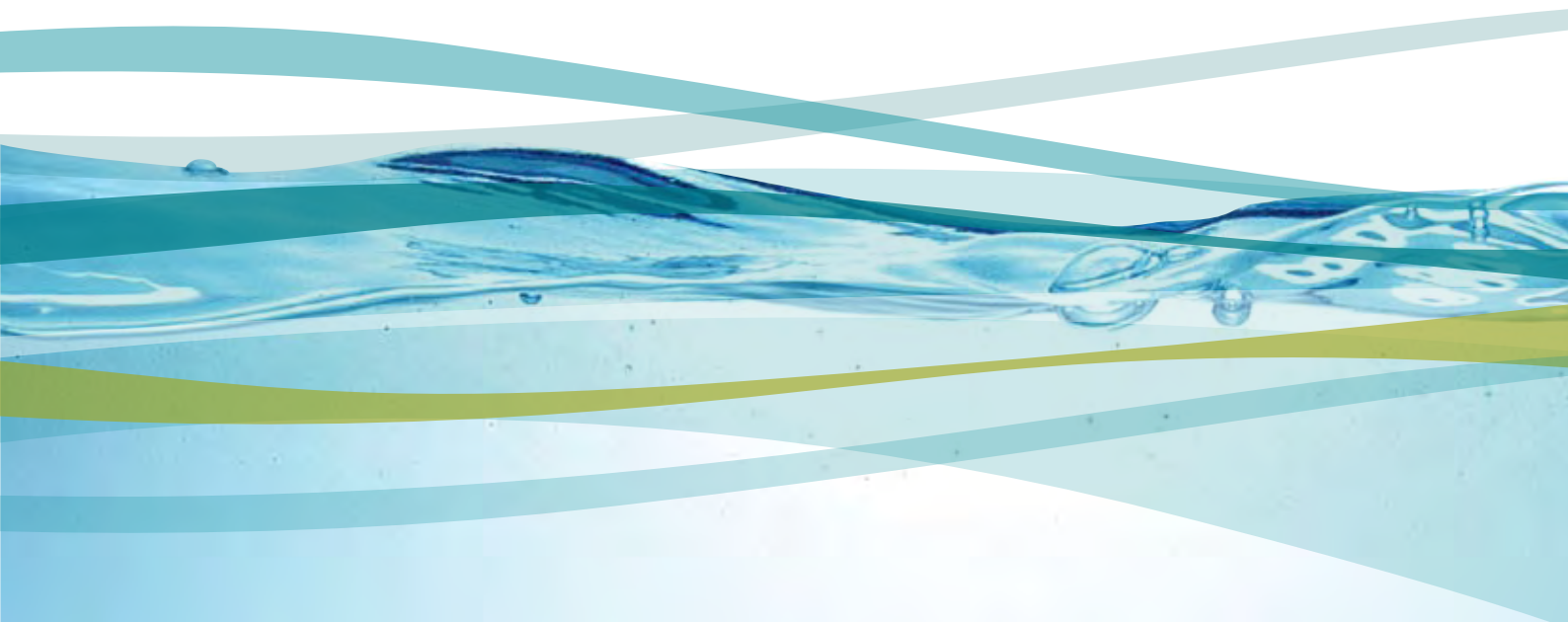
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#### **Recommendation 10.5**

The Commission supports further efforts to improve understanding of structural adjustment. Addressing current deficiencies in the availability of data to monitor and assess adjustment, including separating out the relative importance of water reform from other factors driving change, is required.

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**11**

Urban water

## 11.1 Overview

In recent years, urban water supply has become a critical national issue. Population growth and declining water availability, as a result of prolonged drought over much of Australia, has led to severe water restrictions in many of Australia's towns and cities. Governments are responding in a number of ways, including by investing in new water supplies, improving the management and delivery of urban water services, and allowing for greater innovation and more efficient water use. As governments have moved to diversify supply options away from the traditional reliance on rainfall-dependent catchment storages, they have been confronted by issues relating to planning, regulation, pricing, market and institutional reforms, and public confidence.

This chapter considers the progress that has been made to date in addressing urban water issues in Australia.<sup>36</sup> The overarching objective as defined in the NWI is for reliable, healthy, safe and sustainable urban water supply. Successful urban water reform would be characterised by:

1. Water security through integrated planning and management of all water sources in the urban water cycle and the development of water-sensitive cities.
2. Protection of public health and the environment through effective regulation.
3. Market and institutional arrangements that encourage innovative, efficient and safe water supply, including in regional and remote communities.
4. Increased water use efficiency and effective demand management (see Chapter 8).

While good progress has been made in delivering the limited set of urban water actions committed to under the NWI, new challenges that were not as evident when the NWI was signed have presented themselves. Changing and less predictable rainfall and runoff patterns, uncertainty about climate change, community demands for sustainable water supply solutions, and increases in water prices to pay for new water infrastructure are illustrative of further reform pressures to secure urban water supplies. Given the scale of the challenges, a lot remains to be done to fully achieve the urban water objectives.

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### Finding 11.1

The continued reliance on urban water restrictions across many parts of Australia indicates that meeting the NWI objective of reliable water supply continues to be a challenge. Severe restrictions impose significant costs on water users, government authorities and the broader community, and should thus only be applied when their benefits clearly outweigh those costs. In general, the Commission considers that urban water restrictions should be carefully reserved as one option for managing the available water supplies during periods of drought and should not be relied on for extended periods.

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### Finding 11.2

Despite recent efforts and substantial investments, urban water supply is yet to achieve nominated levels of security, as demonstrated by the protracted and costly water restrictions which remain in place in most urban centres. While desired levels of security have generally not been achieved, the targeted levels of security, and the shortfalls meeting the targets, are now at least becoming more transparent.

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### Finding 11.3

Significant efforts and major investments have been made to diversify our towns' and cities' water supplies towards less rainfall-dependent sources. There has been a considerable increase in the uptake and use of new and alternative water sources, particularly desalination, large-scale non-potable recycling, sewer mining, greywater collection and reuse, and rainwater tanks. These developments are consistent with the NWI's support for integrated urban water cycle management and the development of water sensitive cities.

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### Recommendation 11.1

Considering the extent of investment in urban water security and continuing challenges associated with balancing supply and demand in an efficient and sustainable manner, the Commission encourages speedier implementation by jurisdictions of the COAG National Urban Water Planning Principles.

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<sup>36</sup> Urban water reforms relate to a number of other areas of water reform discussed in previous chapters of this assessment. In particular, aspects of Chapter 1 (water planning) and Chapter 8 (pricing, demand management and other policy initiatives) are relevant to this chapter, so references to them are made where relevant.



<b>Finding 11.4</b>	Since 2004, most jurisdictions have strengthened long-term planning and strategy development to secure long-term supply. All jurisdictions have, or are in the process of completing, strategic planning processes to determine future requirements against a range of climate scenarios. An important result from current strategic long-term planning is that, for a number of major cities, further significant investments will be needed over the next 5–25 years to meet growth in demand for water as a result of population and economic growth.
<b>Finding 11.5</b>	Climate change is increasingly being taken into account in urban water planning processes, but a variety of approaches are being used and there is no common national methodology or even best practice guidance. The Commission supports the COAG decision that jurisdictions will publish guidance to facilitate best practice scenario planning for climate variability and climate change impacts on urban water supply and demand by water utilities and government.
<b>Finding 11.6</b>	While some jurisdictions have made progress in more rigorous evaluation of supply and demand side options, there is scope for taking account of new information, use of trigger levels and more systematic review and adaptation provisions.
<b>Recommendation 11.2</b>	The Commission recommends further improvement in the use of urban water plan review processes and advanced tools for analysing and selecting efficient investment portfolios and strategies that best manage climatic uncertainty. Water plans should not just respond to current circumstances, but should outline flexible strategies that will apply under future conditions expected as a result of climate change.
<b>Finding 11.7</b>	While urban water planning is now based on a more diverse portfolio of supply and demand options, a number of policy decisions continue to constrain certain water supply options (for example, explicit or implicit limitations on consideration of new dams, rural–urban trading, indirect potable reuse, interstate trading and interbasin transfers). In the Commission’s view, none of these options should be ruled out before a robust, open-minded and transparent comparison of all options to weigh up all benefits, costs and risks.
<b>Finding 11.8</b>	Most jurisdictions have embraced greater integration of the urban water cycle and have made substantial progress since 2004 in terms of policy development and implementation of demonstration projects.
<b>Finding 11.9</b>	Many jurisdictions have programs to fund demonstration projects that contribute to the development of water sensitive cities. However, achieving broader adoption of water sensitive urban design will require the removal of obstacles, including further regulatory and institutional reform, investment in capacity building and development of tools and standards that provide a more positive environment for investment.
<b>Recommendation 11.3</b>	The Commission considers that realising water sensitive cities requires improved methodologies to quantify the full costs, benefits and risks (including environmental costs and avoided costs of infrastructure upgrade) associated with new and alternative sources to enable integrated and decentralised options to compete on an equal footing with more traditional options. The Commission recommends development of a national strategy to identify and quantify the potential for, and advance the development of, water sensitive cities in Australia.
<b>Finding 11.10</b>	The Commission considers that progress in engaging effectively with the community and stakeholders is improving but remains mixed.
<b>Finding 11.11</b>	In general across Australia, compliance with drinking water quality standards has remained very good in major cities, with no major incidents. Some regional areas have reported less consistent compliance with drinking water quality standards.
<b>Finding 11.12</b>	Many utilities have improved performance in the management of sewage spills to the environment, and the combination of increased treatment standards and recycling targets has led to improvements in the discharge of treated effluent to the environment. Further work is required in some cases to ensure consistent performance across Australia and to meet increasing community expectations.

<b>Finding 11.13</b>	The recent development of sophisticated national guidelines for the safe and effective implementation and regulation of both potable and non-potable reuse is the first step in support of growth in new and alternative sources of water supply. However, regulations and guidelines for reuse and recycling are lagging behind actual activity at a variety of scales. In particular, it is difficult to cost-effectively apply the national guidelines to smaller, decentralised and on-site recycling systems, and improved coordination and national consistency across regulatory requirements are necessary.
<b>Recommendation 11.4</b>	The Commission recommends that jurisdictions implement mutual interstate recognition and better processes to validate, verify and approve smaller recycling systems. Local government approvals would benefit from streamlining and the opportunity to rely on generic state and national approvals for new water reuse systems.
<b>Recommendation 11.5</b>	The Commission recommends that institutional arrangements in the water sector be subject to a national review to identify opportunities for competition and private or public sector participation and innovation.
<b>Finding 11.14</b>	The Commission supports initiatives to clarify responsibilities for longer term urban water planning in each jurisdiction.
<b>Finding 11.15</b>	The Commission is supportive of the significant efforts of jurisdictions such as Tasmania and Queensland to reassess the structure and institutional arrangements for urban water supply and of the changes made to improve the efficiency and quality of services provided to urban water customers. New South Wales has commenced a similar process but results seem further off. Mindful of the steadily rising technical sophistication of water supply operations, further reform is required for regional water utilities (particularly smaller utilities) to improve their planning, reporting and pricing functions and ensure that the financial and specialist technical resources are available to enable the provision of cost-effective, safe and reliable water supplies into the future. For example, structural/organisational reforms (for example, aggregation and shared service models) and regulatory reforms may warrant further consideration in some rural and regional areas, particularly where services are currently provided by local government authorities.
<b>Finding 11.16</b>	The Commission strongly supports the establishment of effective, independent economic regulation of the urban water sector to provide incentives for cost efficiency, pricing efficiency and the provision of required levels of service, and to support the development of access-based competition. The Commission believes the arrangements could be usefully strengthened in several jurisdictions, while recognising recent progress in this regard, particularly in South Australia.
<b>Finding 11.17</b>	The Commission welcomes steps in some jurisdictions to introduce effective third-party access regimes as consistent with the efficiency and security objectives of the NWI. The Commission encourages other jurisdictions to follow suit, taking into account the National Competition Council's views on the design of such regimes.
<b>Finding 11.18</b>	The Commission supports the COAG decision that jurisdictions will give active consideration to broader pricing reforms that go beyond the NWI requirements. This should include options for more market-based pricing approaches.

## 11.2 Context for this assessment

### Background: Terminology and relevant NWI clauses

Clause 90 of the NWI states that the parties agree that the outcome for urban water reform is to:

- i) provide healthy, safe and reliable water supplies;
- ii) increase water use efficiency in domestic and commercial settings;
- iii) encourage the re-use and recycling of wastewater where cost effective;
- iv) facilitate water trading between and within the urban and rural sectors;
- v) encourage innovation in water supply sourcing, treatment, storage and discharge; and
- vi) achieve improved pricing for metropolitan water (consistent with clauses 66(i) to 66(iv)).

The NWI recognises the importance of improved urban water supply and contains a number of specific objectives to be achieved from urban water reforms. However, the actions required under the NWI (clauses 91 and 92) with respect to urban water reform are limited in scope and relate to demand management and innovation and capacity building to create water sensitive cities. As noted in the Commission's previous assessment, achieving the desired outcomes for urban water reform will depend on implementation of the NWI as a whole, including better water planning, opening up water markets and implementing best practice water pricing and institutional arrangements.

The Commission's 2007 Biennial Assessment (NWC 2007a) and 2008 Update (NWC 2008) found that reasonable progress had been made in implementing the specific commitments under clauses 91–92 of the NWI, but that they had been '... overshadowed by the scale of water challenges now facing Australia's cities' (NWC 2008, page 17). Thus, the key issue was not the pace of implementation (although patchy), but rather whether the actions committed to under the NWI were sufficient to achieve the outcomes desired for urban water reform. In many instances, jurisdictions have moved beyond them in delivering on the objectives of urban reform as set out in NWI clause 90.

With this in mind, the 2008 Update suggested there was a need to supplement the existing NWI urban water reform commitments through a new cooperative national urban water reform agenda (NWC 2008, page 18). At its meeting on 29 November 2008, COAG adopted an enhanced national urban water reform framework, consistent with the National Water Initiative, to improve the security of urban water (DEWHA 2009). Jurisdictions have agreed to:

- + adopt national urban water planning principles
- + establish and publish the levels of service for metropolitan water supplies
- + publish guidance to facilitate best practice scenario planning for climate variability
- + finalise and adopt NWI pricing principles
- + review consumer protection arrangements in relation to services provided by water utilities
- + investigate possible enhancements to pricing reform, including scarcity value of water and the valuation and recovery of environmental externalities
- + explore the issue of establishing entitlements for recycling, stormwater and managed aquifer recharge
- + promote the use of competition through an examination of barriers to third-party access and the costs and benefits of establishing a nationally consistent regime
- + examine the case for a micro-economic reform agenda in the urban water sector
- + examine the role of improved urban water metering and billing practices in the allocation, use and management of water
- + finalise a review of water restrictions in Australia
- + investigate the establishment of a national clearing house for best practice urban water management
- + investigate the development of a national system for reporting urban water consumption
- + establish centres of excellence for recycling and desalination
- + develop a strategy to improve water supply and wastewater services in remote communities.

As part of this urban water reform agenda, jurisdictions have agreed to adopt the National Urban Water Planning Principles. The principles (Box 56) articulate further priority reform areas for urban water systems and management, and provide a context for this assessment.

The principles reflect aspects of the Commission's consistent public advocacy for improvements in urban water planning, in particular the need for publicly specified levels of service, open consideration of the full portfolio of supply options, and the expanded use of pricing and market instruments where feasible.

#### **Box 56: National Urban Water Planning Principles**

1. Deliver urban water supplies in accordance with agreed levels of service (for each system, minimum service levels should be specified in terms of water quantity, water quality and service provision, such as reliability and safety).
2. Base urban planning on the best information available at the time and invest in acquiring information on an ongoing basis to continually improve the knowledge base.
3. Adopt a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply–demand balance.
4. Manage water in the urban context on a whole-of-water-cycle basis.
5. Consider the full portfolio of water supply and demand options.
6. Develop and manage urban water supplies within sustainable limits.
7. Use pricing and markets, where efficient and feasible, to help achieve planned urban water supply–demand balance.
8. Periodically review urban water plans.

Source: DEWHA (2009)

The assessment within this chapter therefore not only considers NWI actions, but also considers progress in terms of the broader urban water reform framework that is now being implemented.

## **11.3 The Commission's assessment and findings**

This assessment considers progress in urban water reform with regard to the objectives of water security, protection of public health and the environment, and cost-effective service delivery and innovation. As noted, increased water use efficiency and demand management are discussed in Chapter 8.

### **11.3.1 Water security**

The Commission recognises that water security has been the principal focus for governments, industry and the community in urban water since the agreement of the NWI in 2004. After 2004, drought, climate change and climate variability, along with population and economic growth, coalesced to significantly undermine water security for the majority of urban Australian households. The response to this supply crisis has been the principal driver behind changes to the urban water sector since 2004 and changes to the reform agenda beyond the reforms specified in the NWI.

#### **11.3.1.1 Current levels of reliability of supply**

The Commission's 2007 assessment found that severe and protracted water restrictions were testing the NWI outcome of reliable urban water supplies. Since then, water storage levels in southern towns and cities of Australia have continued to decline, and remain a concern in most urban areas (NWC 2007a).

By the end of May 2009, Melbourne had had its driest start to a year on record, and water storages had dropped below 30%. Victorian regions, such as Central Gippsland, Geelong and Bendigo, also experienced declining water storages in 2008–09. Perth had a reduction in storage levels to around 37%. Brisbane and Sydney had slight increases, but their storage levels remained around 45% and 61%, respectively. Adelaide's storage levels were considerably higher than in 2008, at 71%, but water security remained an issue, given the much smaller capacity of the city's storages and reduced certainty of access to River Murray supplies when storage levels drop.

All major Australian cities except Darwin and Hobart continue to have water restrictions or water-saving rules in place (Table 31). Australia's six biggest cities have been on restrictions for several years. Water restrictions have had a major impact on outdoor activities and businesses, and the Commission views long-term water restrictions as an inequitable and inefficient way of balancing supply and demand. The Productivity Commission (2008) has estimated that restrictions cost in the order of a \$1 billion per year.

**Table 31: Water restrictions across Australia, June 2009**

City	Level (and target if applicable)	Summary description
<b>Brisbane</b>	Medium level (target 200 L/person/day)	Gardens may be watered with a bucket, filled directly from a tap, on any day except Monday, between 4 pm and 8 am. On specific days, hoses fitted with a twist or trigger nozzle, an efficient sprinkler, or efficient irrigation systems can be used. Only one of these watering methods can be used at a time.
<b>Sydney</b>	New 'water wise' rules in place	All hoses must now have a trigger nozzle. To avoid the heat of the day, watering is allowed before 10 am and after 4 pm. No hosing of hard surfaces, such as paths and driveways, is allowed. Washing vehicles is allowed. Fire hoses may be used for firefighting activities only.
<b>Adelaide</b>	Stage 3 enhanced water restrictions	Hoses fitted with a trigger nozzle and drip systems can be used for gardening for a maximum of 3 hours per week. Buckets can be used anytime. Sprinklers and other watering systems are banned.
<b>Melbourne</b>	Stage 3a (target 155 L/person/day)	Handheld hoses may be used between 6 am and 8 am on two days a week. Lawn watering banned. Only vehicle mirrors, windows and lights can be washed (by bucket). Manual drip systems and automatic systems can be used for limited hours twice per week.
<b>Perth</b>	Permanent water-saving rules	Permanent water-saving rules for watering gardens include sprinkler rosters on two days a week and daytime sprinkler bans.
<b>Canberra</b>	Stage 3	No sprinkler or other irrigation system may be used on private gardens. Watering of lawns banned. Handheld hoses may be used between 7 am and 10 am and between 7 pm and 10 pm on alternate days. Vehicle washing banned, except at a commercial car washes.
<b>Hobart</b>	No restrictions	Not applicable.
<b>Darwin</b>	No restrictions	Not applicable.

#### ■ Finding 11.1

The continued reliance on urban water restrictions across many parts of Australia indicates that meeting the NWI objective of reliable water supply continues to be a challenge. Severe restrictions impose significant costs on water users, government authorities and the broader community, and should thus only be applied when their benefits clearly outweigh those costs. In general, the Commission considers that urban water restrictions should be carefully reserved as one option for managing the available water supplies during periods of drought and should not be relied on for extended periods.

#### 11.3.1.2 Level of service (security) targets

While the prevailing level of restrictions provides a useful general indicator of the level of water security during a severe drought, it needs to be recognised that extra security comes at a cost (100% security may only be attainable by constructing an unaffordable water supply system). This suggests that a more appropriate measure of water security performance is the extent to which the specified or desired level of water security for an urban water system is achieved in practice. The Commission has long argued that a prerequisite for doing this is to clearly define the desired level of service or security standard (for example, the frequency, duration and severity of water restrictions) and then to report on whether that standard has been achieved.

Recognising that this was not always done in the past, the November 2008 COAG Urban Water Planning Principles now require each water supply system to specify the minimum service in terms of water quantity, water quality and service provision, such as reliability and safety (Principle 1). The Commission has previously suggested that levels of urban water security be more clearly articulated in plans and that governments explore the feasibility of a national minimum reliability benchmark for water supply in major centres, specifying the expected frequency and severity of water restrictions.

The Commission has found that jurisdictions have adopted a range of approaches to setting agreed service levels (see Table 32).

- + Some, including the ACT and Queensland (SEQ), have undertaken willingness-to-pay studies to better understand customers' views on the trade-offs in using water restrictions to balance supply and demand, and incorporated their findings into level of service standards.
- + Unlike other states, South Australia does not appear to have a formally defined level of service standard. However South Australia's recently released *Water for good* strategy states that 'the Government will set security standards for South Australia's water supplies. These standards will define the risk points that would threaten water supply and require decisions on options to increase supply, or reduce demand, or both ...' (South Australian Government 2009b).
- + Western Australia has a relatively stringent target level of service compared with other states.
- + Tasmania and Queensland (SEQ) are in the process of introducing far-reaching reforms, which provide an opportunity for clarifying desired service levels. As noted, Queensland (SEQ) has made progress in this area.

**Table 32: Urban water—level of service targets**

Jurisdiction	Service level standard
<b>ACT</b>	<p>Levels of service in 2005 for ACTEW customers were based on: a) minimum storages of 5%; b) 5% of time in restrictions; c) frequency of restrictions being 1 in 10 years; d) 1% of time in Stage 3 or higher restrictions; and e) frequency of Stage 3 or higher restrictions of 1 in 25 years.</p> <p>Current level of service is based on the Water Services Association of Australia Framework for Urban Water Resource Planning 2005, comparing least cost of additional supply with the cost of not supplying (restrictions) and using updated cost of restrictions data for 2008 for the ACT region. (Knee 2009)</p>
<b>NSW</b>	<p>The current performance criteria for the Sydney supply system are as follows:</p> <ul style="list-style-type: none"> <li>– Reliability: estimates that, on average, restrictions due to drought will not need to be applied more often than 3.6 months in 10 years (that is, less than 3% of the time). This is often expressed as '97% reliability'.</li> <li>– Robustness: estimates that, on average, not more than 10 years in 100 years will be affected by restrictions due to drought (where a year is considered to be affected by restrictions if restrictions are applied on any one day in that year). This is expressed as '90% robustness'.</li> <li>– Security: requires that the dams must not approach emptiness (less than 5% of total storage) more than 0.001% of the time. That is, in a period of 8333 years, only in one month should the combined level of the operating storages approach emptiness. (adapted from White et al 2006)</li> </ul>
<b>NT</b>	To date, restrictions have not been required. 100% security is obtained through n-1 and n-2 backup supplies.

<b>Qld</b>	<p>The creation of the south-east Queensland (SEQ) water grid manager and three new bulk state-owned water businesses in effect transfers responsibility for overall water supply security in SEQ from a large number of local councils to the state. The draft South East Queensland Water Strategy includes a water supply guarantee supported by a series of level of service objectives, which relate to the expected frequency, duration and severity of restrictions during future droughts. The choice of the level of service objectives has involved trade-offs between financial costs, environmental impacts, and the willingness of the community to accept restrictions on a periodic basis.</p> <p>Sufficient investment will occur in the water supply system with the objective of ensuring that medium-level restrictions:</p> <ul style="list-style-type: none"> <li>– will not occur more than once every 25 years, on average</li> <li>– will last longer than six months no more than once every 50 years, on average</li> <li>– need only achieve a targeted reduction in consumption of 15% below the total consumption volume in normal operations.</li> </ul> <p>Combined regional storage reserves will reach levels of 10% of capacity not more than once every 1000 years.</p> <p>Regional water storages must not be permitted to reach minimum operating levels.</p> <p>Outside the SEQ region, local governments will remain the primary providers of water supply. (Draft South East Queensland Water Strategy)</p>
<b>SA</b>	<p>SA Water uses, as a guide, 1:100 for the reliability of its major water resources. For the metropolitan water supply system, SA Water has a licence to use River Murray water to a maximum of 650 GL over five years. This licence was determined at the time the Murray–Darling Basin cap was being established, by using water-use modelling (based on 2001 levels of development) indicating that the full 650 GL would be exceeded once in 100 years.</p> <p>On this basis, there is an obligation for SA Water to base its planning on a 1 in 100 level of reliability. (This has been defined for recent studies as being the need to go to Level 3 restrictions or higher in only one year in 100 years.) This standard would apply to all of SA Water's metropolitan system, which includes both the Mount Lofty Ranges and River Murray supplies. (South Australian Government 2009a)</p>
<b>Tas.</b>	<p>As part of the reforms in the Tasmanian water and sewerage sector, a statewide supply and demand plan will be developed which will assess the urban water supply and demand balance. The plan will be an important tool for the sector in relation to developing pricing and service plans and capital expenditure programs. (information provided to the Commission by the Tasmanian Government)</p>
<b>Vic.</b>	<p>In Melbourne, requirements are that restrictions should only occur as a 1 in 20 year event. (information provided to the Commission by the Victorian Government)</p>
<b>WA</b>	<p>In Perth, the Water Corporation has planned on the basis of needing a total sprinkler ban in only 0.5% of years (or 1 in 200 years).</p>

While jurisdictions have generally not achieved the levels of reliability or security for which their systems were supposedly designed, the security standard itself is at least becoming more transparent. The Commission views commitments by states to articulate levels of security in future water planning as a positive step, but suggests that more could be done by governments to engage communities in this process.

## ■ Finding 11.2

Despite recent efforts and substantial investments, urban water supply is yet to achieve nominated levels of security, as demonstrated by the protracted and costly water restrictions which remain in place in most urban centres. While desired levels of security have generally not been achieved, the targeted levels of security, and the shortfalls meeting the targets, are now at least becoming more transparent.



### 11.3.1.3 Responses to improve water security

The Commission recognises that jurisdictions have adopted a broad suite of reforms, investments and approaches designed to increase future urban water security. Approaches have typically included:

- + significant investment in new supply capacity
- + diversification of sources of supply, with a focus on less climate-vulnerable sources
- + measures to improve supply flexibility, such as water grids and system interconnectors
- + improvements in planning, including a portfolio approach to assessing supply and demand options within a range of future climate and growth scenarios
- + a shift to incorporate alternative sources of non-potable supply to reduce demand on potable water
- + demand-management measures as part of the portfolio of approaches to balancing supply and demand.

In many jurisdictions, the improvement in water supply security, primarily through additional, less climate-dependent sources, has been a priority. The following sections provide a snapshot of the significant increase in the adoption and use of new and alternative sources. In summary, the water industry reports that a capital works program comprising \$30 billion worth of projects is well underway. Projects being undertaken include desalination plants, recycled water schemes, pipelines linking catchments, indirect potable reuse and accessing groundwater (WSAA 2008). For example, the Victorian Government is delivering a water grid linking water systems across the state through new connections and pipelines. Similarly, a water grid has been established in south-east Queensland, including the introduction of alternative water sources through the Western Corridor Recycled Water Project and the desalination plant at Tugun. Desalination and other new investments are likely to improve water supply security for urban areas in the short to medium term; however, new supply investments will be required as populations grow and inflows into dams decline, as suggested by climate change projections.

#### Desalination plants

Over the past 3–4 years, various state governments and major water utilities have announced plans to construct large-scale desalination plants to augment urban water supplies in major coastal cities. As reported by the Productivity Commission (2008), this investment will result in desalination capacity in the order of several hundred gigalitres per annum and a capital cost approaching \$9 billion (see Table 33).

**Table 33: Major new desalination plants in Australia**

	Capacity (GL/ year)	Proportion of current total water supply (%)	Capital cost (\$ billion)	Expected date of completion
<b>Sydney</b>	91	15	1.9	2009–10
<b>Melbourne</b>	150	35	3.10	End 2011
<b>Adelaide</b>	100	30	1.80	50 GL by 2011 and 100 GL by 2012
<b>Perth (1)</b>	45	17	0.40	In service
<b>Perth (2)</b>	50	–	0.95	2011
<b>Gold Coast</b>	46	15	1.20	End 2008

Source: Adapted from Productivity Commission (2008).

Investment has been driven by a combination of factors that were almost unforeseeable as little as five years ago. These have included improvements in the cost effectiveness of large-scale desalination technologies such as reverse osmosis, the prolonged drought, uncertainty regarding the impacts of climate change on catchment inflows, and general recognition of the insurance value of a supply source that is independent of rainfall.

The variable supply costs of desalinated water are typically much higher than the variable costs of traditional catchment sources. For that reason, the key risk associated with the current and planned desalination investment is that a return to historical or pre-drought rainfall levels could reduce scarcity (increase storage levels) and thus affect the need for desalinated water supplies. From an environmental sustainability perspective, the key challenges for desalination relate to the energy-intensity of the treatment process (and associated greenhouse gas emissions) and the disposal of brine.

Nevertheless, the Commission makes clear its support for open-minded consideration of desalination as an important option to improve urban water security throughout Australia. Its costs, risks and benefits (including its insurance value) need to be weighed against those of other options in the circumstances in each town or city.

### **Recycled water**

There are a number of sources of recycled water (for example, wastewater treatment plants, sewer mining, greywater), types and levels of treatment (potable and various classes of non-potable), and uses of recycled water (potable, non-potable/outdoor household reuse, irrigation of golf courses, parks and gardens, and agriculture). The uptake of various types of recycling varies considerably.

Recycling of treated effluent from existing wastewater plants has increased significantly over the past two decades. As noted in Section 11.3.3.3, new national guidelines for managing the human and environmental risks associated with recycled water have recently been developed and endorsed by jurisdictions (EHPC, NHMRC and NRMCC 2006, 2008a). At the same time, Australia's major water utilities have significantly increased the total volumes of recycled water supplied. In fact, recycling by urban utilities has risen by 117% since 1999–2000 (NWC and WSAA 2009).

### **Sewer mining**

Sewer mining involves extracting sewage from the sewerage network before it reaches the treatment plant, treating it to the required standard, and supplying the recycled water to customers. The Sydney Olympic Park Authority's Water Reclamation and Management Scheme at Homebush Bay was Australia's first large-scale urban recycling scheme to source wastewater through sewer mining for irrigation and residential non-drinking uses (Sydney Water 2008). Kogarah Council was the first council in Sydney to pilot sewer mining and recycle treated wastewater to irrigate its parks, playing fields and golf courses. There are now a number of examples of sewer mining projects in operation across Australia, and state-based third-party access regimes have been and are being developed across some jurisdictions to facilitate this type of recycling (see Section 11.3.4.3).

### **Greywater reuse**

Greywater is the term used to describe all household wastewater except toilet waste. Greywater can be treated before being reused, or used untreated. Reuse of untreated greywater (mainly from laundries and bathrooms), particularly for outdoor use and toilet flushing, has increased significantly in recent years. In 2007, more than half (54.5%) of Australian households reported using greywater as a source. Victoria had the highest percentage of households reporting greywater as a source (71.7%), followed by the ACT (63.1%). The Northern Territory had the lowest reported use of greywater, but use was still substantial in almost a third of households (32.2%). In 2007, nearly a quarter (24.0%) of Australian households reported greywater as their primary source of water for the garden (ABS 2007).

Many urban residents have recycled greywater during recent drought periods, and there have been no reported health problems from that practice. However, there are concerns for public health, for example where faecal material from soiled clothing or nappies could contaminate water with microbial pathogens. Testing of greywater has shown that it can contain substantial amounts of faecal micro-organisms (PMSEIC 2003).

### **Rainwater tanks**

In recent years, there has been a resurgence in investment in rainwater collection tanks in Australian cities and towns. In 2007, more than one-fifth (20.6%) of all Australian households reported that their dwelling had a rainwater tank, up from 15.2% in 1994. South Australia had by far the highest proportion of dwellings with a rainwater tank (40.2% in Adelaide and 74.7% in the rest of the state). The overall rate of rainwater tank ownership outside capital cities was 34.7% compared with 12.5% in capital cities (ABS 2007).

Rainwater tanks are typically being installed and connected to supply outdoor use as well as some non-potable indoor uses, such as toilet flushing. The main stated reasons why households installed a rainwater tank were to save water (over 40%), because they were not connected to the mains (approximately 28%), because of water restrictions on mains supply (approximately 14%), and due to water quality concerns (approximately 20%) (ABS 2007).

## Stormwater harvesting and managed aquifer recharge

While stormwater infrastructure in cities has traditionally been designed primarily to prevent flooding of property, there has been growing interest in stormwater harvesting as a potential source of urban water supply. This growing interest has been based on the rationale that urban areas produce plentiful quantities of stormwater close to the point of consumption, and that beneficial use of stormwater could mitigate negative environmental impacts associated with its discharge to waterways.

Urban lakes and wetlands and managed aquifer recharge provide possible approaches to manage the storage and treatment of stormwater. The increase in urban lakes in new residential developments also illustrates that stormwater can have a range of beneficial uses, including amenity and recreational values, in addition to its consumptive use value.

In Australia in 2008, managed aquifer recharge projects contributed 7 GL per year to urban water supplies across Queensland, South Australia, Western Australia and the Northern Territory. That contribution included 3 ML per year of stormwater recharge recovered for drinking supplies, and up to 700 ML per year of reclaimed water recharge to augment horticultural irrigation supplies (Dillon et al 2009). The Commission expects that these figures could well continue to increase, partly as a result of the recent finalisation of national guidelines for stormwater harvesting and reuse, and managed aquifer recharge (EHPC, NHMRC and NRMCC 2008b, 2008c).

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### ■ Finding 11.3

Significant efforts and major investments have been made to diversify our towns' and cities' water supplies towards less rainfall-dependent sources. There has been a considerable increase in the uptake and use of new and alternative water sources, particularly desalination, large-scale non-potable recycling, sewer mining, greywater collection and reuse, and rainwater tanks. These developments are consistent with the NWI's support for integrated urban water cycle management and the development of water sensitive cities.

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### ■ Recommendation 11.1

Considering the extent of investment in urban water security and continuing challenges associated with balancing supply and demand in an efficient and sustainable manner, the Commission encourages speedier implementation by jurisdictions of the COAG National Urban Water Planning Principles.

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## 11.3.2 Best practice urban water planning and management

These measures have undoubtedly increased the level of water security of urban water systems in Australia. However, given the difficulty in accurately quantifying the inherent level of water security provided by particular urban water supply systems, assessment of performance in this area necessarily requires examining the extent to which 'best practice' urban water planning and management approaches to water security have been adopted.

The following discussion examines the performance of jurisdictions in implementing best practice urban water planning and management (as reflected in the National Urban Water Planning Principles recently agreed by COAG—see Box 56) through considering the extent to which:

- + urban water planning addresses uncertainties and information gaps (COAG Principles 2 and 8)
- + all water supply and demand options are considered (Principle 5)
- + water is managed on a whole-of-water cycle basis, reflecting integrated urban water cycle management (IUWCM) and water-sensitive urban design principles (Principle 4)
- + transparent and consultative planning processes are used (Principle 3)
- + urban water supplies are managed within sustainable limits (Principle 6).

Other principles relating to service standards and pricing are discussed in other sections of this chapter.

### 11.3.2.1 Dealing with uncertainty and information gaps

#### Information

COAG's Urban Water Planning Principles require that urban planning be based on the best information available at the time and that investments in acquiring information be made to continually improve the knowledge base (Principle 2). Such up-to-date information on current and future water resources, water supplies and water demand is critical for effective urban water planning. In dealing with uncertainty, urban water planning should make use of scenario planning that incorporates uncertainty in supply and demand. It should also be integrated with future economic development and land-use planning, to ensure full knowledge of available water supply and water savings opportunities.

In evaluating and selecting new investments to bolster water security, either through augmenting supplies, demand management or increasing the level of interconnection between regions and between water systems, key requirements in the process include:

- + using best available information, including information on climate change
- + basing the evaluation on the full financial, social and environmental costs, risks and benefits
- + adopting a portfolio approach to managing system security
- + periodically reviewing evaluations as more information becomes available.

The Commission recognises new actions and commitments by jurisdictions since the signing of the NWI Agreement to account for these uncertainties and new challenges. For example, in Queensland it appears that many of the inadequacies of the past are being addressed (see Box 57).

#### Box 57: South East Queensland approach to water security planning

Using the proposed new approach outlined in the draft South East Queensland Water Strategy released in March 2008, the inadequacies of past approaches are being addressed by:

- using stochastic modelling to provide better information about climate variability and the potential for droughts worse than those that have been recorded
- developing climate models to assess potential reductions in surface water availability due to climate change
- undertaking a detailed review of water consumption patterns and implementing cost-effective measures to reduce demand
- defining a yield for the water grid as a whole, such that it can be supplied at the specified levels of service
- using the most cost-effective suite of potential supplies, where they have acceptable environmental and social impacts
- operating water supply and delivery infrastructure in a coordinated manner
- adopting a total water cycle management approach and operating within water resource plan limits
- ensuring that planning for future droughts is a core element of the planning process.

#### ■ Finding 11.4

Since 2004, most jurisdictions have strengthened long-term planning and strategy development to secure long-term supply. All jurisdictions have, or are in the process of completing, strategic planning processes to determine future requirements against a range of climate scenarios. An important result from current strategic long-term planning is that, for a number of major cities, further significant investments will be needed over the next 5–25 years to meet growth in demand for water as a result of population and economic growth.

## Climate change

The possible impacts of climate change are not well understood, and further refinement of supply and demand approaches will be required as knowledge improves. For example, the Victorian Auditor-General (2008, page 6) was critical of the Victorian Government in relation to the impacts of climate change on estimates of water savings that are to be procured for urban and other uses, finding that:

*A major concern, repeatedly noted in the stakeholder submissions to the food bowl steering committee, was the use of long-term inflows as the basis for estimating water losses and savings. Stakeholders were concerned that this assumption did not take account of climate change or the lower recorded inflows of the past decade ...*

Each jurisdiction has adopted its own approaches to estimating the impacts of climate change. New approaches include changes in the application of historical rainfall data (to gauge future inflow trends), incorporation of climate change models, and new ways to determine efficiency gains from water conservation initiatives and water use. However, these new approaches contain considerable uncertainties, particularly as they relate to downscaling of regional models and transfer of data from other catchments.

Moreover, the conclusions of the Victorian Auditor-General's (2008) review of the Victorian Water Plan highlight broader problems with the process and level of rigour applied to the evaluation of options. The Auditor-General concluded that (at page 2):

*Audit recognises that the Department had to complete the plan as an emergency response to the record low inflows of 2006, and the risk that water supplies might run critically low within a few years. The timelines for finalising the plan were extremely tight and this explains the need to streamline the normal project development processes.*

*Nevertheless the processes used to develop the Victorian water plan fell short of the standard the Department applied when developing the white paper and the Central Region strategy. In particular, the plan was finalised with minimal stakeholder consultation and inadequate levels of rigour applied to estimate the costs, benefits and risks of some of the key component projects ...*

The Commission believes that those problems are typical across the jurisdictions, as they struggle to come to grips with the uncertainty associated with climate change. This has been particularly so in non-metropolitan urban communities.

The Commission is concerned that some cities may even be moving from a situation of underinvestment to one of overinvestment. While recognising and supporting the need for decisive action, the Commission encourages jurisdictions to continually reappraise their investment programs and consider the merits of completing projects in a staged approach with robust and transparent investment triggers (see also the concept of readiness described below).

In adjusting urban water planning to climate change, Bligh Tanner (2009) recommends the following:

- + Promote the development of a comprehensive and consistent Australia-wide policy on response to climate change in urban water planning.
- + Develop the necessary procedures and tools required by the water industry to adequately assess the anticipated impact of climate change.
- + Promote a further change in policy from responding to immediate pressures such as drought to a long-term focus on climate change.

The Commission supports these proposals.

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### ■ Finding 11.5

Climate change is increasingly being taken into account in urban water planning processes, but a variety of approaches are being used and there is no common national methodology or even best practice guidance. The Commission supports the COAG decision that jurisdictions will publish guidance to facilitate best practice scenario planning for climate variability and climate change impacts on urban water supply and demand by water utilities and government.

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## Reviews

The COAG National Urban Water Planning Principles recognise that there is a need for periodic review of urban water plans and their underpinning assumptions (Principle 8). All parties involved in the development of an urban water plan should be committed to ensuring that the plan can adapt as necessary to reflect new information and knowledge and changing circumstances. For example, in New South Wales the Metropolitan Water Plan is reviewed by an independent multidisciplinary panel of experts and is also updated every four years based on the latest information, such as climate change projections (Sydney Water 2009).

## Readiness strategies

'Readiness' is a concept that has not been explored to the extent it deserves. A traditional dam takes at least a decade from conception to delivering water, so it requires very long lead times to be incorporated in planning, and offers little flexibility to respond to short-term changes. A reverse osmosis desalination plant, on the other hand, can be delivered from a standing start in under three years and, with some pre-work, within 18 months. The ability to respond in such a short timeframe offers water planners a powerful insurance tool, because surface water sources can be driven much harder with the knowledge that a fallback option can be invoked within 18 months.

This concept was recognised in Sydney, but now that the desalination plant option has been taken, that specific low-cost insurance tool is no longer available. However, the plant has been designed to be doubled in capacity, from 250 ML/day to 500 ML/day, so there remains some element of insurance.

Portfolio analysis is also important in understanding the overall security of an urban supply system. Real options analysis is an advanced technique for economic appraisal that can be used to estimate the value of readiness strategies, which are difficult to assess using traditional cost-benefit analysis.

The Sydney Metropolitan Water Plan includes the potential to commission two borefields, which have now been tested. The borefields could be commissioned within six months, thus providing an even shorter lead time than desalination, although they are essentially emergency sources that would be used only for a few years in a deep drought, after which they would need to be rested to allow the aquifers to recharge.

The Commission believes that a flaw in a number of urban water plans produced since 2004 is that they have failed to develop contingencies and identify triggers for policy change and new investments in advance. There is evidence that, rather than being shaped by appropriate periodic review, a number of urban water plans have been overtaken by events as they have unfolded. While the current drought has been extraordinary, jurisdictions should by now be fully aware of the potential for 'worst case' outcomes to eventuate, and water plans must be sufficiently robust and transparent to be able to respond to the full range of circumstances.

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### ■ Finding 11.6

While some jurisdictions have made progress in more rigorous evaluation of supply and demand side options, there is scope for taking account of new information, use of trigger levels and more systematic review and adaptation provisions.

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### ■ Recommendation 11.2

The Commission recommends further improvement in the use of urban water plan review processes and advanced tools for analysing and selecting efficient investment portfolios and strategies that best manage climatic uncertainty. Water plans should not just respond to current circumstances, but should outline flexible strategies that will apply under future conditions expected as a result of climate change.

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#### 11.3.2.2 Consideration of all supply and demand side options

COAG's Urban Water Planning Principles require the full portfolio of water supply and demand options to be considered (Principle 5). Options could include optimising the use of existing infrastructure through efficiency measures; residential, commercial and industrial demand-management initiatives; purchasing water entitlements from other sectors; and the development of additional centralised and/or decentralised water supply options, including manufactured water sources (such as recycling and/or desalination).

The Commission considers that the water industry and jurisdictions are progressively moving to a planning basis that incorporates detailed analysis of a portfolio of options for supply and demand measures to ensure that future water needs are met. For example, in non-metropolitan New South Wales, local utilities are required to consider the merits of all available options in developing their 30-year integrated water cycle management strategies. This trend represents a marked improvement in the quality of urban water supply planning processes since 2004. As highlighted above, efforts have been made to improve the certainty of water security outcomes by properly considering new water sources that are less dependent on rainfall.

There are, however, a number of remaining policy barriers that restrict consideration of all possible options, such as explicit or implicit 'no new dams' policies, refusal to consider indirect potable reuse proactively, and constraints on urban–rural trade. The Water Services Association of Australia (WSAA 2009, page 1) contends that:

*... while all the NWI parties agreed to promote water trading to ensure that water would be used where it was most valued, State governments continue to hinder water trading outside defined regions ... Interstate trading and trade between rural and urban users is impeded even more and is always considered 'controversial' ...*

Purified recycled water of potable quality is used internationally to augment potable water supplies. The major advantages of potable reuse are that it does not require costly replication of the water supply network, and that it removes the need for costly, regular audits of cross-connections. It is also less vulnerable to climate than traditional sources of water, may reduce the environmental impacts of treated sewage otherwise discharged to the environment, and may offer infrastructure savings for the sewerage system.

While the uptake of new and alternative sources of water supply is viewed as a very positive result, the Commission believes that barriers to the adoption of some cost-effective new and alternative sources remain. The Commission is of the strong view that, rather than outright policy bans, options should be selected through a robust, open-minded and transparent comparison of all options, examining the social, environmental and economic costs and benefits and taking into account the specific water system characteristics, in consultation with the community.

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#### ■ Finding 11.7

While urban water planning is now based on a more diverse portfolio of supply and demand options, a number of policy decisions continue to constrain certain water supply options (for example, explicit or implicit limitations on consideration of new dams, rural–urban trading, indirect potable reuse, interstate trading and interbasin transfers). In the Commission's view, none of these options should be ruled out before a robust, open-minded and transparent comparison of all options to weigh up all benefits, costs and risks.

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Efficient investment in sewerage and stormwater systems is also critical, both in relation to exploring opportunities for new and alternative water security strategies, and for the maintenance of the high standards achieved across Australia despite the ageing systems in place in many areas. Comprehensive asset management systems and robust investment processes are required to prioritise investment in these systems. In adopting a more integrated approach to the achievement of these outcomes, the Commission considers that targeted use of sewer mining and household recycling can reduce pressure on the existing sewerage system, in turn reducing the impact on the environment and the costs of system maintenance.

As discussed above, the Commission considers that more can be done to understand the costs and benefits of decentralised recycling initiatives, compared to the costs of replacing ageing assets. Local government authorities and state agencies also face increasing costs for replacing ageing and incapacitated stormwater infrastructure, alleviating and repairing the impacts of flood damage, and managing stormwater pollution to ensure ecosystem services. Again, an integrated and robust approach to investment planning is required.

#### 11.3.2.3 Manage urban water on a whole-of-water cycle basis

The COAG National Urban Water Planning Principle 4 requires that water in the urban context be managed on a whole-of-water cycle basis. This means that further improvements to water security for urban communities should be approached using a comprehensive and consistent 'integrated urban water cycle management' (IUWCM) strategy, which includes 'fit for purpose' water use, the promotion of alternative water sources, and the deployment of decentralised systems where deployment is cost effective.

This is consistent with the NWI, which calls for the achievement of water sensitive cities. The water sensitive cities (WSC) concept embraces a range of water management techniques, including stormwater harvesting, flood management, urban water recycling and reuse programs, urban rainwater harvesting, and urban water use efficiency programs. 'WSC' and 'IUWCM' are sometimes used interchangeably.

WSC is part of broader urban planning and has been attracting growing interest in recent years, particularly as urban planning authorities develop their adaptation strategies for climate change. The basis for creating more water sensitive cities is IUWCM, which can be defined as:

*the integrated management of all water sources, to ensure that water is used optimally within a catchment resource, state and national policy context. It promotes the coordinated planning, sustainable development and management of water, land and related resources (including energy use) that are linked to urban areas. It directs the application of Water Sensitive Urban Design principles within existing and new urban environments ... (NWC 2007b, page 9)*



Water sensitive urban developments apply at various scales:

- + large-scale residential developments (typically greenfields developments)
- + small to medium-scale residential developments (likely to include infill developments and conversions in existing urban areas)
- + large and small to medium-scale industrial developments
- + regional developments.

There is a clear requirement for water sensitive urban design and development in the NWI, which calls for:

- + development of health and environmental guidelines for water sensitive urban design elements
- + development of national guidelines for evaluating options for water sensitive urban design applications in new urban subdivisions and high-rise buildings
- + evaluation of existing 'icon water sensitive urban developments'.

In recent years, there has been a shift towards IUWCM, evident in the utilisation of new and alternative water sources in the urban water cycle and in the development by jurisdictions of new national water recycling guidelines (EHPC, NHMRC and NRMCC 2006, 2008abc).

To capture the opportunities presented by adopting an IUWCM approach, it is important that an overarching strategic framework for IUWCM be in place across the jurisdictions. The Commission considers that much has been achieved in this area. In its review for the Commission, Bligh Tanner (2009) concluded that considerable progress has been made across jurisdictions in developing policy and providing strategic direction for integrated urban water planning and management.

Overall, good progress has been made in delivering the specific actions under the NWI to progress water sensitive cities. There is a large suite of innovative practice in place across Australia at a range of scales, demonstrating the feasibility and benefits of linking centralised and decentralised approaches and technologies to delivering water services and managing urban water systems.

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#### ■ Finding 11.8

Most jurisdictions have embraced greater integration of the urban water cycle and have made substantial progress since 2004 in terms of policy development and implementation of demonstration projects.

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Despite this progress, concerns have been raised that the full potential for such solutions is being hampered by various obstacles and disincentives to their 'on the ground' adoption. Although allusions to IUWCM and its related, synonymous concepts (water sensitive urban design and water sensitive cities) are frequent, only a minority of new water and sewerage developments actually embrace all the principles. Notable exceptions are substantial developments with strong IUWCM attributes: Queensland's Pimpama Coomera project and South Australia's Mawson Lakes project. Other examples of comprehensive adoption are generally small and still uncommon. At the current rate of take-up, it will take many decades before the proportion of sustainable urban water systems is large enough to make a significant difference to outcomes. Bligh Tanner's review for the Commission (2009, page xvii) found that:

*[the] key issue is the lack of uniform application of IUWCM policies developed at a state level, within jurisdictions and local government agencies. Many key aspects of IUWCM are well developed but separately lack the effectiveness of a unified policy ...*

In the Commission's view, obstacles and disincentives which may be preventing the full potential benefits of WSC from being realised include the following:

- + Project cost estimates may fail to take into account the full range of societal benefits (for example, environmental benefits in waterways otherwise receiving urban stormwater runoff).
- + Approval pathways for WSC projects are unclear and uncertain.
- + There is a multiplicity of agencies and authorities involved in WSC approvals, each with different objectives and responsibilities (for example, authorities responsible for land-use planning, waterway health, flood management, roads and infrastructure planning, and water and wastewater services; health authorities; environment agencies; strata and community title managers).
- + There is a lack of clarity about legal entitlements to, and third-party access to, stormwater, wastewater and other water sources.
- + There is a lack of clarity about liability arrangements for health risks, environmental risks and other risks associated with WSC projects.

Efforts have been made by jurisdictions, industry and local governments to support capacity building. However, the Commission believes that significant further resources need to be dedicated to capacity building and the development of tools and practical guidelines that help enable water sensitive urban design. Such efforts should address technical and scientific uncertainty (which tends to prolong approval times), community engagement, and improved evaluation of the full costs, benefits and risks of water sensitive urban design. The Commission also sees merit in review of the institutional and regulatory arrangements (including local government planning and building codes) to identify and then address any aspects which impede take-up of WSC where appropriate.

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#### ■ Finding 11.9

Many jurisdictions have programs to fund demonstration projects that contribute to the development of water sensitive cities. However, achieving broader adoption of water sensitive urban design will require the removal of obstacles, including further regulatory and institutional reform, investment in capacity building and development of tools and standards that provide a more positive environment for investment.

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#### ■ Recommendation 11.3

The Commission considers that realising water sensitive cities requires improved methodologies to quantify the full costs, benefits and risks (including environmental costs and avoided costs of infrastructure upgrade) associated with new and alternative sources to enable integrated and decentralised options to compete on an equal footing with more traditional options. The Commission recommends development of a national strategy to identify and quantify the potential for, and advance the development of, water sensitive cities in Australia.

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#### 11.3.2.4 Public involvement in planning processes

The COAG National Urban Water Planning Principles recommend adopting a partnership approach so that stakeholders are able to make an informed contribution to urban water planning, including consideration of the appropriate supply–demand balance (Principle 3). Decisions to invest in urban water infrastructure involve trade-offs between cost and reliability of supply. Therefore, stakeholder input is essential to ensure that the proposed levels of service and the supply and demand management options required to deliver that level of service are considered in the light of consumers' attitudes, including their willingness and ability to pay. In the Commission's view, the minimum reliability benchmark should be developed in consultation with the community. Communities need to be engaged more effectively in defining the appropriate level of water supply system security. Urban water planning processes should be transparent and inclusive and should recognise that different consultation processes are appropriate in different circumstances.

There are several good examples, such as the community consultation process undertaken by the Water Corporation in Perth for the *Water forever* strategy (see Box 58). The New South Wales Government stated that rigorous community involvement has been required in New South Wales for many years. However, where plans have been developed or changed rapidly in response to water scarcity, community engagement has often been the first casualty (see, for example, Victorian Auditor-General 2008).

#### Box 58: Community consultation in urban water planning

The community consultation process undertaken by Water Corporation in Perth for *Water forever: Options for our water future*, a 50-year planning document for Perth and surrounds, provides an interesting case study on the breadth and sophistication of community consultation in urban water resource planning.

*Water forever: Options for our water future* was released in April 2008 for a three-month public comment period which involved a comprehensive community engagement process. Everyone from school students, industry groups and government agencies to members of the public was invited to have their say on planning for the water future of Perth and surrounding areas. Particular attention was given to engaging with specific sectors of the community, such as youth, Indigenous groups, stakeholders and decision makers.

This engagement was supported by a number of communication tools, including a comprehensive website and over 40 information sheets to promote more detailed understanding of water, wastewater and drainage issues.

Opportunities for Western Australians to have their say focused on relatively informal and easily accessible channels, such as shopping centre displays, online surveys and a blog to encourage open dialogue. This complemented the more formal meetings and workshops attended by industry groups, government agencies, academics, researchers and other stakeholders.

Over 2,350 people participated in this phase, which culminated in the publication of *Water forever: Reflections*, a report released in September 2008 that summarised the feedback.

The intent of this engagement was to test the planning assumptions and to help define broad themes for Perth's water future.

Source: WSAA (2009)

In relation to community engagement on implementing IWCM, CSIRO has suggested that poor involvement of communities in the planning and management of decentralised water systems leads to false expectations and possibly inappropriate use of alternative water sources (CSIRO 2009). Griffith University (2009) has indicated that a lack of involvement by strata and community title managers in the decision-making processes of decentralised systems has resulted in a suboptimal uptake of decentralised water systems in large urban developments.

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#### ■ Finding 11.10

The Commission considers that progress in engaging effectively with the community and stakeholders is improving but remains mixed.

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#### 11.3.2.5 Managing urban water supplies within sustainable limits

COAG National Urban Water Planning Principle 6 requires that urban water supplies be managed within sustainable limits. Ensuring the protection of the environment and waterway health is an integral part of urban water planning. As discussed in Chapters 1 and 5, sustainable levels of extraction should be established through publicly available water plans prepared at a catchment and/or system scale for all water use, recognising the connectivity between surface and groundwater systems (Chapter 2). To ensure sustainability, extraction levels should also be monitored over time and periodically reassessed to reflect changes in scientific knowledge and climate variability.

### 11.3.3 Protecting public health and the environment

Delivering integrated urban water cycle outcomes entails moving away from the traditional institutional separation of water supplies, wastewater and stormwater to an integrated process to deliver fit-for-purpose water services. In that process, however, the protection of public health and the environment is critically important.

#### 11.3.3.1 Drinking water quality

##### Recent outcomes and performance

Safe drinking water is essential, and every effort needs to be taken to ensure that drinking water suppliers provide consumers with water that is safe to use. In Australia, the *2004 Australian drinking water guidelines* published by the National Health and Medical Research Council (NHMRC) provide the framework for managing drinking water to assure safety at the point of use. The guidelines define safe, good quality water, how it can be achieved, and how it can be assured. They describe drinking water quality in both human health and aesthetic terms (NHMRC 2004).

In general, Australia's performance in providing safe drinking water remains high. The *National performance report 2007–08: Urban water utilities* (NWC and WSAA 2009) published performance against compliance with the *2004 Australian drinking water guidelines*. Results outlined in Table 34 suggest high performance among major urban water utilities. There has also been some evidence of improvement over time, as many of the utilities that failed to meet required standards before 2007–08 exhibited improvements in subsequent years.

Data for smaller utilities suggests that compliance with drinking water quality standards has been less consistent in regional and remote communities. For example:

- + in 2007–08, Albury failed to comply with the required microbiological water quality for 25% of its population, resulting in 'boil water' alerts in May 2008 for the suburb of Lavington
- + in December 2007, MidCoast Water had a material reduction in compliance, falling from 100% to 91%, after reporting high *E. coli* readings had been detected at Bulahdelah on 27 November 2007 due to an electrical fault at the raw water pumping station (NWC and WSAA 2009).

**Table 34: Percentage compliance with microbiological standards, major water utilities (100,000+ connections)**

Utility	2005–06	2006–07	2007–08
ACTEW	100.0	100.0	100.0
Barwon Water	99.8	100.0	100.0
Brisbane Water	100.0	100.0	100.0
City West Water	100.0	100.0	100.0
Gold Coast Water	100.0	100.0	99.6
Hunter Water	99.6	99.8	100.0
SA Water—Adelaide	100.0	100.0	100.0
South East Water	100.0	100.0	100.0
Sydney Water	100.0	100.0	100.0
Water Corporation—Perth	100.0	100.0	100.0
Yarra Valley Water	100.0	99.7	100.0

Source: NWC and WSAA (2009)

#### ■ Finding 11.11

In general across Australia, compliance with drinking water quality standards has remained very good in major cities, with no major incidents. Some regional areas have reported less consistent compliance with drinking water quality standards.

### Regulation of drinking water quality

While the *Australian drinking water guidelines* have contributed to very good public health outcomes, the continuing regulation of existing water utilities, as well as the range of new entrants, is likely to pose a number of challenges. Those challenges will be complicated by new institutional arrangements (such as third-party access) and by diversified urban water sources and treatment systems (such as sewer mining, water recycling, stormwater harvesting, greywater reuse, and managed aquifer recharge). In relation to both new and existing operators, the Commission considers that better implementation of the framework for managing drinking water quality, articulated in the *Australian drinking water guidelines* (NHMRC 2004) and other national water-quality management documents on water recycling (EHPC, NHMRC and NRMCC 2006, 2008abc), will be essential in maintaining performance levels. The Commission also considers that improving water treatment plant operator qualification requirements is similarly important.

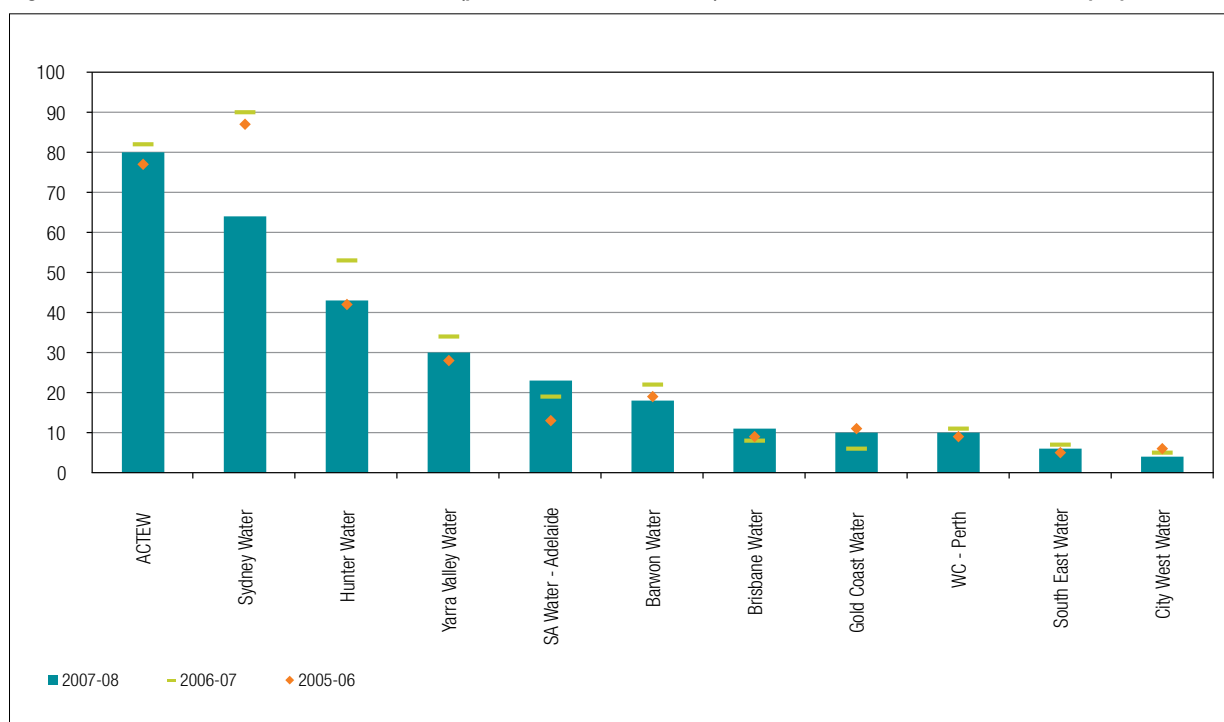
### 11.3.3.2 Protection of the environment and public health from sewage spills and treated effluent discharge

#### Recent outcomes and performance

Increasing urbanisation puts more pressure on existing wastewater and stormwater systems and can increase pollutant loads entering our natural waterways (ASEC 2006). Whilst evidence suggests the rate of decline of urban waterway health has been arrested in some places, it also suggests a continued decrease in aquatic biodiversity, an increase in sedimentation and erosion, continued excessive nutrient levels in stormwater and an increasing rate of algae growth in urban waterways (ASEC 2006, DECC 2003, Queensland Healthy Waterways 2008, Western Australian Government 2007).

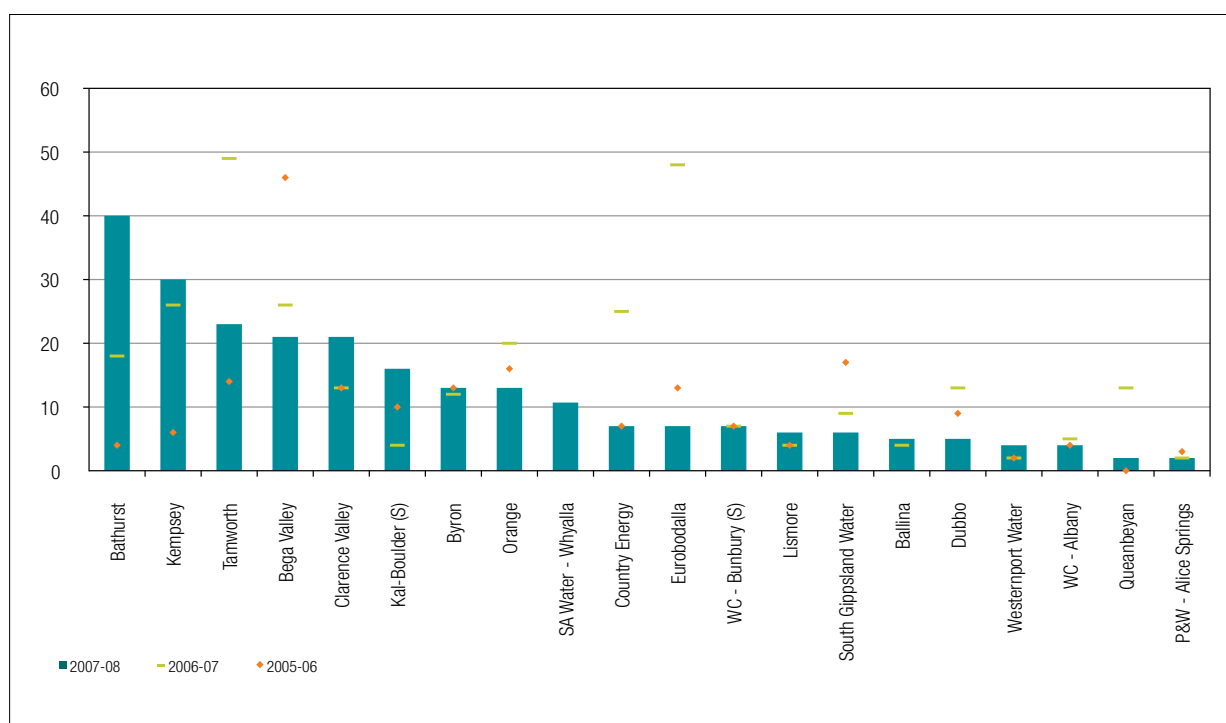
While many factors contribute to waterway health in urban areas, the water industry's main impacts relate to sewage spills to the environment and the management of stormwater as part of the urban water cycle. Sewage spills to the environment pose public health and environmental risks. The number of sewer overflows to the environment varies greatly across different water utilities and years (see Figure 10 and Figure 11).

**Figure 10: Sewer overflows to the environment (per 100 km of sewer main), for utilities with 100,000+ connected properties**



Source: NWC and WSAA (2009)

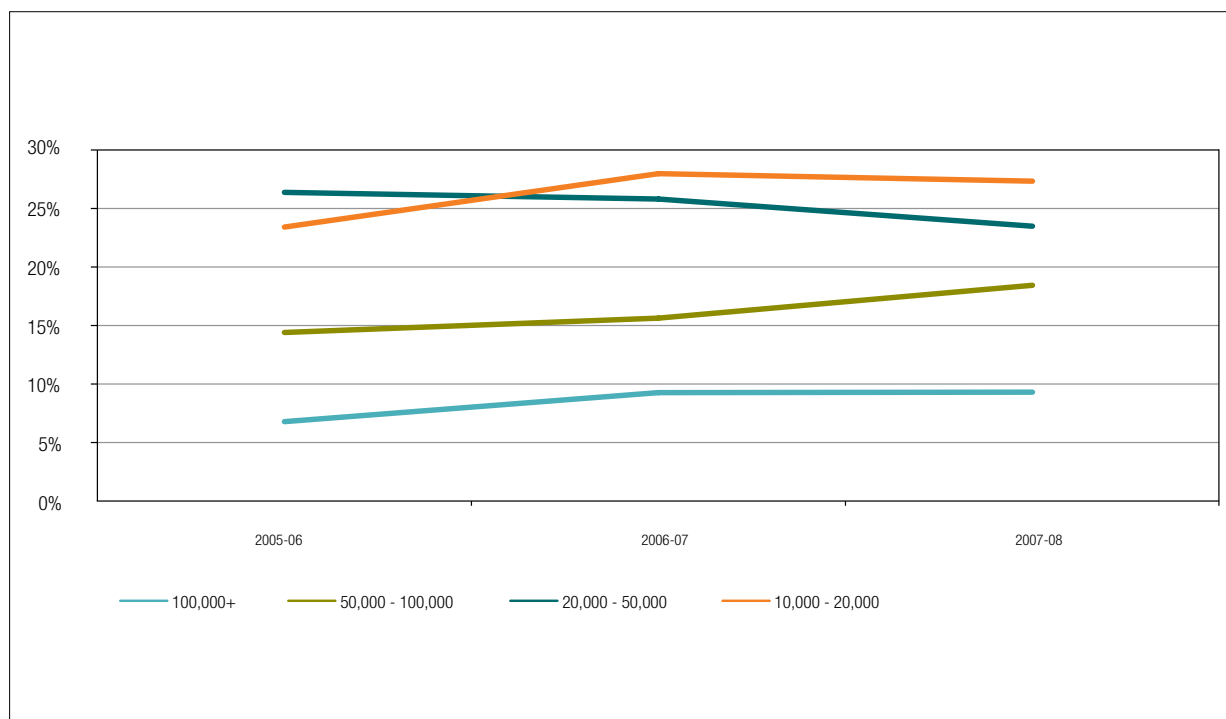
**Figure 11: Sewer overflows to the environment (per 100 km of sewer main), for utilities with 10,000 to 20,000 connections.**



Source: NWC and WSAA (2009)

The community has demonstrated increasing concern about environmental impacts on waterways receiving discharges from wastewater treatment plants. This has led to significant investment in improving treatment processes. Figure 12 shows that the proportion of wastewater recycled by major urban utilities is between zero and 30%. In its submission, the South Australian Government noted that Adelaide currently has the highest level of wastewater reuse of Australian cities (30%), and that recycling capacity will increase to nearly 45% by 2013 through projects currently underway. Much of the improvement over time has been driven by water recycling targets set by the jurisdictions.

**Figure 12: Proportion of wastewater recycled across Australia, all major utilities**



Source: NWC and WSAA (2009)

## Regulation of sewerage systems and effluent discharge

Conventional wastewater treatment plants and sewerage systems are regulated to protect public health and the environment, typically by the environment protection agency and health regulator in each state. The Commission assesses that regulatory compliance remains high across Australia.

Regulatory standards, particularly for effluent discharge to marine and inland waterways, have become progressively more stringent in response to community concerns. This has in turn prompted significant investment in the upgrading of treatment plants, which improves effluent quality and increases the range of potential uses for recycled water from those plants.

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### ■ Finding 11.12

Many utilities have improved performance in the management of sewage spills to the environment, and the combination of increased treatment standards and recycling targets has led to improvements in the discharge of treated effluent to the environment. Further work is required in some cases to ensure consistent performance across Australia and to meet increasing community expectations.

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### 11.3.3.3 Integrated regulation of new and alternative water sources

The ongoing protection of human health and the environment is a fundamental precondition for the further uptake of new and alternative water sources involving stormwater harvesting and recycled water. In this regard, the development of National Water Quality Management Strategy guidelines for the reuse of water for drinking and non-drinking purposes is a major achievement that addresses a significant commitment under the NWI. The recycling guidelines provide important governance and institutional assurance to underpin the diversification of urban water supplies and the further development of fit-for-purpose urban water resources (see Box 59).

#### Box 59: Australian Guidelines for Water Recycling

The Environment Protection and Heritage Council, the Natural Resource Management Ministerial Council and the National Health and Medical Research Council have developed guidelines for the safe use of recycled water. The guidelines include:

- *Australian guidelines for water recycling (Phase 1): Managing health and environmental risks, 2006*
- *Australian guidelines for water recycling (Phase 2): Augmentation of drinking water supplies, 2008*
- *Australian guidelines for water recycling (Phase 2): Stormwater harvesting and reuse, 2009*
- *Australian guidelines for water recycling (Phase 2): Managed aquifer recharge, 2009*

Australia now boasts some of the most sophisticated national guidelines for the safe and effective implementation and regulation of both potable and non-potable reuse. This high-quality regulatory regime is the first step in support of growth in new and alternative sources.

The Victorian Government's submission to the biennial assessment highlights the strengths of the national guidelines, but also points out challenges in applying the guidelines to smaller, decentralised systems:

*The release of the Australian Guidelines for Water Recycling, in particular Phase 1 Managing Health and Environmental Risks and Phase 2 (draft) Stormwater Harvesting and Reuse has enabled the use (in some cases) of alternative water supplies for urban uses. A gap area that remains is detailed guidance about how the principles of the Phase 1 guidelines could be applied to small onsite water recycling schemes, as the guideline focuses on large-scale systems that have significant resources directed toward their establishment and operation.*

In addition to national efforts, jurisdictions have invested significant resources in developing scientific knowledge and regulatory systems to ensure that water quality standards are met and that health and environmental outcomes are not compromised. The recent stocktake of urban water planning prepared for the Commission by Bligh Tanner (2009) found that progress has been made across most jurisdictions in relation to guidelines and the regulation of water quality associated with new and alternative sources.



For example, the Queensland Government has developed the *Water Supply (Safety and Reliability) Act 2008*, which provides new regulatory provisions for recycled water and drinking water that require the preparation of recycled-water management plans and drinking water quality management plans. In 2006, the New South Wales Government published *Managing urban stormwater: Harvesting and reuse* (NSW Government 2006). This guide was prepared to help stormwater harvesting become a more mainstream water management discipline. It provides guidance on the planning and design aspects of stormwater harvesting projects, taking into account statutory and regulatory requirements.

However, the rapid growth in household, local and centralised recycling schemes has placed considerable pressure on water quality and health regulators across Australia. There is also some evidence that national standards-setting processes have been unable to deliver timely standards needed to meet burgeoning activity in the sector.

The Western Australian Government's submission states that Western Australia's 2008 water recycling strategy recognises the need to improve policy and regulation to facilitate water recycling, and states that health, environment and water resource management agencies will review and develop policy in 2009 to support water recycling.

Moreover, there is currently no national institutional framework in place through which to deliver efficient mutual recognition for systems approvals, or the validation and verification of recycling systems. This is impacting on industry development opportunities as well as increasing the costs of regulators.

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#### ■ Finding 11.13

The recent development of sophisticated national guidelines for the safe and effective implementation and regulation of both potable and non-potable reuse is the first step in support of growth in new and alternative sources of water supply. However, regulations and guidelines for reuse and recycling are lagging behind actual activity at a variety of scales. In particular, it is difficult to cost-effectively apply the national guidelines to smaller, decentralised and on-site recycling systems, and improved coordination and national consistency across regulatory requirements are necessary.

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#### ■ Recommendation 11.4

The Commission recommends that jurisdictions implement mutual interstate recognition and better processes to validate, verify and approve smaller recycling systems. Local government approvals would benefit from streamlining and the opportunity to rely on generic state and national approvals for new water reuse systems.

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### 11.3.4 Cost-effective and innovative service delivery

This element of the assessment of urban water supply arrangements considers institutional and market-based reforms aimed at improving urban water and wastewater service efficiency, quality and reliability. This includes initiatives to improve the allocation of roles and responsibilities for planning, service provision and regulation, and wider institutional arrangements to promote competition and innovation, to open up water markets and to implement best practice water pricing and institutional arrangements.

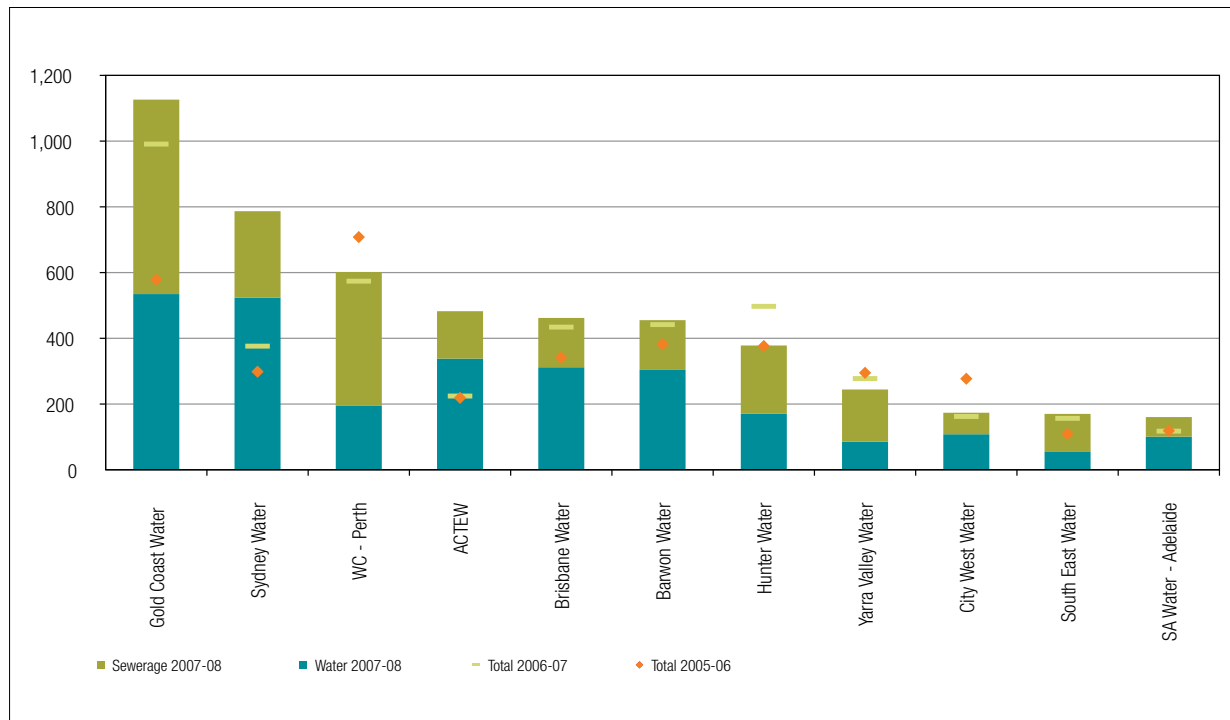
#### 11.3.4.1 Recent outcomes and performance

While achieving water security and protecting public health and the environment are fundamental urban water outcomes, it is also important that the water, wastewater and recycled-water services are provided at the standards customers require at the lowest long-term cost.

Relevant measures of performance thus include the efficiency of service provision, the quality of services provided, and the costs faced by customers.

NWC and WSAA (2009) provides an authoritative source of information on recent performance. While performance on a number of fronts (such as demand management and the uptake of recycled water) is clearly improving, there is also evidence that costs are increasing, largely because of substantial investments in water security projects.

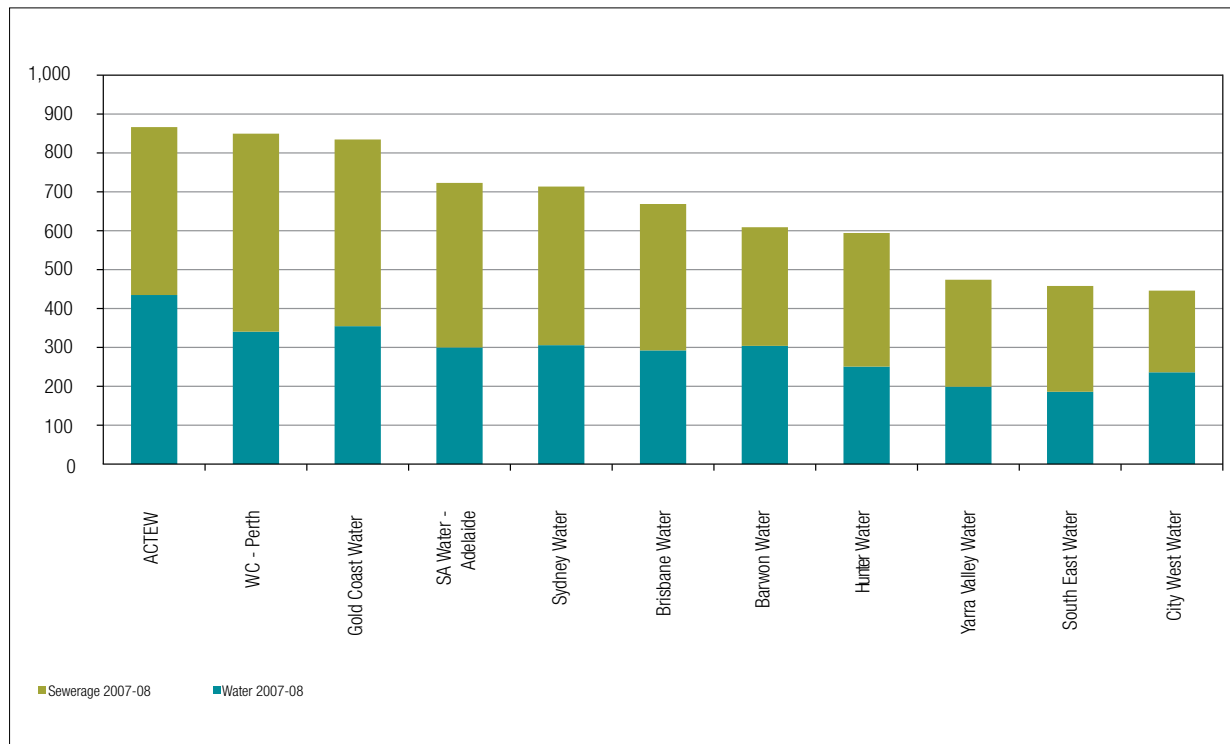
**Figure 13: Capital expenditure per property for utilities with over 100,000 connections (\$)**



Source: NWC and WSAA (2009)

Urban water prices have risen steadily, in part to pay for new water infrastructure and also to offset reduced revenue due to conservation measures (including restrictions). The average residential bill for water and sewerage services supplied by utilities increased across all utility size groupings in 2007–08: up by 3.8% for utilities with 100,000+ properties, by 3.3% for utilities with 50,000 to 100,000 properties, by 3.9% for utilities with 20,000 to 50,000 properties, and by 3.8% for those with 10,000 to 20,000 properties.

**Figure 14: Typical annual residential water and sewerage bill for utilities with over 100,000 connections (\$ per customer)**



Source: NWC and WSAA (2009)

The report also shows generally improving services standards, although the majority of utilities recorded a longer duration of unplanned interruptions in 2007–08 compared to 2006–07, with only Hunter Water and Barwon Water recording shorter durations.

While a comprehensive assessment of the efficiency of service provision by existing water utilities is beyond the scope of this report, a number of recent independent reviews (for example, Productivity Commission 2008, VCEC 2008, ERA 2008, IPART 2005) have all supported careful consideration being given to reforming institutional arrangements and adopting market-based approaches as a means to further improve the cost-effectiveness, quality and innovation of services provided to urban water users.

#### 11.3.4.2 Institutional reform

Institutional reform means changes to the organisations and governance and management arrangements for the supply of water and wastewater services in urban areas.

##### Background: Terminology and relevant NWI clauses

Clause 74 of the NWI states that parties agree that, as far as possible, the roles of water resource management, standard setting and regulatory enforcement and service provision continue to be separated institutionally.

Clause 75 requires the states and territories to report independently, publicly, and on an annual basis, benchmarking of pricing and service quality for metropolitan, non-metropolitan and rural water delivery agencies under a nationally consistent framework.

Under clause 77, the parties agree to use independent bodies to set or review prices, or price-setting processes, for water storage and delivery by government water service providers.

The Commission's 2007 assessment found that all states had generally met the specific actions required in relation to institutional arrangements under the NWI.

However, the more fundamental issue and the focus of this assessment is the extent to which the institutional arrangements best facilitate the achievement of the broad objectives of the national water reform agenda—to provide healthy, safe and reliable water supplies and encourage innovation in supply.

In the Commission's view, institutional reform in the water sector has not kept pace with other sectors, such as telecommunications, electricity, gas and ports. Institutional arrangements in the water sector should be reviewed to provide greater opportunity for private sector investment and private sector or public sector innovation. Regulatory reforms, including price-setting, allocation and tradeability of bulk water resource access rights, and third-party access to natural monopoly infrastructure have the potential to promote more efficient resource use and greater choice in water services and water products.

Coinciding with major investments in supply augmentation and related policy reforms to address the security of supply pressures, a number of jurisdictions have completed or initiated reviews into the institutional arrangements for urban water and wastewater service provision. A number of jurisdictions are reforming the institutional arrangements for water supply to improve efficiency and, in line with the NWI requirements, separating standard setting and regulatory enforcement and service provision. The key institutional changes being made in the different jurisdictions are as follows.

- + New South Wales has developed a state-based third-party access regime to provide access to essential water and wastewater infrastructure. This includes a key role for the independent economic regulator in ensuring appropriate terms and conditions of access, as well as a licensing framework for new entrants to ensure that public health, the environment and consumers will continue to be protected.
- + In Queensland, significant changes have been made to the institutional arrangements and structure of the water businesses in SEQ. A consolidated industry structure is being put in place, consisting of a mix of state and local government owned businesses that includes two bulk water businesses (WaterSecure, SEQwater), a bulk transport business (LinkWater), and consolidation of the existing 10 council-owned water business into three integrated water distribution and retail businesses (which will be owned by the councils, but which will operate as separate commercial businesses). Operation of the bulk water grid will be controlled by the water grid manager.
- + Tasmania has introduced legislation, with the support of local government, that establishes new water and sewerage corporations and an enhanced regulatory system. The legislation establishes three regional water and sewerage businesses; a business to provide common services to those three businesses; an economic regulator who will independently set prices and minimum customer service standards and monitor the performance of the businesses; an expanded role for the Tasmanian Ombudsman to resolve complaints from water and sewerage customers; and a yearly *State of the industry report* that monitors water quality and environmental performance, as well as the financial performance of the corporations.

- + Western Australia is considering recommendations from the Economic Regulation Authority of Western Australia (ERA) to improve planning and competitive procurement processes (through an independent procurement entity) and to establish a state-based third-party access regime.
- + In Victoria, the Victorian Competition and Efficiency Commission completed an inquiry into the reform of the Melbourne Metropolitan Retail Water Sector in 2008. The report made a number of recommendations for the reform of the sector, including that the Victorian Government develop an access regime for water and wastewater infrastructure services. In its response to the inquiry report, the Government agreed to that recommendation, and asked the Essential Services Commission (ESC) to inquire into an access regime. The ESC released a draft report in June 2009. As well as proposing the development of a comprehensive access regime for Victoria's water and sewerage infrastructure, the report recommends the development of a licensing regime for water and sewerage service providers. This recognises that all service providers, not just the publicly owned water businesses, should be subject to appropriate customer, health and environmental protection standards. Victoria has also advised that a Grid Manager Discussion Paper is due for release at the end of September 2009.
- + South Australia has recently released its *Water for good* strategy, which includes a number of institutional reforms, including independent economic regulation and the development of a third-party access regime (South Australian Government 2009b).
- + The Northern Territory and the ACT have not undertaken any significant institutional reforms in the past two years.

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### ■ Recommendation 11.5

The Commission recommends that institutional arrangements in the water sector be subject to a national review to identify opportunities for competition and private or public sector participation and innovation.

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Three specific areas of institutional reform which the Commission sees as vital for the delivery of urban water outcomes are:

- + the institutional arrangements for urban water planning
- + service delivery in regional and remote communities
- + benchmarking and independent economic regulation.

#### **Institutional arrangements for urban water planning**

Since the signing of the NWI, it has become increasingly important that responsibility for long-term planning and reliability of supply is clearly allocated. There needs to be absolute clarity about who is responsible for long-term resource planning, and those authorities need the ability to access the appropriate expertise.

Several jurisdictions are establishing clearer institutional arrangements in relation to urban water planning, including the establishment of planning entities and a clearer allocation of planning responsibilities:

- + New South Wales—The New South Wales Department of Water and Energy is the lead agency responsible for ensuring the provision of a secure and sustainable water supply for all users. The department is currently coordinating a review of the New South Wales Government's 2006 Metropolitan Water Plan and of how the government will provide a secure supply of water to meet the needs of Sydney.
- + Queensland—The Queensland Water Commission has prepared the South East Queensland Water Strategy, a plan for meeting SEQ's water supply requirements for the next 50 years. The strategy is the beginning of a transparent water supply planning cycle and will be subject to review at regular intervals.
- + South Australia—The South Australian Government has established the independent Office for Water Security, which recently released *Water for good*, the statewide water security plan. The plan provides proposals for providing a secure water supply into the future, including proposed urban water planning responsibilities and arrangements.
- + Victoria—In its response to the VCEC report on reform of the metropolitan water sector (VCEC 2008), the Victorian Government announced that it is clarifying the role of the Office of Water within the Department of Sustainability and Environment in strategic water planning for the metropolitan water sector.
- + The Western Australian Government is considering proposals by ERA to establish an independent procurement entity with a central role in supply planning and procurement.

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#### ■ Finding 11.14

The Commission supports initiatives to clarify responsibilities for longer term urban water planning in each jurisdiction.

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#### **Service delivery in regional and remote communities**

Local water utilities in regional and remote communities (including remote Indigenous communities) face major challenges, such as climate change, skills shortages, demographic changes and tighter human health and environmental standards. The level of technical sophistication of water supply operations is rising constantly. In recognition of this, COAG directed that an assessment of performance of water supply and wastewater systems in regional and remote communities be undertaken as a matter of urgency.

As noted above, major recent reforms in Tasmania have sought to address previous deficiencies in the provision of water and wastewater services in regional areas by local government entities.

In New South Wales, an independent panel has submitted its report on the Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW (Armstrong and Gellatly 2008). The panel found that the poor performance of several local water utilities, combined with the significant challenges they face, confirms the need for structural change to better plan for and manage their responsibilities in most instances. The panel has therefore recommended that, while council ownership and management of water supply and sewerage services should be maintained, a number of functions should be centralised, including planning and reporting functions. The panel has also recommended the mandating of planning requirements and 'best practice pricing'.

The situation is similar in regional Queensland, where local council amalgamations have reduced the number of councils from around 120 to 72; however, there has been no further reform of regional water services at this stage.

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#### ■ Finding 11.15

The Commission is supportive of the significant efforts of jurisdictions such as Tasmania and Queensland to reassess the structure and institutional arrangements for urban water supply and of the changes made to improve the efficiency and quality of services provided to urban water customers. New South Wales has commenced a similar process but results seem further off. Mindful of the steadily rising technical sophistication of water supply operations, further reform is required for regional water utilities (particularly smaller utilities) to improve their planning, reporting and pricing functions and ensure that the financial and specialist technical resources are available to enable the provision of cost-effective, safe and reliable water supplies into the future. For example, structural/organisational reforms (for example, aggregation and shared service models) and regulatory reforms may warrant further consideration in some rural and regional areas, particularly where services are currently provided by local government authorities.

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#### **Benchmarking and independent economic regulation**

Monopoly supply of urban water services is a dominant feature of urban water supply and is likely to continue for many elements of the supply chain (such as the transportation network). Arrangements for external scrutiny and discipline on performance are therefore necessary. This is reflected in the NWI.

The national performance reports jointly published by the National Water Commission and the Water Services Association of Australia (for example, NWC and WSAA 2009) deliver on a key NWI commitment to annually benchmark water pricing and service quality, and to do so independently and publicly.

While transparent and consistent reporting is useful, independent regulation is needed to provide incentives for cost efficiency, pricing efficiency and the provision of required levels of service. Independent regulation would also support moves to allow access-based competition in urban water supply (discussed below).

As discussed in Chapter 8, while jurisdictions have met the strict requirements for independent economic regulation under the NWI, in the Commission's view the arrangements could be usefully strengthened in several jurisdictions, particularly South Australia, Western Australia, Tasmania, the Northern Territory and Queensland. South Australia's recently released *Water for good* plan (discussed in Chapter 8) is a step in the right direction.

The Commission understands that reforms to the economic regulation of the urban water sector are currently under active consideration in these jurisdictions. The Queensland Government has advised that regulatory oversight arrangements for the bulk, distribution and retail entities are currently being developed as part of the reform process. It has also advised that the Queensland Water Commission is considering forms of pricing oversight arrangements, initially for the urban water supply chain but with the possibility of eventually introducing third-party access for the distribution entity.

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#### ■ Finding 11.16

The Commission strongly supports the establishment of effective, independent economic regulation of the urban water sector to provide incentives for cost efficiency, pricing efficiency and the provision of required levels of service, and to support the development of access-based competition. The Commission believes the arrangements could be usefully strengthened in several jurisdictions, while recognising recent progress in this regard, particularly in South Australia.

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#### 11.3.4.3 Market-based reforms

A number of aspects of the NWI and the COAG Principles for Urban Water Planning require the use of market-based approaches to urban water supply where those approaches are feasible, where the benefits exceed the cost, and where that use would support the key objectives of greater efficiency, improved resource management and improved outcomes for customers. COAG Urban Water Planning Principle 7 promotes the use of pricing and markets, where efficient and feasible, to help achieve planned urban water supply–demand balance.

Market-based reform proposals in the NWI and the COAG principles relate to the utilisation of water trading in urban settings, pricing reform, and the scope for greater competition and private sector involvement in water and wastewater supply in urban areas (where this offers benefits). The NWI also provides the opportunity for increased trade between the rural and urban sectors and within urban areas.

The aims of market-based reforms are to:

- + get the signals right for consumption and investment (including in demand management) that could result in better matching of supply and demand
- + foster innovation that could improve urban water supply outcomes, including innovation in technologies; management and planning processes; and available products and services (such as water supply with different reliability and water quality characteristics)
- + provide services at least cost
- + use scarce water supplies in a way that meets all basic needs but better manages the allocation of water among competing water users.

This assessment considers the following market-based approaches:

- + competition and private sector involvement in water and wastewater supply
- + water trading
- + pricing reform.

#### Competition and private sector involvement

The Commission considers that future urban water reforms should consider opportunities for competition and private sector involvement, where that can offer benefits. As with pro-competitive reforms in other utility sectors (including electricity, gas and telecommunications), the expectation is that competition should deliver efficiency improvements, resulting in substantial cost savings and improved services to customers. Competition should also contribute to improving security of supply by encouraging innovation and investment in new supply options.

A range of competition models could be adapted and applied to the water sector (see Box 60).

#### Box 60: Models of competition

Models for competition could involve:

*Markets for the resource:* market-based options that are focused on establishing competitive markets for the exchange of water and wastewater. These market-based arrangements could include water trading (including intra-urban trading and rural–urban trading), water offset schemes, competitive sourcing of supply capacity, and wholesale markets for water and wastewater.

*Markets for service provision to end users:* market-based options that are designed to introduce competitive markets and/or contestable arrangements for the supply of water and wastewater services to end users. This could incorporate a range of options, including:

- competition within the market, allowing consumers to choose between a range of competing providers for the supply of a good or service
- competition for the market, allowing firms to compete for the right to provide water and wastewater services to customers in a defined geographical area.

Source: Frontier Economics (2008)

The current arrangements provide for some limited forms of competition in the supply and allocation of water resources and related services. In particular, the private sector has become increasingly involved in the industry via a range of contractual arrangements, predominantly for the competitive provision of inputs with a view to increasing the efficiency of service provision.

To date, however, there has been very little direct competition in the market for the supply of water and wastewater services to customers. Water and wastewater customers have generally had little choice of their supplier, the source of their water, or its level of security.

The jurisdictional reviews of the arrangements for urban water supply and the Productivity Commission's recent research paper have canvassed options for increasing competition. The most important recent developments in relation to competition and private sector involvement in urban water supply relate to:

- + the development of third-party access regimes by a number of jurisdictions
- + expanding the scope of competitive sourcing
- + exploring the scope for broader competitive reforms.

#### Third-party access

Third-party access can be defined (Marsden Jacob 2005, page 9) as the access or increased access granted to a new market entrant to an incumbent's infrastructure and services where these are:

- + a natural monopoly, i.e., it is more economic for a single facility or network system to supply the market than to duplicate the facility or network
- + essential in underpinning another (dependent) market where products and services can otherwise be competitively supplied.

There is increasing action and support for access-based competition in urban water supply. While access-based competition is possible under the National Access Regime, some jurisdictions are developing state-based access regimes to provide more streamlined access arrangements.

In 2008, New South Wales was the first state to allow access to water and wastewater infrastructure through a legislated third-party access regime. Private sector entry into the water and wastewater industry is now possible through the introduction of the *Water Industry Competition Act*, which provides an access regime for third-party access to Sydney and Hunter Water Corporations' water and wastewater network. The National Competition Council recommended to the Commonwealth Minister for Competition and Policy and Consumer Affairs that the regime be certified as an effective regime under the *Trade Practices Act* (NCC 2009a).

Using this Act, a \$100 million recycled water plant and pipeline system is to be built, owned and operated by AquaNet Sydney and Veolia Water Australia. The system will supply recycled water to major industrial customers in western Sydney.

Other jurisdictions, including Victoria, Queensland and Western Australia, have indicated that they will also introduce or consider state-based third-party access regimes. Victoria is the most advanced: the Victorian Government announced in July 2008 that it would develop an access regime for water and sewerage infrastructure services and has commissioned the Essential Services Commission to report on the design of the regime by 28 September 2009. The Victorian Government's response to the access regime recommendations is currently scheduled



for December 2009. The South Australian Government (2009b) has recently announced plans to develop a state-based third-party access regime that allows water and wastewater suppliers to access the water and wastewater infrastructure.

The Commission regards the development of the New South Wales regime—and the prospective development of regimes in other jurisdictions—as a significant step in urban water reform. However, it notes that the National Competition Council, in its draft recommendation on the New South Wales regime, identified a number of aspects where the regime would benefit from further consideration by the New South Wales Government, and by other governments developing third-party access arrangements for water infrastructure services (NCC 2009b). The Commission acknowledges that in undertaking its inquiry into an access regime for water and sewerage infrastructure services in Victoria, the Essential Services Commission has taken into account the NCC's feedback on New South Wales' access regime. The Commission supports the Essential Services Commission's approach in this regard.

The Commission expects the development of effective third-party access regimes in the water industry to support outcomes in relation to:

- + optimal operational water infrastructure and use of water from the diverse sources supplying urban water grids
- + appropriate signals for future supply and demand side investment, including innovative water recycling and reuse technologies and water sensitive urban design solutions
- + efficient water usage, by providing signals to consumers on efficient consumption and improved signals of the relative value of demand-side management measures.

Third-party access regimes can be overlaid on the existing institutional structure as a means of facilitating the entry of innovative new businesses. This means that opportunities for competition and private sector involvement are offered without having to make major and potentially costly changes to the basic industry structure.

The Commission notes that under the enhanced national urban water reform framework, COAG have agreed to 'promote the use of competition through an examination of barriers to third-party access and the costs and benefits of establishing a nationally consistent regime'. The Commission supports such a review; however, this should not delay progress at the state level.

### Access pricing

The access price levied by the incumbent service provider on the third party entrant to access services provided by the incumbent is an important factor affecting the financial viability of the services to be provided by the new entrant. The Commission notes that prior to certification, the National Competition Council assesses whether an access regime is an 'effective access regime' by applying relevant principles set out in the Competition Principles Agreement, which include pricing principles.

In relation to access pricing, the Commission supports transparent access pricing arrangements that accord with the Competition Principles Agreement so as to promote efficient resource and infrastructure use and innovative water supply options.

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#### ■ Finding 11.17

The Commission welcomes steps in some jurisdictions to introduce effective third-party access regimes as consistent with the efficiency and security objectives of the NWI. The Commission encourages other jurisdictions to follow suit, taking into account the National Competition Council's views on the design of such regimes.

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### Competitive sourcing

The use of competitive sourcing to foster innovation and efficiency has a long history in the urban sector. For example, Western Australia's desalination plant was completed under a 'Design, Build, Operate' framework; a similar strategy was used for the Gold Coast and Sydney plants; and outsourcing strategies have also been used to manage service delivery, as in the case of Adelaide's water supply.

To the extent that competitive sourcing is combined with a rigorous and transparent system planning process, it could improve security by ensuring that new capacity is commissioned in an optimal manner (for example, in terms of timing, cost, capacity increments and opportunities for innovation in meeting the identified supply needs).

### Broader competitive reforms

While third-party access and competitive sourcing are worthwhile and important, the Commission does not see them as the last word. In the future, it will be worth exploring opportunities for broader based competition in urban water supply—such as exists in other utility sectors.

For example, there may be scope for competitive markets in bulk and retail water supply. The Commission's view is that structural reform of the urban water sector would provide opportunities to ensure that competitive pressure is brought to bear where it makes sense to do so (for example, in sourcing water at the wholesale level and at the retail supply level).

## Water trading

Under the NWI, the Australian and state and territory governments have agreed to facilitate water trading between the urban and rural sectors. The NWI also supports trading of water within urban areas where it is feasible and efficient. Support for water trading is based on its allocative efficiency benefits—it allows water be allocated among competing water users (including rural and urban water users) based on the relative value that they place on the water.

### Rural–urban water trade

The trading of water between rural and urban areas requires:

- + a physical connection between the two systems and an ability to practically transport and manage the water flows
- + a policy framework that allows for such trade and that addresses transitional, adverse consequences of the trade (for example, on rural communities) when that is required (as discussed in Chapter 10)
- + mechanisms and processes by which trades can occur, such as the existing water markets or bilateral contractual arrangements.

The physical connectivity that would allow rural–urban water trade already exists in some areas, including Adelaide (River Murray), Melbourne (via the Thomson Dam and the planned Sugarloaf Interconnector) and Perth (links to the south-west of the state). There are plans to connect Canberra's main storages and the Murrumbidgee River, and the SEQ Water Grid will expand links between Brisbane and water sources in the region.

Examples of rural–urban water trade are increasing in Victoria, South Australia, the ACT and Queensland. The trades involve a variety of parties in urban areas (including governments, water authorities, businesses and individuals) and have been achieved in different ways (including purchases out of rural water markets, individual agreements and administrative allocations). The examples of rural and urban trade, including smaller scale examples in regional Victoria, demonstrate real benefits for all parties where water is allowed to move to its highest value use.

However, the Commission has concerns that there remain significant policy and institutional barriers to efficient rural–urban water trade in most jurisdictions (see Finding 11.7).

### Intra-urban water trade

The NWI also supports the development of opportunities for intra-urban water trade where they offer benefits and are practical. However, given the complexity and administrative costs involved, care is needed to ensure that the benefits outweigh the costs.

## Pricing

Improved water pricing is central to urban water reform. Water prices convey important signals to customers and signal the viability of investment in new sources of supply. Getting urban water charging right is therefore critical to ensuring that water is used wisely and that new sources of water supply are brought on line in a timely fashion.

A detailed assessment of progress in achieving NWI pricing objectives and actions is contained in Chapter 8. However, as noted in a recent paper for the Joint Steering Committee for Water Sensitive Cities, the current pricing arrangements are based on a particular industry paradigm, which does not contemplate competition in the water industry or the free entry of innovative supply options (Frontier Economics 2008). In particular, the current arrangements are consistent with the central determination of a price to end users, assume a monopoly supplier, and are based on a centrally determined plan to meet supply and demand over a forward planning period. They do not actively contemplate the potential for competition (rather than regulation) to be used to drive efficient outcomes and hence are not designed to provide signals for required new capacity. The Commission has been urging consideration of alternatives for some time. As part of an enhanced national urban water reform framework, COAG has recently agreed to investigate possible enhancements to pricing reform, including scarcity value of water and the valuation and recovery of environmental externalities.

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### ■ Finding 11.18

The Commission supports the COAG decision that jurisdictions will give active consideration to broader pricing reforms that go beyond the NWI requirements. This should include options for more market-based pricing approaches.

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## Appendix 2: Glossary of terms

**4% interim threshold limit on water trade:** an upper limit for the volume of water available for trade within an irrigation area from a waterway, catchment, basin or aquifer.

**adaptive environmental water** [NSW]: licensed water that can be used for environmental purposes, either through buying of water licences or through water recovery projects.

**bulk entitlement:** water supplied by a water provider to another water provider

**carryover:** the option to hold in storage a portion of unused seasonal allocations for use at a later date.

**Commonwealth Environmental Water Holder** [[www.environment.gov.au](http://www.environment.gov.au)]: The *Water Act 2007* established the Commonwealth Environmental Water Holder to manage the water entitlements that the Commonwealth acquires. Those entitlements will be used to protect or restore environmental assets such as wetlands and streams, including those in the Murray–Darling Basin.

**community service obligation (CSO)** [National Performance Framework, 2006]: the amount received or receivable from governments for specific agreed services to the community. A CSO must be:

- + a non-commercial product or service; that is, products and services whose provision is not in the commercial interests of a commercial business entity
- + clearly purchased by the government for delivery to the community on its behalf to achieve a specific social or economic objective that has been established by the government
- + purchased by the government from an appropriate commercial business entity.

**consumptive pool** [NWI]: 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.

**consumptive use** [NWI]: the use of water for private benefit consumptive purposes, including irrigation, industry, urban, stock and domestic use.

**Dethridge meters:** Invented by John Stewart Dethridge (1865–1926); simple, reasonably accurate and inexpensive devices for measuring the volume of water flow.

**environmental buyback programs:** programs designed to ‘purchase’ water entitlements, which would otherwise be used by irrigators, to ensure that certain environmental flow is ensured.

**environmental and other public benefit outcomes** [NWI]: defined as part of the water planning process and specified in water plans. May include:

- + environmental outcomes: maintaining ecosystem function (e.g. through periodic inundation of floodplain wetlands); biodiversity, water quality; river health targets
- + other public benefits: mitigating pollution, public health (e.g. limiting noxious algal blooms), Indigenous and cultural values, recreation, fisheries, tourism, navigation and amenity values.

**environmental manager:** an agency with overall managerial responsibility for the achievement of environmental objectives.

**environmental manager** [NWI]: an expertise-based function with clearly identified responsibility for the management of environmental water so as to give effect to the environmental objectives of statutory water plans. The institutional form of the environmental manager will vary from place to place, reflecting the scale at which the environmental objectives are set and the degree of active management of environmental water required. The environmental manager may be a separate body or an existing basin, catchment or river manager, provided that the function is assigned the necessary powers and resources, potential conflicts of interest are minimised, and lines of accountability are clear.

**environmental flow:** a water regime applied to a river, wetland or estuary to improve or maintain ecosystems and their benefits where there are competing water uses and where flows are regulated.

**environmental water requirements** [Australian Water Resources 2005]: descriptions of flow regimes (e.g. volume, timing, seasonality, duration) that are needed to sustain the ecological values of aquatic ecosystems, including their processes and biological diversity, and that are designed to provide environmental outcomes.

**environmentally sustainable level of extraction [NWI]:** the level of water extraction from a particular system which if exceeded would compromise key environmental assets or ecosystem functions and the productive base of the resource.

**externality:** occurs when a side-effect of a decision by an individual (or business) affects another party's wellbeing, but that effect is not taken into appropriate account by the decision maker.

**exchange rate [NWI]:** the rate of conversion calculated and agreed to be applied to water to be traded from one trading zone and/or jurisdiction to another.

**extraction rate [NWI]:** the rate, in terms of unit volume per unit time, that water can be drawn from a surface or groundwater system. Used in the NWI in the context of a constraint that might exist due to the impact of exceeding a particular extraction rate at a particular point or within a specified system.

**Groundwater Action Plan:** a comprehensive funding program initiated by the National Water Commission in 2007 to invest in projects which enhance groundwater management and improve our knowledge and understanding of groundwater.

**lower-bound pricing [NWI]:** the level at which, to be viable, a water business should recover, at least, the operational, maintenance and administrative costs, externalities, taxes or tax equivalence (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.

**managed aquifer recharge:** the management of returning water to aquifers through managed strategic percolation.

**metropolitan [NWI]:** refers to water and wastewater services provided in metropolitan urban areas having more than of 50,000 connections.

**non-consumptive use:** water use, such as hydroelectricity generation and in-stream environmental use, that does not reduce the amount of water available to other users.

**overallocation [NWI]:** refers to 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.

**overused [NWI]:** refers to situations where the total volume of water 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.

**Raising National Water Standards:** funding program administered by the National Water Commission offering support for projects which aim to improve Australia's national capacity to measure, monitor and manage our water resources.

**Ramsar** [www Ramsar.org]: Ramsar protected wetlands were established at the Convention on Wetlands, in Ramsar, Iran, in 1971. An intergovernmental treaty signed at the convention provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are currently 159 contracting parties to the convention, with 1,834 wetland sites totalling 170 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance.

**reliability [NWI]:** the frequency with which water allocated under a water access entitlement is able to be supplied in full. Referred to in some jurisdictions as 'high security' and 'general security'.

**river flow objectives [NSW]:** set out 12 aspects of flow considered to be critical for river health, ecology and biodiversity. Some of them aim to protect river levels; some protect flows; some maintain flow variability; some regulate water quality impacts.

**rural and regional:** refers to water and wastewater services provided for rural irrigation and industrial users and in regional urban areas with fewer than 50,000 connections.

**security:** the legal status and tenure of a right to access water. This includes the level of assurance that a water access entitlement will provide that which it specifies.

**structural adjustment:** the ongoing process of change in the relative size, composition and characteristics of industries and their workforces across all sectors of a national or regional economy in response to a range of environmental and market factors, technological change and government policy reforms.

**surface water:** water that flows over land and in watercourses or artificial channels and is able to be captured, stored and supplemented from dams and reservoirs.

**sustainable yield** [General]: the level of water extraction that should not be exceeded if environmental assets are not to be compromised.

**termination fee** [ACCC]: a fee levied by an irrigation infrastructure operator when a delivery entitlement is surrendered to the operator to terminate any rights or obligations associated with that delivery entitlement (including any requirement to pay an access fee).

**unbundling**: the separating into separate entitlements or licences of historical water entitlements that bundled water takes, land, water use, delivery and works approvals (for example, dams and intake and diversion gates).

**upper-bound pricing** [NWI]: the level at which, to avoid monopoly rents, a water business should not recover more than operational, maintenance and administrative costs, externalities, taxes or tax equivalent regimes (TERs), provision for the cost of asset consumption and cost of capital (calculated using a weighted average cost of capital, or WACC).

**water access entitlement** [NWI]: 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.

**water allocation** [NWI]: 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 charge rules** [ACCC]: rules made by the Minister for Climate Change and Water under s. 92 of the *Water Act 2007* that relate to regulated water charges.

**water plans**: statutory plans for surface and/or groundwater systems, consistent with the regional natural resource management plans, developed in consultation with all relevant stakeholders on the basis of best scientific and socioeconomic assessment, to provide secure ecological outcomes and resource security for users.

**water sensitive urban design**: the integration of urban planning with the management, protection and conservation of the urban water cycle to ensure that urban water management is sensitive to natural hydrological and ecological processes.

**water system**: a system that is hydrologically connected and described at the level desired for management purposes (e.g. subcatchment, catchment, basin or drainage division, groundwater management unit, sub-aquifer, aquifer, groundwater basin).

## Appendix 3: 2009 Biennial Assessment of Progress in Implementation Discussion Paper – December 2008

### **2009 Biennial Assessment Discussion Paper**

#### ***Purpose***

The purpose of this discussion paper is to invite stakeholders to make a submission to the National Water Commission (the Commission) 2009 Biennial Assessment of progress under the National Water Initiative (NWI). The paper informs stakeholders about the background to the biennial assessment and provides guidance on how to make a submission. The paper describes the purpose of the biennial assessment and describes each NWI objective, followed by some topics that stakeholders may want to discuss in their submission. However, the Commission welcomes submissions that raise issues beyond those identified in this paper.

#### ***The consultation process***

This discussion paper was prepared by the Commission and draws on information from other Commission publications and studies commissioned by other parties.

The Commission will use written submissions provided by stakeholders to inform the assessment of implementation of the NWI. The 2009 Biennial Assessment is due to be released in mid-2009.

The following sections present background and current issues relating to each objective, followed by the points of specific interest for stakeholders to respond to. Submissions do not need to be limited to these points, nor do they need to address all of the points under each section. Comments on other aspects of water policy, management and use are welcome.

#### ***Making a submission***

The Commission prefers that all written submissions be publicly available to foster an informed, robust and consultative process. Accordingly, submissions will be considered to be public and will be posted to the Commission website, unless the authors make a specific request that the submission remains in confidence.

If you do not want your submission to be public it should be clearly marked 'Confidential'. Reasons must be provided to support the request for confidentiality.

Submissions should be emailed to:

[submissions@nwc.gov.au](mailto:submissions@nwc.gov.au) (submissions should use the word 'Submission' in the title of the email)

Submissions may also be sent by post to:

The 2009 Biennial Assessment  
95 Northbourne Avenue  
CANBERRA ACT 2600

**The closing date for submissions is Friday, February 20, 2009.**

General enquiries may be directed to the Commission at [submissions@nwc.gov.au](mailto:submissions@nwc.gov.au)

## **Introduction**

The Intergovernmental Agreement on the National Water Initiative (NWI) requires the National Water Commission (the Commission) to make biennial assessments of progress in implementing the NWI (clause 106). The objectives of the biennial assessments are to:

- report to COAG on progress with implementation of the NWI
- advise COAG on matters to better realise the objectives and outcomes of the NWI

The first biennial assessment covered the period from the signing of the NWI in June 2004 to the end of March 2007, and was released in August 2007. In February 2008, the Commission provided an update of progress in water reform to the Council of Australian Governments (COAG) Working Group on Climate Change and Water.<sup>1</sup> This report updated the findings of the 2007 biennial assessment to take into account changes in the water policy environment, including the change of Federal government and the passage of the *Water Act 2007* (Cth).

The 2009 Biennial Assessment will report on progress in reform since the signing of the NWI, with a particular focus on the period from March 2007-March 2009.

The NWI agreement includes objectives, outcomes and agreed actions to be undertaken by governments. The objectives are:

- 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 over-allocated 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.

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<sup>1</sup> Web link to [progress report](#)

For background to the NWI assessment task, readers are referred to the 2007 Biennial Assessment. More detail about the NWI objectives can be found in the NWI itself, and in references such as the position statements posted on the Commission's website: [www.nwc.gov.au](http://www.nwc.gov.au)

## **1. Water entitlements**

Secure, nationally compatible water entitlements are fundamental to achieving NWI objectives. In its 2007 Biennial Assessment and subsequent 2008 Update Report to COAG on progress in water reform, the Commission found that almost all states and territories had made good progress in implementing water access entitlement and planning frameworks.

There are some emerging classes of entitlements that do not always have clear status. These include groundwater entitlements, particularly in areas without a management plan, interception entitlements, and entitlements to desalinated and recycled water. Confidence in water access entitlements and the security of entitled environmental water is declining in some areas.

The Commission notes that the progress of converting licences to entitlements is variable around the jurisdictions.

When considering entitlements, it is important to distinguish between the concepts of 'security' and 'reliability.' The security of an entitlement relates to the enforcement rights of the entitlement holder, such as the legislative basis for the entitlement. The reliability of an entitlement relates to the level of certainty that a holder has as to the amount of water that will be allocated to that entitlement.

The Commission seeks stakeholders' views about the following aspects of water access entitlements:

### **Nationally compatible water entitlements**

- 1.1. What progress has been made in converting water licences to water entitlements for surface and groundwater?
- 1.2. Which, if any, water sources, including new water sources or 'special cases' (see NWI paragraph 34), are not adequately covered by entitlements?
- 1.3. Are there water entitlements that cannot be included on a register, because of the way they are defined?

### **Security of different classes of water**

- 1.4. What progress has been made to ensure security of entitled environmental water? Is the security of entitled environmental water specified in the same way as security for other entitled water, and if so, is this realised on-ground?

## **2. Water planning**

To be responsive to current and future water use demands, a water plan must incorporate the best available science, socio-economic analysis and community input. Furthermore, water plans must take account of sustainable levels of extraction to address overused systems; unregulated activities that intercept significant volumes of surface and/or groundwater; Indigenous access needs, and ground and surface water connectivity.

Water plans also require water operational rules to meet objectives, and a monitoring program to determine if objectives are being met.

There is particular urgency about implementing water plans for current and potential stress water resource systems by 2011.

The Commission seeks stakeholders' views about the following aspects of the water allocation process:

#### Extent of water planning

- 2.1. Have water plans been developed for all water resources (not just stressed resources)? Which water resource(s) lack a water plan?
- 2.2. Are there resource or capacity constraints to the water planning process, such as staff availability, access to specialist skills and information gaps?

#### Quality of water plans developed

- 2.3. Are the objectives of water plans underpinned by the best available science and community input?
- 2.4. Is there adequate consultation and provision in the water plans for Indigenous water use? How could consultation with Indigenous communities be improved?
- 2.5. Have activities that intercept significant surface and/or groundwater been identified? How could the identification of these activities be improved?
- 2.6. Are water operational rules clearly defined and are they monitored to see if objectives are being achieved?

#### Progress of implementation

- 2.7. Are all water plans being rolled-out as agreed? Are there resource or capacity constraints to the roll-out of water plans?
- 2.8. Are you aware of any pending or finalised enforcement actions against parties that have breached water plan rules?

### **3. Environmental water**

Striking a balance between water for consumptive uses and water for ecosystem health—so that environmental, social and economic outcomes are optimised—is integral to the NWI. Without adequate and timely water, water-dependent ecosystems lose their capacity to provide services. In some cases, the losses may be irreversible; in others, they may be difficult and costly to reverse. Currently, many significant water-dependent ecosystems are under threat.

Work on High Conservation Value Aquatic Ecosystems (HCVAE) and the Framework for Assessing River and Wetland Health (FARWH) is allowing for better identification and understanding of environmental assets. However, a question remains about prioritisation and development of management plans and environmental watering plans. There are also issues about the establishment, independence and resourcing of environmental managers.

The Commission seeks stakeholders' views about the following aspects of environmental and other public benefit outcomes, and environmental management:



#### Defining environmental water

- 3.1. What progress been made in defining non-entitlement based environmental water?
- 3.2. What level of security is attached to this water, and how is this security applied relative to other entitlements?

#### Prioritising and managing environmental outcomes

- 3.3. Is non-entitlement based environmental water appropriately managed, monitored, reported and reviewed?
- 3.4. Have actions been implemented to enable environmental water, including groundwater, to be delivered or held?
- 3.5. Where water has been recovered for any purpose, what processes were followed and were the NWI principles specifically applied?

#### The role of environmental managers

- 3.6. In your experience, what is the relationship of the environmental water manager with other land and water management functions? How do they interact?
- 3.7. What institutions or individuals serve the role of environmental water manager? Is the manager part of a government agency, trust, private corporation or independent public corporation?
- 3.8. What are the functions and responsibilities of the environmental water manager? Are there any potential conflicts of interest?

### **4. Addressing overallocation and overuse**

A key outcome of the NWI is the implementation of firm pathways for returning overallocated or overused systems to environmentally sustainable levels of extraction.

The NWI defines 'allocation' as the specific volume of water allocated to water access entitlements in a given season, defined according to rules established in the relevant water plan. 'Overallocation' refers to situations where the total volume of water able to be extracted by entitlement holders at a given time exceeds the environmentally sustainable level of extraction.

However, significant volumes extracted from water systems may not be subject to water access entitlements at all. For example, aquifers under urban or peri urban areas, stock and domestic rights, and farm dams that are major extractive users all have lawful rights to take water that may not be covered by an entitlement. 'Overuse' refers to situations where the total volume of water extracted for consumptive use in a system at a given time exceeds the environmentally sustainable level.<sup>2</sup>

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<sup>2</sup> In specific circumstances the term 'use' can be problematic: water can be 'used' without being extracted; for example, water used for hydro power is returned to the system, even though it is 'used'

The NWC is particularly interested in stakeholders' views on the recognition of overallocation and overuse as an issue; the identification of systems that are overallocated and/or overused; and, the implementation of pathways to address overallocation and overuse.

#### Overallocation and overuse

- 4.1. Do you think the issue of overallocation and overuse is adequately incorporated into State, Territory and Commonwealth legislation, policy and programs?
- 4.2. Is there evidence that surface or groundwater systems in your jurisdiction are overused or overallocated?
- 4.3. Do you think water allocation plans result in the adequate identification of overallocated and overused systems?
- 4.4. Is the process for returning overallocated or overused water in your jurisdiction clearly defined and implemented? Is the process adequate to achieve the objective of a return to environmentally sustainable levels of extraction?

### 5. *Water markets*

The potential benefits of water trading in ensuring that increasingly scarce water resources are allocated to their most productive uses have long been recognised in Australia. The NWI identifies the following five outcomes that will result from the implementation of trading arrangements:

- the operation of efficient markets within and between the states and territories
- minimising transaction costs, including through information flows, registry and regulatory arrangements
- the development of a mix of water products and a mix of trading options ('deepening' the market)
- recognition and protection of the environment, and
- appropriate protection of third-party interests.

The Commission seeks stakeholders' views about the following aspects of the establishment of Australia's water markets. In providing your response, please indicate which jurisdiction you have been involved with trading (or if you have been involved in interstate trades).

- 5.1. Have you been involved in water trading, either directly with a transaction, or indirectly in the market? If so, did you have difficulties due to:
  - restrictions imposed on trade (such as the NWI 4% rule, 10% rule in Victoria or termination fees)?
  - market procedures (such as lack of market information, application processes/costs, trade approval times, the role of intermediaries, tagged trade?
  - any other reasons?
- 5.2. How have water trading processes improved? Have these improvements enabled you to trade more easily?

- 5.3. What has been your experience of accessing and using water registers (not only state government registers)? Have there been improvements in water registers, and do they now meet your requirements?

## **6. Risk assignment**

The assignment of risk related to changes in entitlements is important because it reduces uncertainty about the security of entitlements. The risk assignment provisions in the NWI are intended to apply after a system has been brought into balance and extraction is at sustainable levels.

Under the NWI, up to 2014, the risk of a reduced or less reliable water allocation is to be borne by users. After 2014, risk assignment provisions that distribute risks among users, state and territory governments and the Commonwealth Government must be implemented. Alternatively, the parties involved may agree to an alternative risk sharing formula (paragraph 51).

The Commission seeks stakeholders' views about the following aspects of the assignment of risk:

### **Awareness of risk assignment provisions**

- 6.1. Are you aware of the risk assignment provisions of the NWI? Do you understand what they mean?
- 6.2. What consultation processes discussing NWI risk assignment provisions have you been involved in?

### **Implications of risk assignment provisions**

- 6.3. What, if any, actions are you taking in light of the NWI risk assignment provisions? How do the provisions affect your pricing for risk?
- 6.4. What assistance could government offer, to help water users minimise their exposure to the risk of future changes to water availability?

## **7. Water accounting**

Standardised water accounting is important, because it lets us know how much water there is, where it is, who is using it, and what it's being used for. Standardised water accounting underlies public and investor confidence in the amount of water being delivered, traded, extracted for consumptive use, and managed for environmental and other public benefit outcomes.

The Commission seeks stakeholders' views about the following aspects of water accounting:

- 7.1. What progress has been made with the water accounting system? Does the water accounting system gather sufficient information on what water is available, who uses the water, and how it is used?
- 7.2. Is environmental water effectively accounted for, through the water planning process and/or water registers?
- 7.3. What progress has been made with metering systems to measure water extracted for non-urban use?
- 7.4. What progress has been made with monitoring of water use, and enforcement of rules governing water use?

## **8. Policy settings for water use efficiency and innovation**

Policy settings which seek to facilitate water use efficiency and innovation include: water trading; water pricing; water tariff, water metering and water account reform; improved institutional arrangements (including independent economic oversight of pricing arrangements); and policies that promote competition, contestability and water sensitive urban design. Getting each of these policy settings right is critical to ensuring that water is used wisely.

The NWI requirements for pricing and institutional arrangements require parties to implement water pricing and institutional arrangements that:

- promote economically efficient and sustainable use of water resources, water infrastructure assets and government resources devoted to the management of water
- ensure sufficient revenue streams to allow efficient delivery of the required services
- facilitate the efficient functioning of water markets
- give effect to the principles of user-pays and achieve pricing transparency in respect of water storage and delivery and cost recovery for water planning and management
- avoid perverse or unintended pricing outcomes, and
- provide appropriate mechanisms for the release of unallocated water.

The Commission seeks stakeholders' views on the following issues that relate to policy settings which facilitate efficient outcomes and innovation.

- 8.1. Is there a level playing field which underpins water trade? If not, what are the key reasons why? Stakeholders are encouraged to identify specific issues and provide supporting evidence.
- 8.2. What is your opinion on progress against NWI commitments in relation to water storage and delivery pricing, cost recovery for water planning and management, addressing environmental externalities, and waste water removal? (refer to NWI paragraphs 64 through 77)
- 8.3. Where institutional arrangements and charging are consistent with NWI principles, are there any actual or potential unintended outcomes? Do you have suggestions as to how these issues could be resolved?
- 8.4. Do NWI policy settings support efficient outcomes and promote innovation? Are you aware of any additional policy settings which would better facilitate the NWI's objectives for a more efficient and innovative water sector?

## **9. Addressing adjustment issues**

Adjustment pressures such as drought, an ageing farmer demographic, declining terms of trade and future water availability scenarios, including those that may emerge under climate change scenarios, bring into sharp focus the need to improve how governments handle adjustment in the coming years.

Under the NWI, parties are required to consult with affected water users, communities and industry about responses to address adjustment issues, 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) and
- the risk assignment framework referred to in paragraphs 46 to 51.

Under the NWI, the Commonwealth Government commits itself to discussing assistance to affected regions on a case by case basis with the relevant state or territory government.

The Commission seeks stakeholders' views about the following aspects of adjustment for water users and communities:

- 9.1. What measures are you aware of to monitor and evaluate adjustment issues?
- 9.2. Are you aware of any measures that have been used to address significant adjustment issues (e.g. capacity building or other forms of assistance)? Have these measures been successful in your view and how could they be improved?
- 9.3. In relation to water buy-backs, please describe any consultation that took place between government, community and industry about the volume of entitlements sought and the time frame over which the water would be recovered. How could consultation be improved further?

## **10. Integrated management of surface and groundwater**

When the NWI is fully implemented, all connected groundwater and surface water systems will be managed as a single resource.

The management of surface water and groundwater as a single resource is variable across the jurisdictions. In some cases, a failure to recognise and quantify connectivity is leading to double counting of water. This affects security of supply for all users, and puts groundwater dependent ecosystems such as lens lakes, wetlands and springs at risk.

The Commission seeks stakeholders' views about the following aspects of the connectivity between surface and groundwater resources:

- 10.1. In areas where surface and groundwater are connected, do you think that there are effective legislative, planning and management regimes in place to manage the connected system as a single resource?
- 10.2. Should trade be allowed between surface and groundwater entitlement holders?
- 10.3. Do you believe that environmental water provisions for groundwater dependent ecosystems are adequately addressed in planning and management regimes?
- 10.4. Are there adequate charging regimes in place to meet the costs of managing and monitoring groundwater resources to enable the management of connected systems?
- 10.5. If surface water and groundwater are to be managed as a single resource, do you think that the current levels of groundwater management are adequately

resourced? If not, what actions should be undertaken to improve management?

### **11. Urban water**

The urban water reforms under the NWI were framed prior to the emergence of recent critical pressures on supplies for most of mainland urban Australia as a result of major drought, climate variability and underlying demand growth.

The focus of the NWI urban reforms was on actions to strengthen demand management strategies and to foster innovation and capacity building to create water sensitive cities. The majority of specific actions set out in the NWI have now been substantially delivered with some further work to be done in some areas.

Since the NWI was signed, governments have undertaken major investments to bolster water supplies, and in some cases, undertaken major structural, institutional and related policy reforms. While the underlying driver has been to address critical security of supply issues, many of the reforms are broad ranging in nature and have moved beyond the specific commitments agreed in the NWI.

COAG has revisited the issue of urban water reform, and agreed a new set of nationally agreed urban water reform actions. [COAG reconfirmed nationally agreed objectives for urban water reforms – check following COAG announcement]

Against this dynamic background, the Commission is seeking stakeholder views on the following issues that relate to progress against specific urban reform commitments and progress in regard to the broader objectives agreed for urban water reform:

- 11.1. To what extent have the specific demand management reforms undertaken under the NWI been successful or not?
- 11.2. What has been the impact of water restrictions in managing water supply security, and what evidence is there to support your view?
- 11.3. In what ways do you think the community can be more effectively engaged and consulted in setting the levels of service for urban water supplies?
- 11.4. Taking into account both NWI reforms and other major initiatives by jurisdictions, are there major gaps or issues that need to be addressed by governments to create water sensitive cities?
- 11.5. Has there been adequate progress in developing alternative water sources for urban supply, or is there a need to consider further actions in this area?
- 11.6. Broader NWI planning principles apply in the urban context, with specific commitments to progress Integrated Urban Water Cycle Planning and Management. To what extent do you think current urban water planning meets NWI principles and objectives?

## Appendix 4: Public submissions received

Forty-five submissions were received from the following organisations and individuals. There was also one confidential submission.

Name and/or organisation	Location/Jurisdiction
Terrence Dwyer, Australian National University	Australian Capital Territory
Eriks Velins	Templestowe, Victoria
Dr Lin Crase, Dr Sue O'Keefe and Professor Brian Dollery, La Trobe University	Wodonga, Victoria
East End Mine Action Group	Queensland
Alison Joseph	Bullengarook, Victoria
Sharyn Munro	Singleton, New South Wales
Nell Schofield	Clandulla, New South Wales
Neville Peck	Submission received by email
David Penney	Christchurch, New Zealand
Sarah Moles	Goomburra, Queensland
Bruce O'Connor	Wards River, New South Wales
Dr Jennifer McKay, University of South Australia	South Australia
Mark Brindal, University of Adelaide	South Australia
Rivers SOS Alliance	New South Wales
Julia and Colin Imrie	Ulan, New South Wales
Amanda Albury	Limeburners Creek, New South Wales
Julie Favell	Blackmans Flat, New South Wales
John Whyte	Wentworth, New South Wales
Robert White, University of Melbourne	Victoria
Lithgow Environmental Group	New South Wales
Rio Tinto Iron	Western Australia
Queensland Conservation	Queensland
Water Services Association of Australia	
Environment Victoria	
Julie Sheppard	Razorback, New South Wales
George Gordon	Balwyn, Victoria
Western Australian Farmers' Federation	Western Australia
Queensland Murray–Darling Committee	Queensland
DHI Group	Queensland
Queensland Farmers' Federation	Queensland
Ross Knee	Australian Capital Territory
Andrea and Norman Sage	Submission received by email
Australian Academy of Technological Sciences and Engineering	



Name and/or organisation	Location/Jurisdiction
Engineers Australia	
Water Quality Research Australia	
National Farmers' Federation	
Minerals Council of Australia	
Goulburn–Murray Water	Victoria
Snowy River Alliance	
Barwon Water	
Australian Water Association	
Maria E. Riedl	Mildura, Victoria
Sydney Water	New South Wales
Australian Institute of Aboriginal and Torres Strait Islander Studies	
Australian Bankers' Association	

## Appendix 5: Consultancies commissioned to inform this assessment

Consultant name	Description
Alluvium Consulting	Review of environmental water management arrangements for the 2009 Biennial Assessment
Alluvium Consulting	Provision of general advice and support for the 2009 Biennial Assessment
Bligh Tanner	Report on urban water planning
DLA Phillips Fox	Review of NWI risk assignment provisions for the 2009 Biennial Assessment
Frontier Economics	Provision of general advice and support for the 2009 Biennial Assessment
Hamstead Consulting	Review of NWI parties' progress in meeting commitments in the areas of water planning and surface and groundwater resources management
Hyder Consulting	Review of transaction costs of water trade for the 2009 Biennial Assessment
Lawlab	Review of state and territory legislative provisions relevant to implementation of the National Water Initiative
PricewaterhouseCoopers	Review of water storage and delivery pricing arrangements for the 2009 Biennial Assessment
Stephen Saunders	Investigation into the improvement of enforcement and compliance in the rural water sector

## Appendix 6: Template for assessing quality of water plans

**Jurisdiction:** Insert jurisdiction

**Plan:** Insert water plan name

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**a) Characterisation of the resource**

1. Has the water resource to be managed been described (e.g. location, area, ground/surface water) in the plan?

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**b) Collection of data**

2. Has the water availability for use, water uses (both consumptive and non-consumptive), and potential water use been determined in the plan?
3. Has ecological data been collected to establish ecological water regime requirements?
4. Has an independent scientific panel, containing abiotic and biotic expertise, been established to assess the condition of the water source? (i.e. how was the technical data assessed?)
5. Has all abiotic, biotic and socioeconomic data used to inform the preparation of the plan been made publicly available?
6. Has a consultation process been established to identify water user needs (including Indigenous), and to settle trade-offs between competing outcomes?
7. Has the trade-off process been documented to make transparent the rationale for allocating the water resource? If so, briefly describe/comment.

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**c) Measurable objectives**

8. Have measurable management objectives been developed using best available science, socioeconomic analysis, and community input?

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**d) Water operational rules**

9. Have water operational rules been defined for the life of the plan to address the environmental and social objectives?
10. Has a consumptive pool, including water access entitlements (shares), been defined with the rules to allocate water during the life of the plan?

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**e) Monitoring arrangements**

11. Have monitoring arrangements been included for assessing if the objectives are being achieved in the plan?
  12. Are mechanisms (e.g. trigger points) included to modify the plan at any time during the life of the plan in response to new findings from the monitoring program, or other knowledge improvements?
-

## Appendix 7: Water plans reviewed to inform Chapter 5— Addressing overallocation and overuse

### Australian Capital Territory

ACT Water Sharing Plan (Water Resources Management Plan)

### New South Wales

#### Individual water sharing plans—Regulated water sources

Water Sharing Plan for the Gwydir Regulated Water Source

Water Sharing Plan for the Hunter Regulated Water Source

Water Sharing Plan for the Lachlan Regulated Water Source

Water Sharing Plan for the Macquarie and Cudgegong Regulated Rivers Water Source

Water Sharing Plan for the Murrumbidgee Regulated River Water Source

Water Sharing Plan for the Namoi Regulated River Water Source

Water Sharing Plan for the NSW Murray and Lower Darling Regulated Rivers Water Sources

Water Sharing Plan for the Paterson Regulated River Water Source

#### Individual water sharing plans—unregulated water sources

Water Sharing Plan for the Adelong Creek Water Source

Water Sharing Plan for the Apsley River Water Source

Water Sharing Plan for the Castlereagh River above Binnaway Water Source

Water Sharing Plan for the Commissioners Waters Water Source

Water Sharing Plan for the Coopers Creek Water Source

Water Sharing Plan for the Dorrigo Plateau Surface Water Source and Dorrigo Basalt Groundwater Source

Water Sharing Plan for the Jilliby Jilliby Creek Water Source

Water Sharing Plan for the Kangaroo River Water Source

Water Sharing Plan for the Karuah River Water Source

Water Sharing Plan for the Mandagery Creek Water Source

Water Sharing Plan for the Ourimbah Creek Water Source

Water Sharing Plan for the Phillips Creek, Mooki River, Quirindi Creek and Warrah Creek Water Sources

Water Sharing Plan for the Rocky Creek, Cobbadah, Upper Horton and Lower Horton Water Sources

Water Sharing Plan for the Tarcutta Creek Water Source

Water Sharing Plan for the Tenterfield Creek Water Source

Water Sharing Plan for the Toorumbbee Creek Water Source

Water Sharing Plan for the Upper Billabong Water Source

Water Sharing Plan for the Upper Brunswick River Water Source

Water Sharing Plan for the Wandella Creek Water Source

Water Sharing Plan for the Wybong Creek Water Source

### Individual water sharing plans—Groundwater sources

Water Sharing Plan for the Kulnura Mangrove Mountain Groundwater Source

Water Sharing Plan for the Tomago Tomaree Stockton Groundwater Sources

Water Sharing Plan for the Stuarts Point Groundwater Sources

Water Sharing Plan for the Alstonville Plateau Basalt Groundwater Source

Water Sharing Plan for the Lower Macquarie Groundwater Sources

Water Sharing Plan for the Lower Gwydir Groundwater Sources

Water Sharing Plan for the Lower Murrumbidgee Groundwater Sources

Water Sharing Plan for the Lower Murray Groundwater Sources

Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources

Water Sharing Plan for the Lower Lachlan Groundwater Sources

Water Sharing Plan for the NSW Great Artesian Basin Groundwater Sources

### Macro water sharing plans—Unregulated and alluvial water systems

Water Sharing Plan for the Bellinger River Area Unregulated and Alluvial Water Sources

### Northern Territory

Alice Springs Water Resources Strategy

Ti Tree Region Water Resources Strategy

### Queensland

Barron (water resource plan and resource operations plan)

Border Rivers (water resource plan and resource operations plan)

Boyne River Basin (water resource plan and resource operations plan)

Burdekin Basin (water resource plan)

Burnett Basin (water resource plan and resource operations plan)

Calliope River Basin (water resource plan and resource operations plan)

Georgina and Diamantina (water resource plan and resource operations plan)

Condamine-Balonne (water resource plan and resource operations plan)

Cooper Creek (water resource plan)

Fitzroy Basin (water resource plan and resource operations plan)

Gold Coast (water resource plan)

Great Artesian Basin (water resource plan and resource operations plan)

Gulf (water resource plan)

Logan Basin (water resource plan)

Moonie (water resource plan and resource operations plan)

Mitchell (water resource plan)

Mary Basin (water resource plan)

Moreton (water resource plan)

Pioneer Valley (water resource plan and resource operations plan)

Warrego/Paroo/Bulloo & Nebine (water resource plan and resource operations plan)

## South Australia

### Surface water plans

Morambro Creek and Nyroca Channel Prescribed Watercourses including Cockatoo Lake and the Prescribed Surface Area Water Management Plan

River Murray Prescribed Watercourse Water Allocation Plan

Barossa Prescribed Water Resources Area Water Allocation Plan

Clare Valley Prescribed Water Resources Area Water Allocation Plan

### Groundwater plans

Angas Bremer Prescribed Wells Area Water Allocation Plan

Comaum–Caroline Prescribed Wells Area Water Allocation Plan

Lacepede Kongorong Prescribed Wells Area Water Allocation Plan

Mallee Prescribed Wells Area Water Allocation Plan

McLaren Vale Prescribed Wells Area Water Allocation Plan

Musgrave Prescribed Wells Area Water Allocation Plan

Naracoorte Ranges Prescribed Wells Area Water Allocation Plan

Noora Prescribed Wells Area Water Allocation Plan

Northern Adelaide Plains Prescribed Wells Area Water Allocation Plan

Padthaway Prescribed Wells Area Water Allocation Plan

Southern Basins Prescribed Wells Area Water Allocation Plan

Tatiara Prescribed Wells Area Water Allocation Plan

Tintinara Coonalpyn Prescribed Wells Area Water Allocation Plan

## Tasmania

Greater Forester Water Management Plan

Lakes Sorell and Crescent Water Management Plan

Little Swanport Water Management Plan

Mersey Water Management Plan

River Clyde Water Management Plan

## Victoria

### Surface water management plans

Diamond Creek Water Supply Protection Area Streamflow Management Plan

Hoddles Creek Water Supply Protection Area Streamflow Management Plan

Plenty River Water Supply Protection Area Streamflow Management Plan

Steels / Pauls / Dixons Creeks Water Supply Protection Area Streamflow Management Plan

Olinda Creek Water Supply Protection Area Streamflow Management Plan

Stringybark Creek Water Supply Protection Area Streamflow Management Plan

### Groundwater management plans

Campaspe Deep Lead Water Supply Protection Area Groundwater Management Plan

Groundwater Management Plan for the Katunga Water Supply Protection Area

Murrayville Groundwater Supply Protection Area Management Plan

Neuarpur Groundwater Supply Protection Area Management Plan

Nullawarre Groundwater Supply Protection Area Groundwater Management Plan

Shepparton Irrigation Region Groundwater Supply Protection Area Groundwater Management Plan

Spring Hill Water Supply Protection Area Groundwater Management Plan

Yangery Water Supply Protection Area Groundwater Management Plan

### Western Australia

Ord River Surface Water Management Plan

Broome Groundwater Areas Management Plan

Derby Groundwater Areas Management Plan

Carnarvon Artesian Basin Water Management Plan

Lower Gascoyne River Groundwater Management Strategy

Cockburn Groundwater Management Plan

Kemerton Groundwater Sub areas Management Plan

Esperance Groundwater Water Management Plan





# Abbreviations

ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
ACTEW	ACTEW Corporation Limited
AWD	available water determinations
AWR	Australian water resources assessment (2000 and 2005)
AWRIS	Australian Water Resources Information System
BoM	Bureau of Meteorology
CIT	Central Irrigation Trust
CMA	catchment management authority
COAG	Council of Australian Governments
CRC	cooperative research centre
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSO	Community Service Obligation
DERM	(Queensland) Department of Environment and Resource Management
DEWHA	(Commonwealth) Department of the Environment, Water, Heritage and the Arts
DPI	Department of Primary Industries
DPIW	(Tasmania) Department of Primary Industries and Water
DSE	(Victoria) Department of Sustainability and Environment
DWE	(New South Wales) Department of Water and Energy
EC payments	Exceptional Circumstances payments
E-mod	ecological modeller
ERA	Economic Regulation Authority (Western Australia)
ERWS	Economic Regulator of Water and Sewerage
ESCOSA	Essential Services Commission of South Australia
GTE	government trading enterprise
HIZ/LIZ	high impact zone / low impact zone
ICRC	Independent Competition and Regulatory Commission
IGA	intergovernmental agreement
IMEF	Integrated Monitoring of Environmental Flows
IPART	(New South Wales) Independent Pricing and Regulatory Tribunal
IUWCM	integrated urban water cycle management
MDB	Murray–Darling Basin
MDBA	Murray–Darling Basin Authority
MPEPP	minerals, petroleum, energy generation pulp and paper
NCC	National Competition Council

NCP	National Competition Policy
NFF	National Farmers' Federation
NMI	National Measurement Institute
NRM	natural resource management
NRMMC	Natural Resource Management Ministerial Council
NRSWS	Northern Region Sustainable Water Strategy
NSW	New South Wales
NT	Northern Territory
NWC	National Water Commission
NWI	National Water Initiative
QFF	Queensland Farmers' Federation
Qld	Queensland
QWC	Queensland Water Commission
ROP	resource operations plan
SA	South Australia
SEQ	South-East Queensland
SOD	state of destination
SOO	state of origin
SRA	Sustainable Rivers Audit
states	states and territories
SWS	sustainable water strategy
TER	tax equivalent regime
VCEC	Victorian Competition and Efficiency Commission
VEFMAP	Victorian Environmental Flow and Monitoring Program
WA	Western Australia
WACC	weighted average cost of capital
WACF	Water Accounting Conceptual Framework
WADC	Water Accounting Development Committee
WADCO	Water Accounting Development Committee Office
WASB	Water Accounting Standards Board
WELS	Water Efficiency Labelling and Standards Scheme
WMP	water management plan
WRP	water resource plan
WSC	water sensitive cities

