

Australian Government National Water Commission



The National Water Initiative securing Australia's water future

2011 assessment



Australian Government National Water Commission



The National Water Initiative securing Australia's water future

2011 assessment

© Commonwealth of Australia 2011

This work is copyright.

Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission from the Commonwealth. Requests and enquiries concerning reproduction and rights should be addressed to the Commonwealth Copyright Administration, Attorney General's Department, National Circuit, Barton ACT 2600 or posted at *www.ag.gov.au/cca*.

ISBN 978-1-921853-27-2

The National Water Initiative-securing Australia's water future: 2011 assessment, September 2011

Published by the National Water Commission 95 Northbourne Avenue Canberra ACT 2600 Tel: 02 6102 6000

Email: enquiries@nwc.gov.au

Date of publication: September 2011

Design by Papercut

Printed by Paragon Printers

Front cover image courtesy of CSIRO

An appropriate citation for this publication is: National Water Commission 2011, *The National Water Initiative—securing Australia's water future:* 2011 assessment, NWC, Canberra



Chair

The Hon Julia Gillard MP Prime Minister of Australia Parliament House CANBERRA ACT 2600

Dear Prime Minister

It is with pleasure that I deliver to you, as Chair of the Council of Australian Governments (COAG), the National Water Commission's third biennial assessment of the 2004 National Water Initiative (NWI). The report is a comprehensive review of the NWI as required under Section 7 of the *National Water Commission Act 2004*.

Drawing on the findings of the review, the Commission recommends twelve critical actions to reinvigorate the water reform agenda.

In a continent characterised by a highly variable climate, and in the face of expected climate change impacts, sustainable management of Australia's water is an enduring national imperative. The NWI is a notable achievement in the development of Australia's approach to water resource management. It articulated for the first time a nationally agreed, coherent set of principles and reform actions for water to achieve optimal economic, social and environmental outcomes. Those principles have been shown to be robust and effective over the seven years since the NWI was agreed by COAG. It is applauded internationally as a model for sound water governance, for addressing the challenges of cross-jurisdictional management of shared resources, and for harnessing the power of markets and price signals to encourage efficient water use and investment.

Achieving sustainable water management is, nevertheless, a long haul game. Experience since 2004 has shown that implementing water reform is challenging, resource intensive and complex. It requires strong leadership to build and sustain the case for change across affected communities and to make difficult decisions that are in the public interest. This is particularly so where rebalancing is required to address historic overallocation of water rights.

Against this backdrop, the Commission's review has revealed that, to a lesser or greater extent, all parties to the NWI have made solid progress in delivering on their reform commitments. These efforts are delivering real gains for water users and the environment.

State and territory governments have, for the most part, provided water users and the environment with clear, statutory water access rights and have extended and improved the quality of water planning. Where implemented, water markets and water pricing reforms are delivering economic benefits at the individual, business and community level. Environmental water management has become an embedded feature of water governance arrangements. While improvement in ecological health takes time and is not yet assured, we can have some confidence that Australia is now better placed to protect and sustainably manage water-dependent ecosystems.

At the Australian government level, an historic investment program nationwide and the governance reforms in the Murray–Darling Basin provide an opportunity to achieve a step change in sustainable water management. Water recovery in the Murray–Darling Basin is already delivering benefits, although attaining a basin-wide plan to guide long-term performance remains a substantial institutional, political and social challenge.

95 Northbourne Avenue CANBERRA ACT 2601 • Telephone: 02 6102 6000 • Facsimile: 02 6102 6006 Email: chloe.munro@nwc.gov.au Despite this progress, the Commission is disappointed that the available benefits of water reform have not been fully achieved. Delays and gaps in implementation, less than adequate resourcing of the reform effort—particularly in core planning, science and monitoring—and examples of ad hoc decisions and backsliding have compromised the gains that Australia's citizens and our environment should expect from the NWI.

The Commission is particularly frustrated that the stated commitment of NWI parties to make substantial progress by 2010 in adjusting all overallocated or overused water systems to sustainable levels of extraction has not been met. We also share the disappointment expressed to us by many stakeholders that public support for reform actions has often been weakened by ineffective engagement and consultation.

Just as the NWI represented a milestone for water management in Australia, our review has found important areas where a maturing agenda now demands new reform measures. In particular, urban water reform commitments in the NWI were limited in scope. A more coherent reform plan is required for this increasingly complex and diverse sector, which is now being seen as a central player in the wider context of liveable cities and sustainable communities.

Changes in water use driven by broader economic developments and government policies have led the Commission to recommend a new focus on aligning policy frameworks for water management and related areas such as mining and climate change mitigation and adaptation. There are also significant opportunities for better linkages between water and natural resource management approaches in both planning and implementation.

With recent welcome rains across much of Australia, public concern about water security has abated, and some of the urgency felt during the early years of the NWI has dissipated. At the same time, new developments like coal seam gas demonstrate that the contest between different users of water, including the environment, and the challenges of establishing an effective management regime are as confronting as ever. The prospect of increased climate variability and the inevitable return to drought also highlight the crucial need to maintain the course on water reform.

As stewards of the nation's water resources over the longer term, NWI parties have an obligation to sustain a commitment to reform and to ensure that public resources for water management are both adequate and effectively targeted. The Commission has made important recommendations to COAG to strategically plan and appropriately resource water information, science and skills development, and to reinvigorate the mechanics and assessment of the COAG water reform work program.

Leadership by COAG parties collectively and by the Australian, state and territory governments individually is indispensable. The Commission urges you, and all first ministers in Australia, to embrace the recommendations in this report and make sustainable water management a proud reality for Australia.

Yours sincerely

Chloe Munro 5 August 2011

Contents

Executive overview	1
Australian water reform	3
Impacts Headline recommendations	
The National Water Initiative	21
The context for this assessment	
Previous assessments of reform progress	22
Approach to this assessment	22
Information sources	23
1 Governance	25
Summary of impacts	27
1.1 Water access entitlements	28
1.2 Statutory water plans	30
1.3 Interception and mining	39
1.4 Indigenous water	44
1.5 Risk assignment	46
1.6 Water accounting and information	48
1.7 Metering water extraction and use	50
1.8 Compliance and enforcement	51
1.9 Science and skills	52
1.10 Accountability and nationally compatible approaches	55
Summary of findings	57
2 More productive and efficient water use	59
Summary of impacts	61
2.1 Efficient water markets and water trading	62
2.2 Pricing and institutional reform	77
Summary of findings	

3	Sustainable water management	91
Sum	nmary of impacts	93
3.1	Understanding water resources	94
3.2	Identifying environmental objectives and water regimes	100
3.3	Returning systems to sustainable levels of extraction	101
3.4	Recovery of water for the environment	105
3.5	Increased security of environmental water	108
3.6	Environmental water management	110
Sun	nmary of findings	117
4	Communities	119
Sum	nmary of impacts	121
4.1	Rural communities	122
4.2	Metropolitan and regional urban communities	129
Sun	nmary of findings	142
App	endix A: NRMMC performance indicator report 2011	144
201	1 update of performance	144
NWI	Objective 1: Clear and nationally compatible characteristics for secure water access entitlements	145
NWI	Objective 2: Transparent, statutory-based water planning	147
NWI envi	Objective 3: Statutory provision for environmental and other public benefit outcomes, and improved ronmental management practices	150
NWI sust	Objective 4: Complete the return of all currently overallocated or overused systems to environmentally ainable levels of extraction	166
NWI the	Objective 5: Progressive removal of barriers to trade in water and meeting other requirements to facilitate broadening and deepening of the water market, with an open trading market to be in place	170
NWI for t	Objective 6: Clarity around the assignment of risk arising from future changes in the availability of water he consumptive pool	180
NWI in re	Objective 7: Water accounting which is manageable to meet the information needs of different water systems espect to planning, monitoring, trading, environmental management and on-farm management	185
NWI	Objective 8: Policy settings which facilitate water use efficiency and innovation in urban and rural areas	185
NWI	Objective 9: Addressing future adjustment issues that may impact on water users and communities	195
NWI syst	Objective 10: Recognition of the connectivity between surface and groundwater resources and connected tems managed as a single resource	196

Appendix B: Summary of progress on NWI actions	200
Australian Government	200
Australian Capital Territory	210
New South Wales	218
Northern Territory	239
Queensland	247
South Australia	263
Tasmania	278
Victoria	289
Western Australia	306
Appendix B references	320
Appendix C: Consultations for this review	324
Appendix D: RSMG model description	329
Appendix E: Murray–Darling Basin trade, market and charge rules	336
References	338
Abbreviations and acronyms	345
Glossary of terms	347
Index	350

Tables

Table 1.1:	Purpose, scope, extent and regulatory effect of water plans, by jurisdiction	31
Table 1.2:	Extent of water planning	34
Table 1.3:	Water plans reviewed for this assessment	36
Table 2.1:	Percentage of Murray–Darling Basin irrigation farms trading water, by agricultural sector, 2006–07 to 2008–09	70
Table 2.2:	Pricing functions and coverage of independent economic regulators	78
Table 3.1:	Jurisdictional responses on performance indicators for overallocation and overuse	102
Table 3.2:	Numbers of overallocated, overused and fully allocated systems identified in water plans, 2009 and 2011	103
Table 3.3:	State priority projects funded under the Sustainable Rural Water Use and Infrastructure Program	105
Table 3.4:	Water recovered under the Restoring the Balance buyback program (to 31 May 2011)	106
Table 3.5:	Water recovery measures listed on The Living Murray Environmental Water Register	107
Table 3.6:	Methods for defining and providing environmental water	109
Table 3.7:	Environmental water managers for each jurisdiction	111
Table 3.8:	Examples of monitoring and reporting on plan performance	114
Table 4.1:	Agricultural value, water use and trading, 2000–01 and 2005–06	126
Table 4.2:	Large desalination plants	129
Table 4.3:	Total recycled water supplied (ML)	130
Table 4.4:	Future price paths for urban water businesses	133
Table 4.5:	Average annual residential water supplied, major capital city utilities, 2005–06 to 2009–10 (kL/property)	
	for utilities with 100 000+ connected properties	135
Table 4.6:	Percentage of population for which microbiological compliance was achieved,	
	utilities with 100 000+ connected properties, 2005–06 to 2009–10	137
Table A.1:	Government decisions that revoke or change the security of statutory water access entitlements	
	and the reasons for these decisions, 2005 and 2011	146
Table A.2:	Ground and surface water resources covered by water plans, 2004–05 and 2011	148
Table A.3:	Water plans reviewed for performance indicator 3.2	152
Table A.4:	Extent to which actions have been implemented to achieve environmental and other public benefit outcomes defined in water plans	153
Table A 5 [.]	Water resource condition assessment programs by jurisdiction	160
Table A 6	Evidence of environmental management plan or system 2006–07 to 2009–10	165
Table A 7	Identified overallocated and/or overused or fully allocated systems or subsystems. 2009 and 2011	167
Table A 8:	Overallocated and/or overused systems or subsystems reported by jurisdictions. 2009 and 2011	168
Table A 9	Water trade approval times MDB jurisdictions 2008–09 and 2009–10	173
Table A 10 [.]	Water trade approval times, non-MDB jurisdictions, 2009–10	174
Table A 11	Number and proportion of applications rejected by state and territory approval authorities. 2004–05 and 2009–10	175
Table A 12	Administrative cost of water trade 2009 and 2011	177
Table A 13	Application of risk assignment provisions 2005 2009 and 2011	181
Table A 14	Water application rates for irrigated agriculture, average of all irrigated pastures or crops, 2004–05 and 2009–10 (MI /ba)	188
Table A 15	Becognition of surface water – groundwater connectivity 2009 and 2011	197
Table C. 1	Meetings with state and territory agencies	324
Table C.7	Submissions received	325
Table C.4	Stakeholder forum	327
Table C.8	Consultancies commissioned	328
Table D 1	Summary—Baseline scenario representing pre-NWI basin land and water use, sequential solution	330
Table D 2	Baseline irrinated area hy catchment and state (2000 ha)	331
Table D 3	Baseline water use, by catchment (GL)	332
Table D 1.	Baseline gross value of irrigated production, by catchment (\$m)	335
Table D 5.	Baseline net value of irrigated production, by catchment and state (\$m)	<i>333</i>
Table D.J.	Summary-Reseline scenario representing pro-NWI basin land and water use allohal solution	33V
Table D.U.	Difference in key model attributes between the sequential and dlobal runs—notantial gains with fully unimpeded water trade	224
10010 D.1.		000

Figures

Figure 2.1:	Volume of allocation trade, southern Murray–Darling Basin, 1983–84 to 2009–10 (ML)	63
Figure 2.2:	Water allocation levels and proportion traded, southern Murray–Darling Basin, 1998–99 to 2009–10	63
Figure 2.3:	Entitlement trade volumes in the southern Murray–Darling Basin, 1983–84 to 2009–10 (ML)	64
Figure 2.4:	Entitlement trade volumes in the northern Murray–Darling Basin, 2007–08 to 2009–10 (ML)	64
Figure 2.5:	Total entitlement trade in the southern Murray–Darling Basin, 2007–08 to 2009–10, by reliability class	65
Figure 2.6:	Allocation trade outside the Murray–Darling Basin, 2007–08 to 2009–10 (GL)	66
Figure 2.7:	Entitlement trade outside the Murray–Darling Basin, 2007–08 to 2009–10 (GL)	66
Figure 2.8:	Inflation-adjusted gross value of irrigated agricultural production per megalitre of water in the Murray–Darling Basin	
	for various commodities (\$)	67
Figure 2.9:	Index of water consumption in the Murray–Darling Basin, by agricultural commodity, 2000–01 to 2008–09	68
Figure 2.10:	Proportion of water trading farms that bought or sold water, by industry, 2006–07 to 2008–09	70
Figure 2.11:	Rice production, rice prices and water allocation prices, Murrumbidgee, 2005–06 to 2009–10	71
Figure 2.12:	Residential water consumption, 2004–05 to 2009–10 (kL/property)	81
Figure 2.13:	Return on assets, major utilities, 2000–01 to 2002–03 (%)	83
Figure 2.14:	Economic real rates of return, major utilities, 2005–06 to 2009–2010 (%)	83
Figure 2.15:	Economic real rates of return, regional urban water businesses with fewer than 50 000 connections,	0.4
Eiguro 1 1.	Z005-00 to 2009-2010 (%)	120
Figure 4.1.	Two local register table by utility give group 2007, 09 to 2000, 10 (\$)	100
Figure 4.2.	Noturna of water used for consumptive purposes $2004, 05$ and $2009, 00$ (CL (year)	152
Figure A.1.	Tatal pat graphausa gao amigiana urban water utilitian 2005 . 06 to 2000 . 10	150
FIGULE A.2.	(net tonnes CO,-equivalent per 1000 properties)	163
Figure A.3:	Sewer overflows reported to the environmental regulator, utilities with 100 000+ connected properties,	
-	2008–09 and 2009–10 (per 100 km of main)	163
Figure A.4:	Total net greenhouse gas emissions, rural water service providers, 2006–07 to 2009–10 (net tonnes CO ₂ -equivalent)	164
Figure A.5:	Entitlement trade intensity, by number, 2004–05 to 2009–10 (percentage of total entitlements on issue)	171
Figure A.6:	Entitlement trade intensity, by volume, 2004–05 to 2009–10 (percentage of total volume of entitlement on issue)	171
Figure A.7:	Allocation trade intensity, by number, 2008–09 and 2009–10	172
Figure A.8:	Allocation trade intensity, by volume, 2007–08 to 2009–10 (GL)	172
Figure A.9:	Minimum and maximum cost of entitlement trade, 2011 (\$)	179
Figure A.10:	Minimum and maximum cost of allocation trade, 2011 (\$)	179
Figure A.11:	Minimum and maximum cost to lease an entitlement, 2011 (\$)	180
Figure A.12:	Irrigated area for each irrigation method, 2004–05 and 2008–09 (percentage of total irrigated area)	186
Figure A.13:	Gross value of irrigated agricultural production, 2004–05 and 2008–09 (\$/ML)	187
Figure A.14:	Household water consumption per capita, 2004–05 and 2008–09 (L/day)	189
Figure A.15:	Water supplied to users, by source, 2004–05 and 2008–09 (%)	190
Figure A.16:	Water losses in distribution systems, 2004–05 and 2008–09 (%)	191
Figure A.17:	Net profit after tax, urban water utilities, 2008–09 and 2009–10 (%)	192
Figure A.18:	Economic real rate of return, major utilities, 2005–06 to 2009–10 (%)	193
Figure A.19:	Economic real rate of return, rural water businesses, 2006-07 to 2009-10 (%)	193
Figure A.20:	Combined operating cost-water and sewerage, for utilities with 100 000+ connected properties,	
	2005–06 to 2009–10 (\$/property)	194
Figure A.21:	Operating expenditure for rural water service providers, 2006–07 to 2009–10 (\$/megalitre supplied)	195

Boxes

The National Water Initiative		3
Box 1.1:	Status of unbundling of water rights in Australia	29
Box 1.2:	Draft NWI Policy Guidelines for Water Planning and Management	30
Box 1.3:	Suspension of water sharing plans in New South Wales	37
Box 1.4:	Commonwealth water governance reforms—the Water Act 2007	38
Box 1.5:	Initial estimates of interception activities	40
Box 1.6:	Addressing historical mining arrangements in Queensland	42
Box 1.7:	Indigenous water projects funded under the Commission's Raising National Water Standards Program	45
Box 1.8:	Risk assignment under the National Water Initiative agreement	47
Box 1.9:	The Bureau of Meteorology's role and responsibilities in water information	49
Box 1.10:	Source Rivers	53
Box 1.11:	National Centre for Groundwater Research and Training	54
Box 1.12:	Environmental water manager community of practice	55
Box 2.1:	Gross value of irrigated agricultural production—some limitations	68
Box 2.2:	Modelling the economic benefits of the National Water Initiative in the Murray–Darling Basin	69
Box 2.3:	Production choices and water movement in the southern Murray–Darling Basin—the case of rice growing	71
Box 2.4:	Victorian allocation trade suspension	73
Box 2.5:	COAG service standards for processing water trades	75
Box 3.1:	CSIRO Water for a Healthy Country National Research Flagship	95
Box 3.2:	Improving our understanding of water resources in Northern Australia	96
Box 3.3:	The Commission's Groundwater Action Plan	99
Box 3.4:	Environmental sustainability—some definitions	101
Box 3.5:	The Murray–Darling Basin Plan	104
Box 3.6:	Planned and held environmental water	109
Box 3.7:	Managing the Commonwealth's environmental water holdings	112
Box 3.8:	Reporting on outcomes of watering events at Hattah Lakes, Victoria	116
Box 4.1:	Community engagement in the development of the Murray-Darling Basin Plan	124
Box 4.2:	Australian Government funding for water supply diversification	131
Box 4.3:	Managed aquifer recharge on the Swan coastal plain in Western Australia	131
Box 4.4:	Consumer protection frameworks	134
Box 4.5:	Integrated urban water cycle management	140
Box 4.6:	Integrated water management strategy-south-east Melbourne	141
Box A.1:	Chronology of the development of NRMMC performance indicators	145



Executive overview

Executive overview

This report is the third biennial assessment of the implementation of the National Water Initiative (NWI) undertaken by the National Water Commission (the Commission). The *National Water Commission Act 2004* requires that this assessment be a comprehensive review of the NWI, including the extent to which the initiative has improved the sustainable management of Australia's water resources and contributed to the national interest. The report demonstrates significant progress in water reform in Australia, analyses the gains that have been made, and sets out what remains to be done so that the nation is well placed to respond to future challenges.

This overview identifies the core features of the NWI, identifies impacts and achievements and presents recommendations for future action.

Australian water reform

The NWI is a commitment by all state and territory governments and the Australian Government through the Council of Australian Governments (COAG). It maps out Australia's water use and management objectives and the actions that each party will undertake. It acknowledges the importance of economically efficient and environmentally sustainable water management to Australia. Its principles remain robust and relevant now and into the future.

At its heart, the NWI sets out the basis on which freshwater resources are to be shared to support resilient and viable communities, healthy freshwater ecosystems and economic development, especially in the irrigated agriculture sector.

Established through an intergovernmental agreement in 2004, the NWI is a joint commitment to achieve a 'nationally compatible, market, regulatory and planning based system of managing surface water and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes'.

The initiative created a coherent and comprehensive framework for the management of Australia's water resources.

The National Water Initiative

The NWI sets out a number of specific objectives that, when fully achieved, would have a major impact on water management. Clause 23 of the agreement states that full implementation of the NWI will achieve:

- + *effective water planning:* transparent and statutory-based water planning that deals with key issues such as the natural variability of water systems, major water interception activities, the interaction between surface water and groundwater systems, and the provision of water to achieve specific environmental outcomes
- + *clear, nationally compatible and secure water access entitlements:* providing more confidence for those investing in the water industry through more secure water entitlements; better and more compatible registry arrangements; better monitoring, reporting and accounting; and improved public access to information
- + *conjunctive management of surface water and groundwater resources:* so that the connectivity between the two is recognised, and connected systems are managed in an integrated manner
- + resolution of overallocation and overuse: returning overallocated systems to sustainable levels of extraction as quickly as possible
- + *clear assignment of the risks associated with changes in future water availability:* ensuring that the risks arising from reductions in the pool of water available for consumptive use are shared between governments and water users according to an agreed framework, to provide investors and entitlement holders with certainty about how changes will be dealt with
- + *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 confidence about the amount of water being delivered, traded, extracted and managed for environmental and other public benefits
- + open water markets: removing artificial barriers to trading in water entitlements and allocations, bringing about more productive water use and enabling more cost-effective and flexible recovery of water to achieve economic, social and environmental objectives
- + *effective structural adjustment:* ensuring that water policy, planning and management are facilitating and expediting adjustment, rather than impeding it.

These actions, taken together, would achieve:

- + economically efficient water use and related investment that maximise the economic, social and environmental value of Australia's water resources
- + improved environmental water outcomes, including the identification and effective and efficient delivery of water to sustain the health of water-dependent ecosystems of waterways and wetlands.

The NWI was built on a history of Australian water reform, including the 1994 COAG Water Reform Framework. Major elements of the 1994 agreement included recognition of the environment as a legitimate user of water, the establishment of water markets, and the separation of regulatory and operational institutional roles. Those elements remain at the core of the water management framework today.

The concerns that drove the 1994 agreement included environmental degradation, increasing competition for scarce and highly variable water supplies, less than optimal governance and pricing arrangements, and a realisation that opportunities to augment supplies, at least in inland areas, were limited because few cost-effective, large-scale dam sites remained in regions of high water demand. It outlined a set of principles to improve Australia's water management arrangements, including recognition of the water needs of the environment, reforms to water pricing and agreement to develop tradeable water rights.

The decade following the 1994 agreement saw some fundamental shifts in water management, driven as part of Australia's wider competition policy reform agenda. That period revealed, however, that the 1994 principles lacked detailed action commitments, did not recognise the need for compatible interstate arrangements, particularly for shared resources, and did not, as a whole, represent a coherent framework for water management. As a result, in 2004, COAG decided to refresh the reform agenda by instituting the NWI, recognising 'the continuing national imperative of increasing the productivity and efficiency of Australia's water use and [the need] to ensure the health of river and groundwater systems'.

The NWI remains robust and relevant in 2011. Experience since 2004, which has included extremes of wet and dry, has highlighted the benefits of transparent, soundly based and adaptive water planning, secure water rights for consumptive and environmental purposes, and efficient pricing and markets to drive the most productive use of Australia's water resources. These fundamental elements of the NWI have shown their worth. Experience has also shown there is a continuing need to develop and maintain these instruments.

The work of the NWI is not yet done. Implementation action has often proved difficult. Only a portion of the potential economic and environmental benefits have been harvested. There is a need to improve the way communities are engaged in water planning and the implementation of plans. There are opportunities to improve the ways that water plans and regulatory structures respond to variability, particularly extremes, while providing water users with confidence to make decisions for their future. Australia's scientific knowledge of water resources and environmental assets and the understanding of the social and economic impact of reform must continue to develop. There is room to achieve environmental objectives more efficiently by closely coordinating water management and broader natural resource management policies. Existing water management arrangements will continue to be tested by changes in the wider economy and developments in the policy environment, including, for example, emerging carbon policy initiatives. We have also found that, in some areas, the initiative lacks sufficient clarity about reform directions.

Impacts

The Commission has found that the NWI has delivered significant, tangible benefits for Australia. The initiative has catalysed major improvements in water management arrangements, underpinned the speed and direction of reform, and built a broad-based commitment to common objectives. It is yet to fully deliver its intended benefits, including the primary goals of sustainable and efficient water management. Nearly all of those consulted for this assessment recognise the value of the NWI framework and support its continuation.

The Commission is required to evaluate the impact of the NWI over the seven years since 2004. In doing so, we also considered the progress achieved on each of the agreed NWI actions. We assessed the extent to which the NWI has:

- + built a strong and effective operating framework and governance arrangements for water
- + improved the efficiency and productivity of Australian water use
- + improved the environmental sustainability of water management
- + affected regional, rural and urban communities.

While the NWI has had a considerable beneficial impact on water management, the aspiration articulated in the initiative goes much further, and water reform is still a national priority. The task described in the NWI is complex, and many of the agreed actions are inherently difficult. They require real and persistent political commitment and adequate resourcing over time.

The deadlines set out in its implementation schedule have largely passed and were perhaps unrealistic when the NWI was signed. Many important actions are not complete. Drought has distracted and complicated the implementation effort. Historically high levels of investment in water management and infrastructure, particularly at the Commonwealth level, have not always been well aligned with reform objectives, and have sometimes appeared to be directly counter to them. Political commitment and leadership have been variable, and bureaucratic processes at the COAG level have been slow and lacking in transparency.

Despite these hurdles, overall, the NWI has been a success. It is internationally recognised as having placed Australia at the forefront of good water management, and the foundational reform effort delivered so far has positioned Australia to reap significant benefits into the future.

The Commission's recommendations, which are discussed in the next section, take into account what has been learned from the experience so far and address gaps, shortcomings and new issues.

The review has found that the NWI has had the following impacts.

Governance

- + The NWI has been a focal point for water reform nationally. There have been important statutory reforms in most jurisdictions, significant investment by all parties in achieving the NWI objectives and better sharing of information between jurisdictions.
- + Nationally compatible approaches facilitated by the NWI have led to reduced transaction costs and a more transparent investment environment.
- + The implementation of NWI commitments has resulted in stronger governance and institutional arrangements with generally increased transparency and accountability.
- + The quality and extent of water planning in Australia have improved. The water planning cycle can take up to 15 years, so the benefits of improved practice will take time to flow across all regions and plans.
- + NWI-consistent statutory reforms have provided rural water users in most jurisdictions with a more secure and tradeable water asset and established a legal basis for environmental water allocations.
- + The NWI principles underpin many of the reforms in the Murray–Darling Basin.
- + Substantial investments by governments in data collection, monitoring and metering are delivering better information to inform the decisions of government and water users. There remains a need for continued investment in monitoring capacity and the scientific and socioeconomic information base for resilient and adaptive water planning and management.

Productive and efficient use of water resources

- Water markets are now an important mechanism enabling water in many rural areas to move to more productive and efficient uses.
 The markets have produced positive economic gains at the community, regional and national levels. Water trading has become a vital tool for many irrigators in responding to variable water availability and other market factors.
- + Water trading is more streamlined after the removal of many artificial barriers to trade, the facilitation of interstate trade and the implementation of better service standards and transaction systems.
- + Surface water in the Murray–Darling Basin is traded in an increasingly mature market, which could still benefit from further reforms to improve market dynamics. Outside the basin, and for groundwater systems, improvements can be made to the regulatory infrastructure required for trading to develop and grow.
- Pricing and institutional reforms have been beneficial. Consumption-based and cost-reflective pricing has encouraged more efficient water use, although during the recent drought the pricing signal was less significant in urban systems than water restrictions and other demand management strategies.
- + The recovery of full efficient costs means that many water businesses are now better placed to fund necessary new investment. Independent economic regulation and consumer protection frameworks are improving transparency and accountability while protecting disadvantaged customers.

Sustainable water management

- + The NWI has embedded into water management across Australia the imperative to manage water resources sustainably, to articulate environmental objectives more clearly, and to use best available science in decision making.
- + The water plans and environmental management arrangements established under the NWI are improving Australia's capacity to maintain important environmental assets and ecosystem functions and to support economic activity. They have not yet had time to deliver fully their intended outcomes or to demonstrate their efficacy over the long term, including during periods of climatic extremes.
- Governments are using a number of NWI-consistent mechanisms to start to address overallocation or overuse, particularly in the Murray–Darling Basin. They have used water markets established under the NWI as an important mechanism to recover water for the environment while maintaining the security of water users' access entitlements.
- + Despite the effort to recover water for the environment in some areas, many water resources are still not being managed sustainably. Nationally, there has been disappointingly slow progress in the explicit identification of overallocated and overused systems and in restoring those systems to sustainable levels of extraction.
- + There has been some progress across jurisdictions in the development of environmental management institutions and their capacity to deliver environmental water. However, accountability for environmental outcomes remains weak. In particular, monitoring capacity is often inadequate, the necessary science to link environmental watering with ecological outcomes is generally weak, and there is a lack of transparent reporting of results.

Communities

- + NWI-consistent water access entitlements, unbundled from land titles, have created a recognised and valuable business asset. Those reforms have increased access to business finance, made investment in water-efficiency measures more cost-effective, and had flow-on benefits for rural communities.
- + Reforms delivered under the NWI have helped make irrigation communities more resilient in dealing with changes in water availability and economic circumstances. There is evidence that, during the recent drought in south-east Australia, irrigation communities remained significantly more viable than they would have been without the reforms.
- + The NWI provided communities with a clear blueprint for reform to which all governments were committed. NWI principles had, and continue to command, strong stakeholder support from a wide range of perspectives. However, delays in delivering on NWI commitments, inconsistent implementation and poorly managed community engagement processes have weakened community confidence in water governance systems.
- + The urban water sector is now more sophisticated in its approach to supply and demand management, and there are examples of urban utilities engaging in innovative approaches to integrated water management. These developments have highlighted the need for clear objectives to be set for the urban water sector and for the roles and responsibilities of different water agencies to be better delineated.
- + Major capital investments have improved the security of water supply in Australia's urban centres through the augmentation and increasing diversity of available supply options, including increased access to less rainfall-dependent water sources. However, there is evidence that ad hoc government interventions and policy constraints have undermined community confidence that they are receiving value for money services.
- Australians continue to have access to high quality and safe drinking water supplies in the vast majority of communities.
 Jurisdictions are moving towards best-practice risk-based systems of regulation. The growth of more diverse water supply sources and scientific developments demand more adaptive and collaborative approaches to water quality regulation.

Headline recommendations

Leadership

- 1. The National Water Commission calls on the Council of Australian Governments to recommit to the National Water Initiative as the guiding blueprint for sustainable water management in Australia and to task the Standing Council for Environment and Water to drive these reforms as a priority. COAG leadership is essential to reinvigorate national water reform.
- 2. All NWI parties must resolve to stay the course on their reform commitments and give priority to delivering the significant unfinished actions identified by this assessment. This is critical to reap the full benefits of past efforts and to meet the continuing imperative of increasing the productive and efficient use of Australia's water and ensuring the health of river and groundwater systems.
- 3. Governments around Australia should engage with their constituents to develop a shared understanding of why water reform is still vital to build resilient communities, productive industries and sustainable environments.
- 4. All levels of government should strengthen community involvement in water planning and management, recognising the value of local knowledge and the importance of regional implementation, and review institutional arrangements and capacity to enable effective engagement at the local level.

A maturing agenda

- 5. Australia needs a stronger and more contemporary urban water reform agenda. The Commission recommends that COAG develop a new set of objectives and actions to provide national leadership for urban water management.
- 6. Water quality objectives should be more fully integrated into the reform agenda, with better connections between water quality and quantity in planning, management and regulation to achieve improved environmental outcomes. There is also a need for a more coordinated and structured approach to urban water quality regulation at a national level.
- 7. Greater coordination of water management and natural resource management initiatives would yield significant gains, for example by better aligning the development, implementation and review of water plans and catchment plans.
- The Commission urges states and territories to review their existing mining and petroleum regulatory arrangements to
 ensure that water resource impacts are addressed explicitly, and that those extractive activities are fully integrated into
 NWI-consistent planning and management regimes.
- 9. It would be prudent at this stage to analyse the nature and materiality of potential changes to water use as a result of climate change adaptation and mitigation initiatives. Water management policies may need to be elaborated to operate more effectively in the context of these new initiatives.

Making it happen

- 10. Evidence-based decision making and good stewardship of Australia's water assets rely on robust science and socioeconomic information. The Commission reiterates its call for a national water science strategy, backed by sufficient investment to deliver the required capacity. To support improved water management, the Commission also recommends that water service providers and governments state publicly their commitment to resource adequately and implement fully the National Water Skills Strategy.
- 11. Renewed political commitment will require a refreshing of the approach to national reform. The Commission proposes that each of Australia's governments commit to a program of specific actions every three years, based on agreed national priorities and jurisdictional priorities underpinned by the NWI commitments, together with explicit levels of resourcing to implement the program. In the interests of accountability and transparency, the Commission calls on COAG to recommit to oversight of water reform progress by an independent assessment body.
- 12. The Commission urges COAG to consider a new approach to incentives to encourage the delivery of nationally significant water reforms.

The reforms agreed in the NWI have delivered substantial improvements in the way Australia manages its water resources. However, this biennial assessment shows that there are areas where implementation can improve, and new challenges have arisen. The Commission's twelve headline recommendations reflect the reality that wise stewardship of Australia's water resources remains a national priority.

Concerted leadership and commitment for the long haul are required to realise the full benefits envisaged in the NWI. At the very least, this demands the resolve of all Australian governments to deliver on their outstanding commitments and to nourish real engagement with their communities. We also urge COAG to seize this opportunity to address emerging challenges that have become apparent since 2004. There is a pressing need to make sure that water reform aspirations are embedded in and aligned with other closely related national policy agendas—primarily natural resource management, regional development, urban planning and climate change.

We also propose a new suite of incentive mechanisms, together with necessary investments and assessments, that we see as essential to regain and sustain water reform momentum in the years ahead.

Leadership recommendations

Recommitment to the NWI

The NWI is at a key point in its implementation. Realising the full benefits of past efforts and investments requires not only the completion of current business, but a refreshed approach to reform to mitigate emerging risks and take advantage of emerging opportunities.

The continued standing of the NWI through changes in political leadership and governments at the federal and state levels is in itself a significant achievement. It reflects both the broadly accepted value of the framework and continuing evidence of the need for full implementation of the agreed reforms. That need is highlighted by potential impacts of climate change on water availability.

Reform requires leadership—to set goals and visions, to communicate the benefits of reform, and to make difficult trade-off decisions that are in the public interest but may have adverse consequences for some parties. Above all, political leadership is required to maintain resourcing over the long life of the reform process among competing priorities, and to stand firm in the face of the short-term political cost of measures such as implementing cost-reflective pricing.

Consultations for this assessment revealed a broad call for a political recommitment to the water reform framework embodied in the NWI. Advocacy by political leaders for the framework and the benefits of reform is essential to community understanding of, and support for, individual reform actions.

Water management is undeniably complex, affects many people and takes time to do well. Original stakeholder support for the NWI was based on the total package of reform—to back away from any of the main elements of the framework is to undermine the value of the total package and breach the compact that underpins it. The NWI has been used by leaders as a reference point to guide actions at the national, state, regional and local levels to get the best environmental, social and economic results. The sequencing of reform actions is important, and the overall effectiveness of the framework is compromised if significant elements are left out.

Community engagement is a cornerstone of NWI implementation. Governments and the water industry understand how NWI reforms will produce public benefit, but this not always well understood by communities and affected individuals. It is becoming increasingly apparent that the compact has not been cemented. The response to the 2010 release of the *Guide to the proposed Basin Plan* highlighted the fragility of community understanding and acceptance of water reform.

There is a need to rebuild a strong compact with the Australian public to implement water reform.

Recommendation 1

The National Water Commission calls on the Council of Australian Governments to recommit to the National Water Initiative as the guiding blueprint for sustainable water management in Australia and to task the Standing Council for Environment and Water to drive these reforms as a priority. COAG leadership is essential to reinvigorate national water reform.

Delivering the remaining NWI commitments

Where NWI commitments have been delivered, the Commission's review has demonstrated clear benefits to individual water users, communities and the environment. Under the NWI, governments agreed to complete all reform actions by 2011, with the exception of the full removal of barriers to trade in the Murray–Darling Basin. Many NWI actions have progressed considerably and are now embedded in water management. However, the review has also shown that a number of significant commitments have not been met consistently across the country. The review has identified priorities for improvements in practice as well as evidence of reversals of reforms that need to be arrested.

The key areas include the following:

- + Western Australia and the Northern Territory have yet to enact NWI-consistent water management legislation. Water users in those jurisdictions do not benefit from clear and secure NWI-consistent water access entitlements and statutory planning processes.
- + While there has been a substantial increase in the coverage of NWI water plans across the country since 2004, there remains a need for water plans to articulate how decisions about objectives have been reached, how plans will respond to extreme events, and how trade-off decisions about economic, social and environmental objectives have been addressed. Plans also need to make more effective provisions for managing water during periods of extreme climate variability.
- A core NWI commitment is to return all overused and overallocated surface water and groundwater systems to sustainable levels
 of extraction. Many NWI parties remain reluctant to identify overuse and overallocation explicitly. The mechanisms used to manage
 systems that appear to be at or above full allocation are often short term and put at risk the capacity to manage change into the future.
 The Commission is deeply disappointed that this core commitment has not yet been fully delivered.
- + The Murray–Darling Basin Plan and its implementation will be a critical test for water reform and Australia's ability to manage water in a variable climate. This first basin-wide plan is a historic opportunity to address overallocation and overuse in an iconic system that is also the most important agricultural region of Australia. Success requires strong leadership in the face of difficult decisions to balance economic, social and environmental outcomes. Managing the impacts of change will demand coordinated policy and actions that go beyond the scope of the Basin Plan or the remit of the Murray–Darling Basin Authority.
- + Jurisdictions have not fulfilled their commitments to manage water interception effectively. Water interception outside NWI-consistent entitlement and planning frameworks poses an increasing challenge to the integrity of water management. Without a concerted effort by NWI parties to incorporate all significant interception into water plans, the water reform framework is compromised and the confidence that water entitlement holders have in the security of their rights risks being eroded.
- + Our analysis of environmental water management has found that there has been material improvement since 2004 in the security of environmental water, stipulated as rules codified in water plans or as entitlements for the environment, and in the recovery of water for the environment. However, there is a lack of clarity about the responsibility and accountability for environmental water management decisions—a function of both the large number of institutions often involved in those decisions and limited public reporting arrangements.

There is also little effective monitoring of the ecological results of environmental watering. Important gaps in knowledge about ecosystem responses to watering need to be filled.

+ As a consequence of the NWI, there has been increased recognition of the cultural values of water resources and advances in the engagement of Indigenous Australians in water management. Most jurisdictions have established consultative mechanisms intended to engage Indigenous people in water planning. For our own part, the Commission has established the First Peoples' Water Engagement Council.

Nevertheless, the full intent of the NWI parties' commitments on Indigenous interests in water has not yet been achieved. Many water plans do not consider Indigenous cultural values and economic development, leaving the cultural and economic expectations of Indigenous Australians as an unmet demand on the water system.

+ Pricing and institutional reforms have been major components of the national water reform agenda since before the NWI. Reforms under the initiative have provided market signals to water users to encourage the economically efficient use of water, improved the service standards and viability of water service providers, and encouraged more efficient investment. However, those reforms have been inconsistently implemented across Australia; there remain continuing examples of policy or government interventions that have weakened or reversed reforms.

Our recent report, *Review of pricing reform in the Australian water sector 2011*, found that changes in the water sector, particularly in urban areas, provide governments, regulators and water businesses with opportunities to implement water pricing that reflects the dynamic value of the resource, to respond to differentiated customer preferences and to build a more competitive institutional framework.

The development of water markets in the Murray–Darling Basin and to a lesser degree elsewhere in Australia has contributed significantly to the productive and efficient use of water and helped irrigators and their communities manage severe drought. An assessment by the Commission of factors affecting the development of water markets, *Strengthening Australia's water markets*, has identified opportunities to improve existing markets, along with measures needed to develop emerging markets.

- + The extent and accuracy of water metering have improved through the implementation of NWI commitments, but extending metering to all significant water users will require considerable ongoing effort. Accurate metering is essential to protect the integrity of water management systems and to ensure that water planning and allocation are based on sound information about consumption. We continue to support the ultimate objective of universal metering. Implementation should be prioritised on the basis of cost-effectiveness, the level of demand for water and the potential contribution of metering to compliance and resource management activities.
- + The NWI highlighted the importance of sustainably managing the whole water resource, including groundwater. Quantifying surface and groundwater connectivity and aligning their management is unfinished business in most jurisdictions. Unless otherwise established, it should be assumed that all surface and groundwater systems are connected.
- + When fully implemented, the draft National Framework for Water Compliance and Enforcement should ensure confidence in these arrangements. The Commission strongly supports its implementation and a broader commitment to adequately resourced compliance mechanisms that recognise the value of water and the third-party impacts of illegal water extraction.

Recommendation 2

All NWI parties must resolve to stay the course on their reform commitments and give priority to delivering the significant unfinished actions identified by this assessment. This is critical to reap the full benefits of past efforts and to meet the continuing imperative of increasing the productive and efficient use of Australia's water and ensuring the health of river and groundwater systems.

Community engagement

Throughout this assessment, community and industry stakeholders delivered a consistent message about a lack of ownership in the rural reform agenda. They feel that local knowledge of local systems is ignored, and that trust in government processes has been eroded. There is concern that decisions that directly affect water entitlement holders are not always being made at the most effective or efficient level in the complicated landscape of water management.

Even in urban communities, concern is emerging that decisions made in recent years to manage the supply-demand balance have lacked transparent and robust processes, and may impose unnecessary costs into the future.

Water reform will probably always be contentious, and requires community consultation that genuinely engages with people. Failure to communicate the case for reform effectively, or to demonstrate its benefits, results in anxiety in affected communities and undermines political and social commitment to change.

The NWI reflects the imperatives for national compatibility of water management arrangements, for a strategic, coordinated approach to managing interconnected water systems, and for the coordinated implementation of reform actions under the NWI. However, those imperatives need not hinder real community engagement in planning and implementation, or eliminate the knowledge and resources of local institutions and communities as inputs to management decisions. Local knowledge and engagement can potentially deliver innovative solutions and much better coordination.

The Commission welcomes the call by the Chair of the Murray–Darling Basin Authority to strengthen the involvement of local communities in the design and rollout of the Basin Plan and related government programs. NWI parties should review institutional arrangements and capacity at a local level to ensure that they are effectively channelling local input into decisions that must be made at broader regional, state or national levels and to allow delegated responsibility for matters that are most effectively managed locally. We believe that more local delegation is most likely to be appropriate in the management and implementation of water plans, and that a stronger role for natural resource management bodies may be beneficial, within the context of agreed national, state and basin-level water management objectives.

The draft NWI Policy Guidelines for Water Planning and Management articulate nationally agreed principles for water planning. They include stakeholder engagement as a fundamental principle, stressing the need to identify and engage with stakeholders early and to produce clear explanations for decisions. While the draft guidelines set out principles, state and territory legislation and policies dictate current practice, which varies considerably from one jurisdiction to the next.

Some stakeholders have told us that they have been confused and frustrated by the wide range of organisations responsible for different aspects of the water reform agenda. The roles of different players have not always been clearly defined. There will always be many institutions involved in water management, but everyone—communities, governments and water managers—would benefit from greater clarity about roles, objectives and accountabilities.

Recommendation 3

Governments around Australia should engage with their constituents to develop a shared understanding of why water reform is still vital to build resilient communities, productive industries and sustainable environments.

Recommendations for a maturing agenda

The urban sector

The NWI includes principles for urban water reform, a recommitment to cost-reflective pricing, strategies to improve water-use efficiency and initiatives to create water-sensitive Australian cities. However, the Commission's previous biennial assessments observed that the urban reform commitments are limited in scope. They do not give adequate guidance on the appropriate urban water reform agenda.

To provide such guidance, we recently published *Urban water in Australia: future directions* and a series of related, more detailed analyses of pricing, competition and water quality regulation. The Productivity Commission has been undertaking a parallel inquiry into Australia's urban water sector.

The urban water sector has benefited greatly from institutional and pricing reforms, including those set out in the NWI. Those reforms are a platform for addressing many challenges, including climate variability, climate change, rapid population growth, rising costs and ageing network infrastructure.

The recent severe and prolonged drought revealed the limitations of the reforms made so far. Initial responses focused on water conservation campaigns and demand-management programs, combined with increasingly severe and prolonged water restrictions. The unforeseen duration of the drought led governments to take control of planning and investment in conditions of great urgency. Those interventions were marked by stop–start policies and hurried planning with little transparency and community and customer engagement. While no city ran out of water, there were a number of close calls, and the response imposed significant financial and non-financial costs on customers, the community, water businesses, taxpayers and the environment. The response to the drought severely tested political commitment to the NWI and dented consumer confidence in the reform agenda.

In the urban water sector, there are ongoing inadequacies in:

- + the definition of water security objectives
- + institutional roles and responsibilities for supply-demand planning and investment
- + the way policy and regulatory instruments, such as pricing, water restrictions, demand management regulation, artificial policy barriers and government subsidies, are used in combination to manage the supply-demand balance
- + planning assumptions, tools and processes, including planning based on long-term averages rather than on the extremes of variability.

We believe that there is now a need to establish a national urban water reform agenda that better reflects contemporary understanding of the sector. Our consultations during the urban future directions project found divergent sectoral and community views about key issues in urban water. Governments should establish clear and coherent objectives for the urban water sector as a whole, and for the institutions that make it up.

We suggest that the sector's objective should be to provide secure, safe, healthy and reliable water-related services to urban communities in an economically efficient and sustainable manner. Specifically, the sector should understand the long-term interests of all water consumers and meet their needs through the efficient use of system assets and investments in those assets. It should ensure that its operations are managed cost-effectively and in line with community expectations and defined obligations. It should also enhance its contribution to more liveable, sustainable and prosperous cities in which broader social, public health and environmental benefits and costs are clearly defined and assessed, and in which customers or other parties are willing or explicitly obliged to pay for the outcomes.

In the Commission's view, governments should commit to developing an urban water sector that is more resilient, flexible, efficient, transparent, accountable and customer-focused. They should ensure that service providers, regulators and other parties have clearly defined accountabilities, which align with specified roles, functions, resourcing and funding. Governments should also amend policy settings to allow an efficient portfolio of supply and demand measures to emerge and evolve over time, without direct and ad hoc government intervention.

There are opportunities to improve service delivery and develop a greater focus on customers by fully implementing reform commitments to improve the transparency of decision making and independent economic regulation, by using pricing to promote economic efficiency, by pursuing better engagement with consumers in planning decisions and by providing new opportunities for utilities—or new competitors —to provide customers with more innovative service options.

We believe there is also a need for greater clarity about the role water service providers should have in contributing to 'water sensitive' or 'liveable' cities. Opportunities to deliver integrated urban water cycle solutions and adopt water-sensitive urban design mean that water planning is integrally linked to urban planning. Many urban water service providers are 'ahead of the policy game', and are working innovatively to contribute to a liveable cities agenda. However, institutional arrangements are generally not clear about the role of the sector in decisions about broader public and environmental amenity services, how to trade off between the costs and benefits of those services, and who should pay for them.

Recommendation 5

Australia needs a stronger and more contemporary urban water reform agenda. The Commission recommends that COAG develop a new set of objectives and actions to provide national leadership for urban water management.

Water quality

The NWI was designed mainly to address water quantity, rather than quality, and contains few actions aimed at maintaining or improving quality. The relationship of the NWI with water quality regulation and policy, such as the National Water Quality Management Strategy, has been unclear. The emphasis on quantity and water sharing was understandable in the drought that followed the signing of the NWI in 2004, but water quality is a significant and obvious gap in an integrated approach to water management today.

The NWI does not specify quality as a fundamental characteristic that should be recognised in water planning and property right arrangements. Nevertheless, water quality is as important a consideration in water management as volume, location and timing. Contemporary water management requires a recognition of the interactions between quality and quantity and the potential economic uses of water of differing quality.

Water quality depends not only on specific regulatory actions to address point-source impacts, but on wider natural resource management policies and investments to improve the quality of inflows across catchments. For example, achieving desired environmental outcomes in urban and rural catchments depends not only on the size, timing and duration of environmental watering, but on the quality of flows. Access to economically important groundwater sources can also be compromised by poor water quality, for example through cross-contamination between aquifers, the introduction of pollutants, or saline intrusion. Environmental interventions may be more affordable with a better mix of quality and quality targets.

In the urban water sector, Commission reports have shown that the regulation of water quality, public health and environmental impacts is not cost-effective and creates barriers to integrated water management. While the regulatory arrangements governing urban water quality (such as the Australian Drinking Water Guidelines) have served Australia well in the past, and drinking water is generally safe and of a very high quality, there is room for improvement.

Wastewater treatment and disposal standards can be overprescriptive, input focused, and set without adequate consideration of the costs they impose. There is a need for greater clarity about regulatory obligations, which have resulted in differing interpretations and conflict between water service providers and regulators. This is particularly so in relation to environmental protection. Frameworks for water quality regulation, particularly for integrated water management, are jeopardised by insufficient and diffuse technical expertise and inconsistent approaches to their implementation. A recently released Commission Waterlines report, *Review of urban water quality regulation in Australia*, proposes options for improving urban water quality regulation.

Recommendation 6

Water quality objectives should be more fully integrated into the reform agenda, with better connections between water quality and quantity in planning, management and regulation to achieve improved environmental outcomes. There is also a need for a more coordinated and structured approach to urban water quality regulation, at the national level.

Interaction with other policy agendas

The high-level objectives of water reform interconnect with many other facets of government, including agricultural policy, regional development, natural resource management, land-use and town planning.

On the ground, programs and policies deriving from different areas of government can work well together, but gaps, overlaps and inconsistencies can also lead to unintended and undesirable results. This is particularly the case where new frontiers are being opened—for example, measures to address climate change or the rapid growth of a new extractive industry.

The Commission believes there are significant benefits to be gained from more effective coordination of water management with related areas of policy. Equally, there are also real risks from a failure to coordinate.

All states and territories have water plans and catchment management plans of some sort. The two planning mechanisms have different purposes but they overlap—both include provisions to maintain or improve the condition of freshwater aquatic ecosystems.

Protecting and improving freshwater aquatic ecosystems is a complex management task, often requiring a series of coordinated actions. For example, protecting low flows to preserve in-stream habitat may be ineffective if that habitat is destroyed by cattle or sheep. The most cost-effective options for achieving the environmental objectives of water allocation plans may lie in a combination of on-ground natural resource management measures and water regimes, with less impact on irrigation-dependent communities than water recovery alone.

The Commission supports a closer integration of water allocation plans and catchment plans by improving the alignment of existing processes, without at this stage identifying any need for major changes to institutions or legislation. In partnership with the New South Wales Government and Hamstead Consulting, we have developed principles for aligning water allocation and catchment plans that could be adopted, with local variations, in any Australian jurisdiction.

Recommendation 7

Greater coordination of water management and natural resource management initiatives would yield significant gains, for example by better aligning the development, implementation and review of water plans and of catchment plans.

While much of the focus of the NWI and of water reform has been on the balance between agricultural water use and the water needs of the environment, in some parts of Australia other water users are significant. However, those users are not always fully integrated into NWI-consistent planning, entitlement and management arrangements.

Clause 34 of the NWI recognises that there may be special circumstances in the minerals and petroleum sectors that require specific management arrangements outside the scope of the NWI. We have previously expressed concern that this exemption has been applied as the norm, not the exception.

Secure access to water is as important for the extractive industries as it is for other water users. The extraction of water is often also a necessary function of those industries, particularly the burgeoning coal-seam gas sector. Some features of water usage in the extractive industries are not shared by other users, such as:

- + the impact on groundwater or surface water resources of dewatering or water activities that are a part of the extractive operation, which can be substantial in the context of the water system as a whole, involve significant uncertainties about predicted impacts, and create risks for third parties
- + the introduction into the consumptive pool of water (treated or untreated) from previously unused sources
- + a capacity to make productive use of water resources of differing quality.

There have been welcome steps in most jurisdictions to regulate the mining sector's impact on water resources, both for new developments and to regularise historical exemptions. The full integration of this sector into the planning and management frameworks remains incomplete. Exemption mechanisms continue to operate in some jurisdictions, and further work is required to manage dewatering and the cumulative effects of mining activities. In the Northern Territory, mining effectively remains outside water planning and entitlement frameworks, and in Western Australia major mining developments can still be facilitated through arrangements that override water regulation. Nationally, there remains room for better engagement of the mining sector in water planning and more effort to develop mechanisms, such as water markets, in those parts of Australia where the sector is a significant user of water.

The coal-seam gas sector is quickly emerging as a significant component of the economy in key regions of Queensland and New South Wales. The co-production of water during extraction presents risks for sustainable water management in those regions, because of the volumes involved and the uncertainties associated with predicted impacts.

Both Queensland and New South Wales have made or are making extensive changes to regulatory structures to respond to those risks. While reforms in New South Wales are not yet implemented, they appear to be intended to manage water impacts more closely under normal water planning and management structures. The extent or impact of foreshadowed exemptions is unclear. Queensland's regulatory reforms strengthen oversight of groundwater impacts but remain outside water planning and management frameworks.

The mining and petroleum sectors are subject to specific sectoral regulatory structures, but those structures are often not well aligned with state water management frameworks, which can result in higher compliance costs and suboptimal regulation. Given the importance of both good water management and the minerals and extractive sectors for Australia's future, there is a need for greater coordination and alignment of regulatory settings.

Recommendation 8

The Commission urges states and territories to review their existing mining and petroleum regulatory arrangements to ensure that water resource impacts are addressed explicitly, and that those extractive activities are fully integrated into NWI-consistent planning and management regimes.

Policies and investment decisions involving climate change, energy and water are also intrinsically entwined. Decisions in any of those areas can have strong impacts on the others. Climate change mitigation and adaptation policy initiatives have the potential to influence water use patterns in parts of Australia, for example through forestry expansion or the introduction of more water-intensive energy generation technologies. Investments to improve water-use efficiency or water supply security, such as piping irrigation networks or building desalination plants, can increase the energy intensity of water infrastructure.

The policy agendas of climate change, energy and water are currently poorly linked. The principles underlying the NWI—secure water entitlements, market-based mechanisms for the release of unallocated water and the use of water markets to reallocate water to different uses—provide a solid base for managing the potential for changes in water use arising from adaptation or mitigation initiatives. However, the effective operation of those principles is challenged where NWI commitments for planning, entitlements and markets are not fully implemented or well developed, or where competing water uses are not subject to NWI-consistent entitlement arrangements.

In some circumstances, such as where water markets are small or relatively immature, or where the impacts of changed water use include significant environmental or other externalities, appropriate regulatory solutions may be necessary.

There is a need for improved analysis of the materiality of potential changes to water use arising from climate change initiatives. More information sharing between and within agencies dealing with climate change and water management in all jurisdictions will be needed to anticipate likely impacts and to ensure that appropriate policy responses are in place.

Recommendation 9

It would be prudent at this stage to analyse the nature and materiality of potential changes to water use as a result of climate change adaptation and mitigation initiatives. Water management policies may need to be elaborated to operate more effectively in the context of these new initiatives.

Recommendations to make it happen

Science, information and skills

The NWI has played a valuable role in improving the knowledge, science and information needed for good water management. As a result of significant investments, water planners have a better understanding of the sustainable yield of many of Australia's most important surface water and groundwater systems, much-improved modelling tools, better frameworks for assessing river and wetland health, more extensive mapping of freshwater-dependent ecosystems, and a deeper understanding of northern Australia's water resources.

The Bureau of Meteorology is building an impressive capability to collect, analyse and publish extensive water-related data gathered by public and private sector bodies throughout Australia. It is also developing important accounting standards for water resources. Maintaining and developing this information infrastructure will be important to the national capacity to understand and manage water resources.

Some shortcomings persist. For example, the understanding of groundwater systems, the ecosystems that rely on them and their connectivity with surface water systems is not complete; nor is there adequate capacity to predict the socioeconomic impacts of water reform. The Commission is also concerned that there are critical weaknesses in water monitoring networks, particularly for groundwater resources, and in the understanding of ecosystem responses to environmental watering.

Investments by the NWI parties in common information resources to support their decision making have yielded improved knowledge and tools. With inevitably constrained financial resources, there is a need to maximise returns from investments in science and knowledge and to better coordinate between science users and science providers.

Effective adaptive management requires knowledge to be continually extended and broadened, and the application of that knowledge in decision making. Investing in new knowledge and ongoing monitoring to support sustainable water management is thus vital. However, the investment must be targeted so that it is aligned with decision making needs and priorities, is delivered at the right scale, and is affordable.

Currently, there is no national, strategic and coordinated approach to planning and funding science to support water planning and management. This has led to a lack of clarity about priority knowledge needs, particularly for future environmental water management. There is also an emerging risk of loss of capability to undertake adequate water science noting that many current programs are coming to an end.

Investment in water science is a core government responsibility. Investment in water science primarily delivers public good benefits, is crucial to governments' role as good stewards of water resources, and often lacks alternative private sector sources of funding.

We renew our call, made in the 2009 biennial assessment, for the development and implementation of a national science strategy that can build effective collaboration and provide the knowledge necessary to support improved water policy, water planning and water management. While work has commenced at the COAG level to develop such a strategy, it has been disappointingly slow.

Importantly, any such strategy must include formal structures that regularly bring together water research leaders, water policymakers and water managers at the national level. In that way, researchers will be better able to anticipate changing management priorities, and policymakers and managers will benefit from the insights of researchers.

The water sector also faces a broad skills challenge. A COAG-initiated national audit of labour and skills in the water sector in 2008 identified current and emerging shortages arising mainly from the ageing of the workforce, increased labour requirements and competition for skilled people driven by the rapidly growing resources sector. The audit found skills shortages in science and engineering, management, and technical and trades areas. The deficit is expected to continue into the foreseeable future.

Building on the findings of the audit, the National Water Skills Strategy and an associated business plan have been developed. The aims are to attract and retain skilled staff in the water industry, augment the technical skills base in the industry, improve the training and skills support base (particularly for rural water managers), and develop a capacity-building strategy for remote and regional communities, particularly Indigenous communities, to build practical skills in water resource management and planning.

The National Water Skills Strategy and business plan are important steps in enabling the water sector to manage what is likely to be a long-term skills challenge. However, the implementation of planned initiatives will require greater commitment, including financial resources, not only from government but also, importantly, from water service providers. There appear to be opportunities in the urban water sector for larger providers to contribute in-kind capacity to help smaller providers establish and develop skills and competency requirements and access training.

Recommendation 10

Evidence-based decision making and good stewardship of Australia's water assets rely on robust science and socioeconomic information. The Commission reiterates its call for a national water science strategy, backed by sufficient investment to deliver the required capacity. To support improved water management, the Commission also recommends that water service providers and governments state publicly their commitment to resource adequately and implement fully the National Water Skills Strategy.

Refreshing reform machinery

The NWI has provided an enduring focal point for water reform in Australia. It is a coherent and holistic framework for reform in rural water use and has provided important reference points for urban reform.

Importantly, the NWI committed its signatories to clear reform actions and a timeline for the implementation of those actions. It also established an important mechanism for independent and public assessment of the delivery of reform actions by establishing an expert-based organisation—the National Water Commission—and the public biennial reporting process. NWI parties also work together on an ongoing program of reform work through COAG ministerial councils, senior officials and water reform committees, and jurisdictions have committed to further reform through national partnership funding agreements.

The timeline established in the NWI for the implementation of key actions has expired for almost all actions. This biennial assessment report is also the last such report contemplated by the NWI and the *National Water Commission Act 2004*. However, the program of reform actions is yet to be fully implemented, and emerging issues require the development of new action agendas. Our assessment has also found that NWI parties are at different stages of implementing key reform actions and, in some cases, have legitimately different priorities for their reform work.

Experience since 2004 suggests that the time and resources needed to deliver the NWI reforms were underestimated. We now have a more sophisticated understanding of the engagement processes needed for full delivery, and we now know that the data collection and analysis requirements of water planning mean that doing things right will demand more time, more resources, or both.

Despite the challenges in delivering a complex reform agenda, the NWI parties have not developed efficient and timely mechanisms for collaboration at the national level. For example, COAG has not yet responded formally to the Commission's recommendations in its previous biennial assessment, released in 2009. While some actions have been initiated in response to that report, they have not been comprehensive or transparent; nor had they been formally adopted at the time this report was finalised. A delay of that length is disappointing, but not unusual. The Commission is not a party to the deliberations of the senior standing committee of water officials that advises COAG. However, we have noted that the work of that body is seldom made public in a timely manner, and much of the national-level work it undertakes, and which is subsequently endorsed by COAG, often proceeds slowly and only when facilitated by direct Commonwealth funding.

There has also been a proliferation of reporting obligations on state and territory parties to the agreement, beyond the original reporting structure outlined in the NWI, and of subsidiary or related agreements with their own obligations. Those requirements sometimes appear to have been designed with little regard for the consequential administrative burden on all parties.

Consultations for this assessment revealed a widespread view among NWI parties that there are opportunities for a more strategic approach to the ongoing development of the reform work program and reporting requirements. The Commission suggests that NWI parties develop triennial reform commitments that reflect agreed national priorities as well as their own specific priorities. Priorities should allow for the different circumstances of the states and territories to be incorporated, while still recognising the need for compatible national approaches and consistency across shared resources.

New mechanisms need to be established to disclose publicly the future reform commitments of NWI parties, including implementation timeframes, and for the independent assessment of the delivery of those commitments. Independent oversight provides an important accountability mechanism and promotes valuable public debate about water management. It is also a mechanism for delivering external expert advice to governments on emerging issues and provides an opportunity for the strategic review of reform commitments.

We therefore propose that biennial assessments be replaced by a rolling program of strategic reviews of reform implementation and outcomes. Such a program would be risk based and developed by an independent assessment body, subject to consultation with NWI parties.

The Commission is concerned that NWI parties have not devoted adequate staffing and financial resources to water management, water science, socioeconomic analysis, community engagement, and monitoring, review and accountability mechanisms. In our view, some water-related expenditure in other areas, particularly subsidies of urban water infrastructure, might have been better directed to these fundamental aspects of water stewardship that only government can undertake.

At the state and territory level, resourcing of water management agencies appears not to be commensurate with the task at hand. Recent budget cuts in some jurisdictions have only widened that gap. Many states have no arrangements to recover from water users the costs of water planning and management activities that have private benefit. Where such arrangements exist, however, they need to recognise the material public good derived from sustainable water management with appropriate levels of direct government funding.

The Commission calls on NWI parties to commit publicly to resourcing water planning and management when they detail their triennial reform commitments.

The NWI was agreed without an associated mechanism of financial incentives or penalties. Previous water reform commitments under National Competition Policy arrangements, and more recent intergovernmental agreements, have generally involved such mechanisms. In the Commission's view, the financial incentives created by the competition reform framework were instrumental in driving reform action. More recent financial payments directed towards individual projects are much less influential in driving reform, and arguably distract attention from the core responsibilities of government.

There is room to reconsider the balance of current Australian Government funding for water commitments, including whether adequate funding is directed towards facilitation and incentive mechanisms to promote strategic reform. It is important that funding arrangements and reform machinery into the future reflect water's status as a vital national resource for the economy, the community and the environment.

Recommendation 11

Renewed political commitment will require a refreshing of the approach to national reform. The Commission proposes that each of Australia's governments commit to a program of specific actions every three years, based on agreed national priorities and jurisdictional priorities underpinned by the NWI commitments, together with explicit levels of resourcing to implement the program. In the interests of accountability and transparency, the Commission calls on COAG to recommit to oversight of water reform progress by an independent assessment body.

Recommendation 12

The Commission urges COAG to consider a new approach to incentives to encourage the delivery of nationally significant water reforms.

Progress in NWI implementation





Our approach

Our approach

This report fulfils the Commission's obligations under the *National Water Commission Act 2004* (the NWC Act) to review the NWI in 2010–11, including by assessing:

- + the extent to which actions under the NWI have improved the sustainable management of Australian water resources and have contributed to the national interest
- + the impact of the implementation of the NWI on regional, rural and urban communities
- + progress against performance indicators developed by the Natural Resource Management Ministerial Council (NRMMC) in consultation with the Commission.

The National Water Initiative

The NWI is an intergovernmental agreement between the Australian Government and the governments of the Australian Capital Territory, New South Wales, the Northern Territory, Queensland, South Australia, Tasmania, Victoria and Western Australia that commenced in 2004. It sets out agreed actions to improve water sharing and management. The parties agreed to implement the NWI in recognition of continuing national imperatives to:

- + increase the productivity and efficiency of Australian water use
- + service rural and urban communities
- + enhance the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction
- + provide greater certainty for investment and the environment
- + underpin the capacity of Australia's water management regime to deal with changes responsively and fairly.

The primary responsibility for implementing the agreement's reform agenda lies with the state and territory governments, with support from the Australian Government. Initially, oversight was provided by the NRMMC. Responsibility for the NWI was transferred to the Standing Council on Environment and Water on 1 July 2011.

The establishment of the Commission arose from the NWI, under which it has a direct role in assisting with the implementation of the initiative, assessing progress against reform commitments and advising COAG on national water issues.

The context for this assessment

At any time, a range of factors influence water systems and industries and communities that rely on water. Australia has one of the most variable climates in the world, and that variability has a huge impact on the availability of water. Since the NWI was agreed, historically significant climatic extremes—droughts and floods—have affected natural systems and communities, testing the robustness of water management systems.

Market factors, including changes in commodity prices and exchange rates, are significant influences on irrigated agriculture and the patterns of demand in the rural sector. The Commission has considered such external factors in its analyses for this review.

The *Water Act 2007* (Cwth) and the agreement on Murray–Darling Basin reform by basin states and the Australian Government in 2008 have changed the role of the Australian Government in water management in Australia. The Water Act implemented a range of new governance and management arrangements, primarily in the Murray–Darling Basin. Many provisions of the NWI have now been codified through the Water Act, particularly in relation to water accounting, trade and environmental management.

Additionally, the Australian Government's \$12.9 billion *Water for the Future* initiative covers a range of programs and projects. *Water for the Future* has four key priorities:

- + Taking action on climate change
- + Using water wisely
- + Securing water supplies
- + Supporting healthy rivers and wetlands.

Previous assessments of reform progress

This is the third biennial assessment by the Commission. In our previous assessment, *Australian water reform 2009*, we found that, although good progress had been made implementing agreed water reforms, there remained a number of areas in which progress had been disappointingly slow or inadequate. We concluded that sustained effort and resources were required from state and territory governments and the Australian Government, and that continued, active leadership from COAG was vital.

The 2009 assessment made 68 recommendations that comprised a program of practical and logical next steps to improve the way water is managed in Australia. Some key conclusions and recommendations were as follows:

- + Australia's agreed water reform framework, embodied in the NWI, meant water reform had progressed better than it would have otherwise, despite tough conditions.
- + There was unprecedented attention to water, coupled with unprecedented budgets, especially on the part of the Australian Government.
- + Water trading had proven to be very successful and was applauded internationally.
- + Progress had been made in supplementing and diversifying urban water supplies.
- + Governance reforms in the Murray–Darling Basin were historic and welcome.
- + Buybacks for the environment were a commendable development.
- + Overallocation had still not been dealt with, 15 years after state governments first promised to fix it.
- + Forty per cent of promised water plans were still outstanding, and many others were suspended, caught short by extreme climatic events.
- + There was ample evidence of environmental degradation, but the aims and results of some environmental watering were still unclear.
- + Barriers to water trading were still being imposed by state governments.
- + Irrigators lacked the information, clarity and therefore the confidence they needed for planning and investment decisions.
- + In urban Australia, water restrictions were still widespread and there was continued uncertainty about the security of future water supplies in the face of climate change.
- + Interstate conflict over water was continuing, intergovernmental processes were slow, and states lacked adequate policy and implementation resources.

The 2009 biennial assessment was provided to COAG parties on 18 September 2009 and publicly released on 9 October 2009. COAG has yet to respond formally to the recommendations in that report.

Approach to this assessment

The Commission's previous assessments measured water reform progress by reviewing progress on agreed individual actions. For this report, we have assessed the extent to which the NWI has:

- + built strong and effective water management governance arrangements
- + improved the efficiency and productivity of Australian water use
- + improved the sustainability of water management
- + impacted regional, rural and urban communities.

The NWI sought to make fundamental changes to the governance and institutional arrangements that underpin water management in Australia. Chapter 1 assesses whether changes in governance arrangements and improved practices initiated as a result of the NWI will improve water management in the long term.

The NWI committed jurisdictions to act to improve the operation of water markets and water pricing. Chapter 2 examines whether those actions have resulted, or are likely to result, in increased water-use productivity and efficiency.

Under the NWI, reforms to water management structures sought to ensure sustainable water management and maintain high-value environmental assets. Chapter 3 examines whether those goals are being achieved, whether the NWI elements and management approach are working or likely to work, and risks that need to be considered.

Finally, the NWI sought to engage communities in key water planning and management decisions and provide better information and more transparency about decisions. Providing communities with access to safe, healthy and reliable water supplies was also an objective of the initiative. The signatories acknowledged that water reform would involve some structural adjustment and that some measures to assist communities in that process might be needed. Chapter 4 examines the impacts that the NWI water management arrangements are having on regional, rural and urban communities.

At the front of each of these chapters, we have provided an illustration charting the key elements under the NWI and highlighting those discussed in the chapter.

Parties to the NWI agreed that the NRMMC would develop a set of performance indicators for the initiative. A total of 28 performance indicators were agreed in 2008. Under the Act, the Commission is required to assess performance against those indicators.

In our 2009 biennial assessment, we found that many of the indicators were unsuitable for monitoring performance against the NWI. We recommended that the indicators be refined to better reflect the intended outcomes sought by the initiative. However, that recommendation has not been taken up.

Some NWI parties echoed our concerns about the appropriateness of the indicators in their submissions to the 2011 biennial assessment. While we have reported against a greater number of performance indicators for this assessment, we have again identified a number of data challenges and indicators that do not effectively measure intended outcomes. Our report against the indicators and more detailed discussion of these issues is in Appendix A.

To inform our impact assessments, the Commission has compiled a summary of progress by each of the NWI parties against the action commitments made in the NWI. Those assessments are reported in Appendix B.

Information sources

The 2011 biennial assessment drew on public consultation processes, and a range of other data and information sources, including:

- + material provided by NWI parties through formal submission processes and ongoing consultation
- + public submissions
- + publicly available reports
- + studies and workshops commissioned to support this assessment
- + a stakeholder forum held on 17 March 2011.

More detailed information on our consultation process is provided in Appendix C.

Other Commission assessments of progress in implementing water reform have contributed to this review:

- + In 2010 and 2011, under delegation from the COAG Reform Council, the Commission assessed the performance of the Murray–Darling Basin state and territory jurisdictions in meeting their reform commitments under the Water Management Partnership Agreements.
- + Fulfilling its responsibility under section 7(2)(f) of the National Water Commission Act, in June 2010 the Commission released a report into the economic, social and environmental impacts of water trading in the southern Murray–Darling Basin.
- + In 2010 and 2011, the Commission published work that assessed the impacts of pricing and institutional reforms and considered future directions of reform in the urban sector.
- At the request of NWI parties, the Commission is developing a National Water Planning Report Card for all water systems across Australia. The first report card will be completed by the end of 2011 and will document progress on the development and implementation of water plans in all water resource systems.



Governance
NWI elements discussed in this chapter



1 Governance

Summary of impacts

The National Water Initiative (NWI) has been a focal point for water reform nationally. There have been important statutory reforms in most jurisdictions, significant investment by all parties in achieving the NWI objectives, and improved sharing of information between jurisdictions.

Nationally compatible approaches facilitated by the NWI have led to reduced water transaction costs and a more transparent investment environment.

The implementation of NWI commitments has resulted in stronger governance and institutional arrangements with generally increased transparency and accountability.

The quality and extent of water planning in Australia have improved. Because the water planning cycle can take up to 15 years, the benefits of improved practice will take time to flow across all regions and plans.

NWI-consistent statutory reforms have provided rural water users in most jurisdictions with a more secure and tradeable asset and established a legal basis for environmental water allocations.

The NWI principles underpin many of the reforms in the Murray-Darling Basin.

Substantial investments by governments in data collection, monitoring and metering are delivering better information to inform the decisions of government and water users. There remains a need for continued investment in monitoring capacity and the scientific and socioeconomic information base for resilient and adaptive water planning and management.

The NWI is a shared commitment to improve the way water resources are managed in Australia. To achieve the intended outcomes of the initiative, improvements to the clarity, transparency and accountability of decision making and implementation were necessary. That required changes to legislation, regulation and policy settings. For example, to improve the economic efficiency of water allocation, water entitlements needed to have a statutory basis (as property rights) that was separate from land and land use approvals, and tradeable in a market (with willing buyers, willing sellers and a trusted method of conveyance). Similarly, reforms were required to realise improvements to ecosystem health and to deliver the benefits of water reform to communities.

Where there is good water governance, people know the rules and they know the roles and responsibilities of the people and institutions involved. Many submissions to this assessment acknowledged the NWI as one of the most significant governance reforms in the history of Australian water management. Submissions recognised that the NWI is a coherent framework for dealing comprehensively with water policy through knowledge support, policy formulation, implementation, and monitoring and evaluation.

The Commission examined the impact of the NWI on water governance arrangements. In particular, we assessed whether, as a result of implementing the NWI, the legal underpinnings required for effective, efficient and sustainable water management are in place. We also assessed the extent to which the current governance arrangements exhibit the necessary transparency, accountability, consistency, efficiency, effectiveness and completeness. In addition, we identified whether further reform in those areas should be prioritised.

1.1 Water access entitlements

The NWI parties agreed to establish water access entitlements for consumptive use with enhanced security and commercial certainty by clearly specifying the statutory nature of those entitlements. NWI-consistent entitlements are exclusive, separate from land, and defined as perpetual or open-ended entitlements to a share of the water available for consumption in a given system (NWI clause 25).

Water access entitlement reform is a fundamental building block of the NWI. The legislation needed to create secure, NWI-consistent water access entitlements has been enacted in Victoria, New South Wales (NSW), Tasmania, South Australia, Queensland and the Australian Capital Territory (ACT), but not in Western Australia or the Northern Territory. States and territories have made good progress in creating NWI-consistent entitlements for regulated surface water, but entitlement reform for groundwater and unregulated water is lagging.

See Box 1.1 and Appendix B for further detail on the implementation of NWI-consistent water access entitlements.

Water entitlement reform has made an important contribution to Australia's establishment of a system of secure water access entitlements and functioning water markets. Those achievements are regarded internationally as groundbreaking water reforms. They are the result of a sustained reform effort that began with the Council of Australian Governments (COAG) Water Reform Framework (COAG 1994) and the National Competition Policy reforms of the mid-1990s, and expanded under the NWI from 2004.

In work undertaken for this assessment, Marsden Jacob Associates found that the water entitlement reform advanced by the NWI has been in the national interest and has broad community support. After detailed consultation, economic analysis and modelling, Marsden Jacob Associates concluded that entitlement reform has achieved the fundamental objective of enhancing the security and commercial certainty of water access entitlements by clearly specifying the characteristics of the property right, including that it is exclusive; able to be given, bequeathed or leased; able to be subdivided or amalgamated; mortgageable; enforceable and enforced; and recorded in reliable, publicly accessible water registers.

This has facilitated the operation of efficient markets, created opportunities for trading and reduced the transaction costs of trades, which in turn have increased the asset value of water entitlements and stimulated trading in water markets.

Entitlement reform has increased the range of production, risk management and investment opportunities available to irrigators. For example, the Commission is aware that some new entrants to the industry are taking advantage of the opportunity to buy land at a lower price without water and purchase water (permanently or temporarily) when it is required. This has the effect of lowering entry costs for new irrigators. NWI-consistent entitlements also provide previously unavailable opportunities for existing entitlement holders to realise the value of their assets.

A separate analysis by Hyder Consulting identified the expectation among stakeholders that positive economic impacts will flow to communities from the greater commercial certainty and flexibility associated with statutory water access entitlements:

All other things being equal, greater confidence in the status and tenure of a property right will encourage investment in on-farm irrigation infrastructure, machinery and equipment. In addition to broader flow-on effects on the economy, the investment is likely to generate greater direct economic benefits to the community in which it is made.

The Commission considers that there are also significant opportunities to extend the benefits the NWI has delivered so far by persisting with water entitlement reform—by enacting legislation to create NWI-consistent water access entitlements in Western Australia and the Northern Territory, and by including all major water users in the entitlement system.

There would be benefits from extending NWI-consistent entitlements to groundwater and unregulated surface water. While groundwater systems can be more complex than surface water systems, there are likely to be cost-effective opportunities to establish groundwater trade in more areas across Australia. This requires underpinning entitlement reforms. Demand for groundwater is increasing, while sustainable levels of use have been reached or are being approached in many aquifers. In an increasing number of groundwater areas, scarcity and demand are likely to be great enough to support the establishment of markets to allocate resources more efficiently.

Finding 1.1

Water access entitlement reform has delivered significant benefits for water users and water management by creating a more secure, recognised property right to water. There are opportunities to realise further benefits by extending those reforms, particularly through the creation of NWI-consistent entitlements in Western Australia and the Northern Territory.

Prioritisation of groundwater areas and unregulated surface water areas that would benefit from the development of NWI-consistent water access entitlements by state and territory governments would enable entitlement holders in those areas to realise the benefits of such an asset.

Box 1.1: Status of unbundling of water rights in Australia

New South Wales. Most entitlements have now been unbundled in New South Wales, consistent with the NWI. Those that remain bundled are licences specified under the New South Wales *Water Act 1912*, which apply mainly to unregulated surface water and groundwater. Those licences are tradeable, provided they are not in areas where a water sharing plan has been gazetted or is undergoing development. Licences of this type account for less than 10% of licensed water resources in New South Wales, by volume.

Victoria. Water rights to regulated river water sources have been unbundled into access entitlements, use licences and delivery shares. Groundwater and unregulated surface water licences issued under the Victorian *Water Act 1989* have not been unbundled, but are tradeable in some areas subject to trading rules. In total, this accounts for around 14% of Victoria's licensed water resources by volume. There are currently no plans to unbundle water rights for unregulated rivers or groundwater. Victoria advises that the potential benefits of making this further reform are currently under investigation.

Queensland. Approximately 50% of Queensland's water resources, by volume, are now managed under a system of unbundled access entitlements (referred to as 'water allocations'), consistent with the NWI. The remaining 50%, which remains bundled, is managed under a number of licensing instruments, including interim water allocations and water licences specified under the Queensland *Water Act 2000.* They are not detached from land (although interim water allocations can be relocated in limited circumstances) and cannot be traded. Interim water allocations apply to regulated surface water and groundwater and will be converted to water entitlements upon finalisation of water resource plans. Water licences mainly apply to unregulated surface water and groundwater.

South Australia. South Australia is reviewing the feasibility of unbundling water in its unregulated surface water and groundwater systems. Where it is demonstrated to be feasible and of net benefit, further unbundling will be implemented in consultation with stakeholders on a case-by-case basis. Commitments have been made to implement unbundling in three prescribed wells areas by the end of 2014, and unbundling has been completed in the River Murray Prescribed Watercourse. This accounts for about 35% of the state's licensed volume. The remaining water is managed under water licences specified under the South Australian *Natural Resource Management Act 2004*, which are separated from land but remain bundled in other respects. They are tradeable, and principally apply mainly to surface water and groundwater resources other than the River Murray prescribed watercourse.

Western Australia. Western Australia has yet to introduce legislation to give effect to water reform commitments and continues to operate under a water licensing regime that is not consistent with the NWI. 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. Water licences are issued under the state's *Rights in Water and Irrigation Act 1914*. They are unbundled from land but access and use remain bundled. They are tradeable, subject to trading rules.

Northern Territory. All water licences specified under the Northern Territory *Water Act 1992* are unbundled from land but remain bundled in the sense that use and access rights are not separated. Licences in areas covered by water allocation plans are tradeable, subject to trading rules. This accounts for approximately 113 licences out of a total of 274 licences. The Northern Territory is currently reviewing its Water Act, with a view to making amendments to the legislation that will require all existing licences associated with water plans to be converted to NWI-consistent entitlements (that is, unbundled use and access components).

Tasmania. Tasmanian water licences have been unbundled from land. A water allocation may be endorsed on a licence, and the holder of the licence is able to transfer the licence, or allocation, or part thereof (allocations under the Tasmanian *Water Management Act 1999* are set on an ongoing basis; they are not analogous to annual allocations commonly made in Murray–Darling Basin regulated systems). Licences authorise the holder to take water; they do not cover the use of water, and there is no separate instrument for use approval in Tasmania. Section 58 of the Act allows the Water Minister to impose certain conditions on water allocations, but those conditions also relate to the taking of water.

Australian Capital Territory. Implementation of unbundled water access entitlements is limited and the rate of future unbundling is tied to requests by licence holders for their water assets to be separated from their land, or occurs if the land is sold or transferred.

Source: NWC (2011h), updated.

1.2 Statutory water plans

NWI commitments include the implementation of statutory water plans for surface water and groundwater systems where water access entitlements are issued. Water planning is the central mechanism assisting governments and communities in making water management and allocation decisions to meet specific productive, environmental and social objectives. Water plans that have a basis in legislation provide certainty to individuals who hold water access entitlements and reduce the risk of arbitrary change.

An NWI-consistent water planning regime:

- + provides a clear and secure basis for water access entitlements and allocations
- + appropriately balances economic, social and environmental considerations, drawing on and using the best available science, socioeconomic analysis and community input, including Indigenous representation and Indigenous social, spiritual and customary objectives
- + clearly establishes how to deal with currently overused and/or overallocated systems, thereby helping to return necessary water to the environment and ensure environmental and resource sustainability
- + provides an important mechanism for communities to participate in, and develop confidence about, the management of their surface water and groundwater resources.

Experience has shown that water planning is a complex process, and is both resource and time intensive. It involves consideration of multiple, complex factors, and involvement and contributions from a range of stakeholders. The tension between the information gathering and consultation requirements of good planning and the need for timely decisions often adds to the difficulty of an already challenging task.

The NWI provides guidance on the required content, scope and characteristics of water plans (NWI Schedule E), and COAG has expanded on that guidance through the preparation of the Draft NWI Policy Guidelines for Water Planning and Management, which elaborate on the description of best practice in matters such as community engagement (see Box 1.2).

Box 1.2: Draft NWI Policy Guidelines for Water Planning and Management

In response to the Commission's 2009 biennial assessment, the national, state and territory water agencies have developed the Draft NWI Policy Guidelines for Water Planning and Management. The guidelines are under consideration by COAG, and will sit alongside the NWI to provide more detail on its water planning aspects.

Consistent with the NWI, the policy guidelines are intended to be relevant nationally for all water systems. They recognise that legislative and administrative arrangements for water resource management differ among jurisdictions.

The guidelines highlight good-practice approaches to planning and management. They are based on the NWI commitments but provide more detail about the issues to be considered, including stakeholder engagement; improved transparency, monitoring, measuring, metering and reporting; and greater compliance and enforcement.

The objective of the guidelines is to assist all jurisdictions' water planners, policymakers and interested stakeholders in developing and implementing NWI-consistent water planning and management arrangements. The guidelines will also be used as a reference to support the National Water Planning Report Card on the status of water plans and their implementation.

The guidelines are not mandatory, and are designed to be improved in the light of experience through the development of case studies and tools that address specific aspects of planning (for example, methods to estimate future climate change impacts on water resources, to assess surface water – groundwater connectivity and to enable Indigenous participation in planning).

In all jurisdictions except Western Australia, water plans are based in legislation (Table 1.1). Jurisdictional legislation generally specifies what plans must contain and how they should be developed, in a way consistent with the NWI. However, the purpose and scope of water plans differ across the jurisdictions. For example, they may cover:

- + water allocation and sharing
- + water use, water resource development and structural modification
- + river health (including all impacts of water extraction and land management)
- + total water cycle management.

Geographical extent Regulatory effect	All water bodies in the ACT. Some water bodies extend Binding into NSW, the ACT has rights to manage and use water The plan is consistent with the <i>Water Resource Act 2007</i> . from the Googong Dam area in NSW.	 into NSW, the ACT has rights to manage and use water from the Googong Dam area in NSW. into the Googong Dam area in NSW. Water management area (one or more catchments), or one or more water 'sources' (for water sharing). A water source is: A water source is: A to ra regulated river, the part of the river supplied under a single scheme For an unregulated river, a subcatchment or catchment or catchment A for an unregulated river, a subcatchment or catchment or catchment A for an unregulated river, a subcatchment or catchment A for an unregulated river, a subcatchment or catchment A for an unregulated river, a subcatchment or catchment A for an unregulated river, a subcatchment or catchment A for an unregulated river, a subcatchment or catchment A for an unregulated river, a subcatchment or catchment A for groundwater, a contiguous hydrogeological unit. 	Water control district or part of a water control district. Binding. As a matter of policy, this is a subcatchment or a Water resource management in a water control district is to be in hydrogeological sub-unit or unit within the subcatchment. accordance with the water allocation plan for those areas where a water allocation plan has been declared.	Binding. Binding. Required to consider effects on water resources Resource operations plans must be consistent with the relevant water resources plan. In the plan area. Binding. Binding surface water and/or groundwater as needed. Binding.	se Any prescribed water resources, including surface Binding. water and groundwater. The water allocation plan specifies the principles upon which	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure rivers to cadastral units.	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure rivers to cadastral units.	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure rivers to cadastral units.	In practice, boundaries vary from subcatchments to decisions are based and licences can be varied to ensure civers to cadastral units.
urpose and scope	ater sharing, allocation and use	an be for one or more of the llowing: water sharing, water use, ainage management, floodplain anagement, activities on aterfront land, aquifer interference tivities. urrent plans and macro plans are r water sharing only.	ater sharing, allocation and use	ater sharing and allocation and use ater sharing and allocation and use	ater sharing and allocation and use							
Type of plan P	Water resource W management plan 'Think Water Act Water'	management plan <i>Think Water Act Water'</i> Water management fr plan d a a fo	Water allocation plan V	Water resources plan V Resource operations M plan	Water allocation plan W							
State/ territory	ACT	MSN	ΤΝ	DIQ	SA							

Table 1.1: Purpose, scope, extent and regulatory effect of water plans, by jurisdiction

State/ territory	Type of plan	Purpose and scope	Geographical extent	Regulatory effect
Tas.	Water management	Water sharing and allocation and use	Watercourses, lakes and groundwater.	Binding.
	plan		In practice, they are subcatchments.	Minister must administer licensing and allocation of water
			Required to take into account effects on other water resources.	consistent with the plan.
Vic.	Sustainable water strategy	Total water cycle management— development, sharing, extraction, use, recycling	Regional—all water sources.	Non-binding.
	Regional river health strategies	Total river health—extraction, use, water quality, land-use impacts, riparian management	Catchments.	Non-binding.
	Bulk entitlements	Water sharing and allocation and use	Regulated rivers; rural and urban water delivery systems.	Binding on the water authority to which it is issued.
	Water management	Water sharing and allocation and use	Declared water supply protection areas.	Binding on licence holders (conditions in the plan apply) and on
	plans		In practice, these are subcatchments or all or part of a hydrogeological unit.	the authority responsible for administering water sharing in the area.
WA	Regional management plans and proposed regional water plans	Water sharing and water use (broad objectives)	Regional.	Non-binding (but are a relevant consideration in decision making).
	Subregional management plans, and proposed statutory water management plans	Water sharing, allocation, use, and future development	Unspecified, but presumably catchments, subcatchments or hydrogeological units.	Non-binding (but a guide to decision making), but proposal is for statutory plans to be binding.

Source: Hamstead, Baldwin and O'Keefe (2008), updated.

Table 1.1 continued

The NWI (clause 38) provides for the state or territory to determine whether a plan is prepared, what area it should cover, the level of detail required, the plan's duration or frequency of review, and the amount of resources devoted to its preparation. The determination is to be based on an assessment of the level of development of water systems, projected future consumptive demand and the risks of not having a detailed plan.

Given the critical role water plans and planning processes play in improving the water operating environment, the Commission considers that at a minimum plans should be prepared for all areas where there is a significant level of demand, or where there is reason to believe that the resource or environmental assets are under threat.

The decision making process followed to determine that a plan is not required should be robust. While jurisdictions have advised that they have mechanisms in place to determine priority areas for planning, those decision making frameworks and the priorities are not transparent.

It is difficult to assess progress purely in terms of the number of water plans prepared and the areas or water systems they cover—largely because of the differing approaches among jurisdictions and the changes in plan coverage that occur over time (for example, when a new plan replaces a number of older plans).

Nevertheless, the available evidence suggests that all jurisdictions have made significant progress in preparing and revising NWI-consistent water plans, and that the number and extent of plans finalised has increased substantially since 2004 (see Table 1.2), as has the number of water systems covered. In addition, further plans are being developed.

See appendixes A (indicators 2.1 and 2.2) and B (clauses 39 and 40) for further detail on the implementation of NWI-consistent statutory water plans.



Fortescue River, Pilbara region, WA

	Type of water plan	Number o identified	of plans as required	Number of	plans completed	Intentions for areas without plans	Comments
		2004-05	2011	2004-05	2011		
MSN	Water sharing plan (WSP)	6	84	37 (40%)	62 (74%) (51 plans have commenced, 2 are to commence on 1 July 2011, another 8 are to commence shortly, and 1 is on exhibition. Another 5 are being finalised to go on exhibition this year)	NSW proposes to gradually cover the state on a priority basis (the most stressed systems first), although the schedule is not finalised.	95% of water extracted is currently covered by WSPs. In 2004–05, the proportion was approximately 80%. NSW has made adjustments to the numbers and types of plans that were to be developed since 2004. For example, the individual Border Rivers surface water and groundwater areas were combined to allow for integrated management of their water resources.
Vic.	Sustainable water strategy (SWS)	4	4	0 (0%)	2 (50%) (2 are in draft)	100% of the state will be covered by SWSs and regional river health strategies. SWSs address some NWI elements, but other elements are covered under different planning instruments, such as bulk entitlements, groundwater management plans (GWMPs), streamflow management plans (SFMPs) and regional river health strategies.	Based on available information, Victoria has more than 300 bulk entitlements, which specify water sharing arrangements between consumptive users and the environment. Victoria also has 7 GWMPs, 6 operational SFMPs and 1 draft SF/GWMP (Upper Ovens).
QIQ	Water resource plan (WRP) Resource operations plan (ROP)	23 23	23 23	11 (48%) 5 (22%)	22 (96%) (of which 2 are currently being revised) 18 (78%)	Queensland advises that by the end of 2012 all catchments that it has identified as requiring a WRP and an ROP will have a WRP in place, and that remaining ROPs will be in place by the end of 2013.	In 2004–05, about 60% of the state was covered by WRPs. In 2011, over 90% is covered. This figure does not include systems covered by wild rivers legislation.
WA	Water allocation plan (WAP)	31	5	8 (26%)	14 (45%) (plus 5 released for public comment)	WA has developed new WAPs for 75% of the medium and high water use management areas around the state. For the remaining areas, new plans are in preparation, the pre-2006 plans are still valid, or use is low or highly localised and management through licences is considered adequate.	More than 80% of consumptive water is covered by WAPs; the remaining 20% is covered by licences. Since WA signed the NWI in 2006, 19 new WAPs have been developed. Of those, 14 have been finalised and the remaining 5 are nearing completion and used to guide allocations for those areas.

Table 1.2: Extent of water planning

	Type of water plan	Number of identified a	plans s required	Number of	plans completed	Intentions for areas without plans	Comments
		2004-05	2011	2004-05	2011		
SA	Water allocation plan (WAP)	23	23	16 (70%)	20 (87%)	Prescribed water resources include water resources assessed as at risk or potentially at risk, which includes most of the significant water resources in the state.	In addition to the increase in the number of plans in place since 2005, a number of pre-existing plans have been, are being, or are scheduled to be reviewed and amended, bringing them into line with the NWI.
						The remaining water resources are managed under the state's <i>Natural Resources</i> <i>Management Act 2004</i> , relevant regional natural	Four pre-2005 WAPs have been replaced by amended WAPs, and 11 of the other WAPs in place now are currently being reviewed or amended.
						resource management plans, and the State Natural Resources Management Plan 2006.	Three new plans are under development. A number of other plans are being combined to produce four plans where there were previously eight.
Tas.	Water management plan (WMP)	12	12	4	6 (50%)	Additional areas will progressively be covered by plans. They will be determined on the basis of their need for a plan, the benefits of having a plan and the risk of not having a plan.	Four WMPs have been released as drafts, and a further two are being prepared. About 15% of Tasmania is covered by WMPs.
ACT	Water resource management plan				1 (100%)	Not applicable.	100% coverage of water resources identified in legislation.
ЛТ	Water allocation plan (WAP)	2 new plus 2 to be reviewed	9	-	3 (19%) 7 in preparation for completion by 2013 6 yet to commence but programmed for completion after 2013	All water resources, whether covered by a water plan or not, are managed in accordance with the NT Water Allocation Planning Framework (Schedule C of the NWI Implementation Plan).	Four WAPs are in draft/consultation stage, and advisory committees and preliminary consultations are underway on another two.

Table 1.2 continued

To assess the quality of water planning and the content of plans for this report, we reviewed a sample of newer plans completed since 2009 from each jurisdiction (see Table 1.3) and compared those against the practices we observed in our 2009 biennial assessment. We also drew on information gathered as part of our water planning report card project. We focused on several key plan elements:

- + using the best available scientific, economic and social information
- + specification and clarity of objectives
- + monitoring and reporting on outcomes.

Overall, we found that the standard of water planning is improving and that more sophisticated, comprehensive plans are being developed. However our assessment found that water plans could be improved further by more clearly specifying and linking measurable objectives, and by specifying trade-off decisions, the range of scenarios considered (including extremes), and planned monitoring and reporting programs.

Jurisdiction	Plan
NSW	Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources, 2010
	Water Sharing Plan for the NSW Border Rivers Regulated River Water Source, 2009
WA	Draft Gingin Surface Water Allocation Plan (final plan released in April 2011)
	South West Groundwater Areas Allocation Plan, 2009
SA	Barossa Prescribed Water Resources Area Water Allocation Plan, 2009
	Marne Saunders Prescribed Water Resources Area Water Allocation Plan, 2010
Tas.	Ansons River Catchment Water Management Plan, July 2010
	Draft Sassafras Wesley Vale Water Management Plan, November 2009
NT	Water Allocation Plan for the Tindall Limestone Aquifer, Katherine, 2009–2019
Qld	Gulf Water Resource Plan, 2007
	Gulf Resource Operations Plan, 2010
	Logan Water Resource Plan, 2007
	Amendment to the Logan Basin Water Resource Plan to include southern Moreton Bay islands
	Logan Basin Resource Operations Plan, 2009
Vic.	Northern Region Sustainable Water Strategy, 2009
	Draft Western Region Sustainable Water Strategy, 2010

Table 1.3: Water plans reviewed for this assessment

The Commission's national Water Planning Report Card will consider all water systems across Australia and provide further insight into the level of transparency and accountability in water plans. The report card will be published at the end of 2011.

1.2.1 Using the best available scientific, social and economic information

Under the NWI, water plans are required to be developed using the best available scientific knowledge and socioeconomic analyses. The information should include descriptions and assessments of the different values of the water, and the water requirements for maintaining those values. In addition to consumptive values, non-consumptive environmental and social values are to be included.

Our review found that, for most of the plans in the sample, the relevant jurisdiction had undertaken studies to identify the values associated with water-dependent ecosystems and to estimate the water regime required to maintain those values. The rigour of the studies varied substantially, from basic desktop assessments to detailed studies involving field work and experts, reflecting a risk-based approach, the level of information available and the level of use in the system.

Very few of the plans included assessments of non-consumptive social values and the water requirements of those values. Of those that did, the best example was the suite of studies commissioned for Western Australia's South West Groundwater Areas Allocation Plan, which identified a range of cultural, recreational, tourism, aesthetic and other social values associated with the water resource and estimated the water regimes needed to maintain them.

In addition, very few of the plans included robust socioeconomic analysis of their likely impacts on the local and broader communities. Although the Murray–Darling Basin Plan is not a water sharing plan in the same sense as the jurisdictional plans assessed for this report, the Commission notes that public responses to the *Guide to the proposed Basin Plan* were also particularly critical of this element.

1.2.2 Clear objective setting and transparency of decisions

The Commission has seen improvement in the processes used in water planning decision making since 2004. However, government intervention in the operation of water plans can undermine that progress.

The recent drought put pressure on water resources and on the planning provisions put in place to cope with scarcity, and tested planning provisions for low flows. In some instances, the jurisdiction's Water Minister intervened to suspend or limit water planning provisions to protect water supplies deemed essential for consumptive purposes. For example, five water sharing plans in New South Wales were suspended (see Box 1.3).

As the 2009 biennial assessment noted, the Commission considers that actions to suspend plans or to qualify entitlements seriously undermine confidence in water plans and water planning. Although it is inevitable that governments will step in when plans break down, the likelihood of this happening can be reduced by widening the scope of scenarios considered when developing water plans. Plans should be robust enough to cope with a broader range of inflow and storage scenarios. The Commission suggests that each water plan should include specific provisions that define the circumstances under which the plan will be suspended or qualified, and the processes for returning it to full operation.

Box 1.3: Suspension of water sharing plans in New South Wales

In New South Wales, five water sharing plans were suspended during the recent drought. The plans covered the Lachlan, Macquarie, Murray and Lower Darling, Murrumbidgee and Wybong Creek areas.

The suspended water plans were based on average low flows over the previous 10 years. This was thought to be sufficiently representative of expected low flows, but the drought was more severe than anticipated and flows were lower than predicted extremes. This led to inadequacies in trade-off decisions that were exposed when high-security water could not be delivered and priority needs could not be met.

The decision to suspend the plans was taken as an emergency measure, but without any clarity about what the decision would mean to users in the medium or long term. Although four of the five suspended plans had been reinstated by July 2011, at the time of suspension there was no publicly available information about the timelines of the suspensions or the conditions under which the plans would be reinstated.

We also believe there is scope to improve the effectiveness of water decision making by aligning water and catchment planning and implementation where they overlap. On the ground, programs and policies deriving from different areas of government can work well together, but inconsistencies and failures to coordinate can lead to unintended and undesirable results.

All states and territories have water plans and catchment management plans of some sort. Those mechanisms have different purposes but they overlap—both include provisions to maintain or improve the condition of freshwater aquatic ecosystems.

Protecting and improving freshwater aquatic ecosystems is a complex management task, often requiring a series of coordinated actions. For example, protecting low flows to preserve in-stream habitat will be ineffective if that habitat is destroyed by cattle or sheep. The most cost-effective options for achieving the environmental objectives of water allocation plans may lie in a combination of on-ground natural resource management measures and water regimes, with less impact on irrigation-dependent communities than water recovery alone.

We recently completed a project, in collaboration with the New South Wales Office of Water, the New South Wales Natural Resources Commission and the Hunter – Central Rivers Catchment Management Authority, to develop and pilot a methodology for achieving that alignment (Hamstead 2010). The project demonstrated that alignment is possible without major institutional change. It can lead to better outcomes by enabling coordinated action and the sharing of agency resources, processes and knowledge. It can also improve community confidence in water plans and the regulatory and investment actions that derive from them.

Finding 1.2

The standard, quality and extent of water planning have improved across Australia since 2004. However, the following areas warrant further effort:

- + Western Australia and the Northern Territory should enact legislation to provide for statutory NWI-compliant water plans in those jurisdictions.
- + Greater transparency should be provided about decision making processes used to set planning priorities and make judgments about where the level of demand on the resource does not yet warrant a plan.
- + Objectives specified in plans need to be clear and measurable.
- + Plans should be informed by rigorous assessments of non-consumptive social values and by socioeconomic analysis.
- Plans should be stress-tested for extreme conditions to ensure that they can operate in all foreseeable circumstances, and should better articulate the processes to be adopted when unanticipated events arise.
- + Water and catchment management planning and implementation should be more closely aligned.

Box 1.4: Commonwealth water governance reforms—the Water Act 2007

The Water Act 2007 (Cwth), which commenced on 3 March 2008, implemented key reforms for water management in Australia. The Act:

- + establishes the **Murray–Darling Basin Authority** (MDBA) with the functions and powers, including enforcement powers, needed to ensure that Murray–Darling Basin water resources are managed in an integrated and sustainable way
- + requires the MDBA to prepare the **Basin Plan**—a strategic plan for the integrated and sustainable management of water resources in the Murray–Darling Basin
- + establishes the **Commonwealth Environmental Water Holder** to manage the Commonwealth's environmental water to protect and restore the environmental assets of the Murray–Darling Basin, and outside the basin where the Commonwealth owns water
- + gives the **Australian Competition and Consumer Commission** (ACCC) a key role in developing and enforcing water charge and water market rules along the lines agreed in the NWI
- + gives the **Bureau of Meteorology** water information functions that are in addition to its existing functions under the *Meteorology Act 1955.*
- In December 2008, the Water Amendment Act 2008 amended the Water Act in order to:
- + transfer the functions of the Murray–Darling Basin Commission to the MDBA
- + strengthen the ACCC by providing for the water charge rules and the water market rules to apply to all water service providers and transactions
- + extend the powers of the ACCC to determine or accredit determination arrangements for all regulated non-urban water charges
- + enable the Basin Plan to include arrangements for meeting critical human water needs.

The Water Amendment Act was based on a combination of Commonwealth constitutional powers and a referral of certain powers from the basin states to the Commonwealth. The Act passed through the Australian Parliament after the passage of referring legislation through the legislatures of the Murray–Darling Basin states—Queensland, New South Wales, Victoria and South Australia.

1.3 Interception and mining

1.3.1 The effect of interception activities

The NWI recognises that some changes to land-use have the potential to intercept significant volumes of surface water and groundwater both now and in the future. The NWI parties acknowledged that those activities—which include farm dams and bores, interceptions of overland flows and large-scale plantation forestry—present a risk to the integrity of water access entitlements and the realisation of environmental objectives if not subject to some form of planning and regulation. Their impacts tend to be concentrated in particular catchments and subcatchments.

The NWI parties agreed that by no later than 2011 existing significant interception activities in water systems that are fully allocated, overallocated or approaching full allocation would be recorded, and that new activities would require a water access entitlement. In water systems not yet fully allocated or approaching full allocation, significant interception activities would be identified and the amount of water they were likely to intercept over the life of the plan would be estimated. For those systems, a threshold level of interception by significant interception activities would be required if the system approached full allocation or if that threshold were met. The NWI commitment leaves it to the parties to determine what is 'significant' for a given system (clauses 55–57).

A Waterlines report published by the Commission in 2010 (SKM, CSIRO and BRS 2010) provided an initial estimate of unaccounted water use. The report found that the total volume of unaccounted water use is potentially equivalent to around one-fifth of the volume of all water entitlements on issue (see Box 1.5).



Eucalypt plantation near Deniliquin NSW

Box 1.5: Initial estimates of interception activities

The Commission engaged Sinclair Knight Merz, in partnership with the Bureau of Rural Sciences and CSIRO, to develop a national interception baseline. The project analysed the available data throughout Australia to estimate the level of development of each interception activity. It then estimated the impact of each activity (in terms of the volume of water it intercepts in an average rainfall year) at this level of development to establish a likely baseline. It also projected the impact for the years 2015 and 2030.

The project found that the total impact of interception activities in Australia may be in the order of 5600 gigalitres a year (GL/year):

- + forestry plantations: 2000 GL/year
- + farm dams: 1600 GL/year
- + stock and domestic uses: 1100 GL/year
- + overland flows (floodplain harvesting): 900 GL/year.

In a wet year, interception volumes are likely to be even greater; for example, floodplain harvesting may potentially use up to 2600 GL.

To estimate forestry plantation use, the project mapped plantations in 156 surface water management areas. The total plantation area in Australia was estimated to be more than two million hectares in 2008, with a median of 4000 hectares per management area. The project estimated that the evapotranspiration from existing plantations is 2000 GL/year greater than if this land were used for dryland agriculture or other non-forestry activities. In addition, some plantations use groundwater in regions with shallow watertables, which may equate to several hundred gigalitres a year of additional water use in existing plantation estates.

To estimate farm dam use, the project used available farm dam datasets. It estimated that the total impact of farm dams nationally was 1600 GL per year in 2008, and projected that to increase to 1840 GL/year in 2015.

The project estimated that total stock and domestic bore use in Australia was 1100 GL/year in 2008. It found that the highest density of extraction for stock and domestic purposes was in:

- + regions where there is no other available source of water
- + areas where surface water resources have been capped, forcing users to look to alternative water supplies
- + urban centres where water restrictions have caused domestic users to use alternative water sources for garden watering.

Those three characteristics are likely to indicate where future growth in stock and domestic bores may occur.

The project also found that the Great Artesian Basin is the most highly affected region. Stock and domestic bore use in the basin accounts for 638 GL/year, or 69% of the total national impact of that activity. However, because of current policy and management, the number of stock and domestic bores in the Great Artesian Basin is not expected to increase.

Almost all current floodplain harvesting in Australia occurs in the northern Murray–Darling Basin. The project estimated the total volume of floodplain harvesting storages nationwide was approximately 2600 GL in 2008, split mainly between New South Wales (950 GL) and Queensland (1625 GL).

The project showed that the impact of interception activities on other water users is more than a simple volumetric change to runoff in the catchment. The timing and spatial patterns of changes to water flow need to be considered to understand which particular users are most affected. This is because interception activities tend to be focused in particular subcatchments or have impacts on particular aspects of the flow regime. Local users in those subcatchments will be most affected, while those who source their water from elsewhere will be least affected.

Source: SKM, CSIRO and BRS (2010).

There has been some progress towards accounting for intercepted water in recent years:

- + In South Australia, a state-wide policy framework for managing the water resource impacts of plantation forests proposes the establishment of a forest water licensing scheme that will provide a water allocation for commercial plantation forest managers similar to allocations to other licensed water users (DLWBC–DPI 2009). The NRM (Commercial Forests) Amendment Bill 2010 was introduced to parliament in November 2010 to allow the policy framework to be fully implemented. In addition, because surface water is a prescribed resource in South Australia, overland flow is taken into account in water plans (SA Government 2010). In March 2010, the South Australian Government released the *Draft Lower Limestone Coast Water Allocation Plan policy issues discussion paper* for broad public consultation. The paper describes, in detail, how either a forest water licences system or an improved permit system would be applied in this prescribed wells area, which contains most of South Australia's forest estate. No decision can be made about which regulatory instrument will be applied until the Bill has been considered by parliament.
- + In Victoria, the Draft Western Region Sustainable Water Strategy explores the impact of land-use change on water resources. Recommendations on the management of land-use change will be presented in the final strategy, which is due for release later in 2011 (Victorian Government 2010). In addition, the Northern Region Sustainable Water Strategy outlines actions to require the registration of all new or altered domestic and stock dams in rural residential areas. From 1 January 2011, this will be implemented across the state, consistent with the regulations under the Victorian *Water Act 1989* (Victorian Government 2010).
- + In the Northern Territory, drafting instructions have been prepared, but not yet ratified, to incorporate NWI commitments on interception and climate change in water planning into the territory's *Water Act 1992*. The Northern Territory advises that amendments to the Act may be completed in 2011 (NT Government 2010).
- + In Tasmania, a water availability and forest land-use planning tool will provide the capability to assess the potential impact of water interception by plantation forests. The tool has been used in the development of the draft Ringarooma Catchment Water Management Plan. In Queensland, interception activities are recognised in the *Water Act 2000*. Risks from the impacts of interception are identified through water resource plans and managed through resource operation plans. Where identified interception activities are considered to be significant, water use is estimated and included in hydrological modelling used to develop the plans.

These developments do not constitute a comprehensive implementation of the commitments made by jurisdictions in the NWI, and the interception estimates in SKM, CSIRO and BRS (2010) illustrate the significance of water use that remains outside the water planning and entitlements frameworks.

For more detail on jurisdictional progress in addressing interception activities, see Appendix B (clauses 55–57).

Finding 1.3

While some progress has been made, NWI parties have not fulfilled their commitments to bring all significant interception of water within the planning and entitlement frameworks. This is a major weakness in current arrangements.

1.3.2 Minerals and extractive industries

Secure access to water is as important to the minerals and other extractive industries as it is to other water users. In its submission to this assessment, the Minerals Council of Australia noted that:

Water availability and security of supply is a critical business risk for the minerals industry, which generates a very high economic value-add from that use. A study by ACIL Tasman found that the availability of water represents a potential constraint on further investment and expansion of the minerals sector at substantial cost to the industry and broader economy in lost production. By-and-large mining and minerals processing cannot occur without secure access to reliable water supplies (MCA 2010).

The council highlighted particular concerns about the recognition and integration of the minerals industry in water reform, including the lack of representation of the sector and integration of its operations in water planning, and the limited development of water markets in regions of importance for the industry.

Historically, the minerals and other extractive industries have often been treated differently to other water users. The NWI (clause 34) recognises that the mining and extractive industries may face special circumstances that may require specific management arrangements outside the scope of the NWI. The Commission acknowledges that there are some features of the water usage of mining and extractive industries that are not shared by other water users.

In particular, dewatering or other extraction processes can have significant impacts on groundwater and surface water resources in the context of the water system as a whole. The level of uncertainty about the predicted quantity and quality of water to be disposed of, the method of disposal, and impacts on groundwater and surface water systems in the short, medium and long term can create risks for third parties.

In all jurisdictions other than the Northern Territory, new mining operations are generally required to acquire water access entitlements or a licence to take water for mining operation purposes under the same arrangements as any other user. However, historical arrangements mean that some significant mining operations remain outside NWI-consistent water planning and management systems. Such exceptions are still permitted through legislation in Western Australia, South Australia and the Northern Territory:

- + In the Northern Territory, under section 7 of the *Water Act 1992*, mining activity is exempt from all water licence and permit provisions, except for the requirement for a licence to dispose of waste underground by means of a bore outside the mining site. Mining is thus effectively outside the water entitlement and water planning frameworks.
- + In Western Australia, major mining projects may be facilitated under state agreements. These are contracts between the state government and proponents of major resources projects ratified by an Act of the state parliament. They can override any other state legislation.
- + In South Australia, indentures also operate outside water planning mechanisms. They are uncommon, and steps are being taken to bring mining operations within planning structures as water plans are developed.
- + In Queensland, negotiations with existing mining companies that hold rights to water under special legislation separate to the Water Act have been undertaken in some instances to transition those rights into volumetric water access entitlements consistent with other water users. Only one such special arrangement remains in operation (see Box 1.6).

Box 1.6: Addressing historical mining arrangements in Queensland

Queensland's water planning framework provides for the transition of ambiguous water rights into NWI-consistent entitlements, including water rights held by mining companies.

For example, before the Gulf Water Resource Plan and Resource Operations Plan, Mount Isa Mines Limited held rights to take and interfere with water as stated in special legislation. Those rights were ambiguous and open-ended, which had the potential to undermine the effectiveness of water planning strategies in the Gulf.

Queensland's Department of Environment and Resource Management worked with Mount Isa Mines Limited to transition the company's water rights into a NWI-consistent arrangement during the development of the Gulf water plans. The company recognised the benefits that come with having volumetric and secure water entitlements.

Moving from ambiguous arrangements to clearly defined ones involved more than a water planning process, as the existing water rights were legislated in non-water Acts and amendments were required to transition them.

While progress has been made in incorporating mining activities into water planning and licensing regimes, dewatering remains a problematic issue and is not dealt with in a consistent manner across jurisdictions. Dewatering presents particular challenges to existing entitlement and planning arrangements. In addition to the variable quality of the discharged water, it is difficult to predict or manage the volume of water taken, for example, where it affects the safety of the mining operation or to meter the volumes of water involved, for example, where water is seeping through the wall of an open-cut mine. These are often difficult to predict and have not previously been included in calculations of entitlements and allocations that have formed the basis of the existing water plan.

Water licensing arrangements for dewatering vary across the country:

- + The New South Wales *Water Management Act 2000* provides for aquifer interference approvals, however where a mining operation has an approval there has been some doubt about whether a water access entitlement is also required. An amendment to the Act in 2010, clarifying that such an entitlement is required has not yet commenced.
- + In Victoria, the take of water from the environment is regulated through the *Water Act 1989.* However, the legislation is not clear on whether a water licence is needed for dewatering, and this issue is treated differently in different parts of the state.
- + In Queensland, a licence is required for dewateringin areas where groundwater is regulated. The licence may include a specified volumetric limit, which can be difficult to determine depending on the nature of the mining activity and the aquifer properties.
- + In South Australia, licences are issued for net take, allowing for the reinjection of the dewatering water back into the aquifer.
- + In Western Australia, a license is required for dewatering and for extracting water for mining processes. The licenses specify a maximum allowable volume of water to be taken over a 12 month period. They are generally issued for five years with a presumption of renewal. The presumption of renewal ceases when the mine operation ends.

Historically, the assessment of the cumulative impact of mining on water resources has been limited. More recently, cumulative effects on the environment, including surface water and groundwater systems, are included in environmental impact assessments in all jurisdictions.

Nevertheless, there remain opportunities for improvement, such as:

- + a nationally consistent risk-based approach to the environmental assessment of local and cumulative effects of mining on surface and groundwater systems
- + better communication and coordination between agencies involved in planning and approvals to improve decision making
- + nationally consistent water accounting and data collection, storage and sharing protocols.

The Commission considers that NWI-consistent planning and management arrangements should apply to extractive industries wherever possible, and that arrangements outside the scope of the NWI as contemplated by clause 34 should operate as an exception, rather than a norm. Many jurisdictions, with the exception of the Northern Territory, have made welcome progress in incorporating mining into NWI consistent arrangements and negotiating the removal of historic exemptions. Arrangements for dewatering and cumulative impacts would benefit from further reform and the sector as a whole should be better engaged in planning processes.

Coal-seam gas

The coal-seam gas (CSG) sector is developing rapidly in Australia, offering economic and other benefits. The co-production of large quantities of water as part of the extraction process presents significant challenges.

Work undertaken for the Commission indicates that the Australian coal-seam gas industry could extract around 7500 GL of co-produced water from groundwater systems over the next 25 years, or about 300 GL per year, based on currently known reserves. In comparison, the current total extraction from the Great Artesian Basin is approximately 540 GL per year. These estimates are conservative—other industry and government agency projections show a high level of uncertainty about the scale of the impact. Additional water resource impacts of CSG extraction include impacts on connected systems that are already fully or overallocated, changes to aquifer structure leading to increased inter-aquifer connectivity, and changes to water availability for other users and the environment.

Most CSG activity in Australia has been in Queensland and, to a lesser extent, New South Wales. In both states, the regulation of co-produced water is undertaken outside water entitlement and water planning frameworks.

In Queensland, co-produced water is regulated by several different pieces of legislation including the *Petroleum and Gas (Production and Safety) Act 2004*, the *Environmental Protection Act 1994*, the *State Development and Public Works Organisation Act 1971*, the *Water Act 2000* and the *Water Supply (Safety and Reliability) Act 2008*. Legislative requirements for co-produced water management, including the disposal of brine and salt, depend on whether the co-produced water is considered a waste or a resource under the Environmental Protection Act. Recent improvements to Queensland's management framework include the amendment of the Water Act to provide requirements for groundwater management in response to CSG operations, and the appointment of the Queensland Water Commission as a central body to advise on cumulative impacts of CSG operations in areas of intensive development.

Queensland's Department of Environment and Resource Management is responsible for regulating the impacts of groundwater extraction on groundwater levels and quality, and on groundwater users. It issues environmental approvals for new CSG developments and conducts compliance activities in relation to baseline assessments, bore assessments, water monitoring strategies and impacts on springs.

In New South Wales, CSG developments operate under the *Petroleum (Onshore) Act 1991* during the exploration phase. When moving to full production CSG activities will require development approval following assessment under the *Environmental Planning and Assessment Act 1979*. Recent amendments to that Act mean that these projects will also still require aquifer interference approvals under the *Water Management Act 2000*. In May 2011, the New South Wales Government implemented a 60-day moratorium on new CSG exploration licences as part of transitional arrangements designed to address concerns about land-use conflicts associated with the mining and CSG industries.

New South Wales advises that previous arrangements did not address co-produced water directly or provide specific guidance to assist decision makers to regulate co-produced water. However, new arrangements under the Strategic Regional Land Use Policy involve the development of an Aquifer Interference Regulation to tighten the regulation of mining and petroleum exploration activities. The first stage of this regulation, which commenced on 30 June 2011, amended the *Water Management (General) Regulation 2004* to require water licences for any exploration activity that takes more than 3 ML per year. This removed an exemption that was previously in place. The second stage of the regulation will implement an aquifer interference policy, which is currently being developed in consultation with the community. These reforms, expected to commence in late 2011, will define exemptions from the need to hold a water licence and the need to obtain an aquifer interference approval. They will also give effect to the New South Wales Government's commitment to ban the use of evaporation ponds for the disposal of water taken in petroleum production (including CSG).

The significant uncertainties surrounding the water resource impacts associated with CSG developments demand a precautionary and adaptive management approach. The reforms underway in New South Wales appear to bring CSG developments more closely under water management arrangements. Foreshadowed exemption mechanisms should be minimised and clearly justified where they are needed. The Commission remains concerned about the degree to which the sector remains separate from other water management arrangements in Queensland.

See Appendix B for further detail on how jurisdictions have addressed NWI clause 34.

Finding 1.4

Most jurisdictions have made progress in incorporating mining and extractive industries into NWI-consistent planning and management arrangements however, the arrangements for dewatering and managing cumulative impacts remain a challenge. The rapid growth and significant potential impacts of the coal-seam gas industry on water resources represent a risk to sustainable water management in a number of regions.

1.4 Indigenous water

The NWI is the first intergovernmental water agreement that explicitly recognises the interests of Indigenous people (NWI clauses 25(ix), 52–54). All jurisdictions, apart from Tasmania, have explicit processes for community consultation with Indigenous people in water planning. These developments are a necessary first step, but the focus should be on:

- + using those engagement processes to more explicitly account for Indigenous water values and requirements in water planning
- + building the capacity of Indigenous leaders to participate in water planning and management, including by recognition of Indigenous knowledge of water systems.

In the 2009 biennial assessment (NWC 2009a), the Commission found that:

- + it was rare for Indigenous water requirements to be explicitly included in water plans, and most jurisdictions were not yet engaging Indigenous people effectively in water planning
- + water to meet Indigenous social, spiritual and customary objectives was rarely clearly specified in water plans; where those objectives were considered, it was often assumed that they could be achieved by rules-based environmental water provisions.

Research conducted for this report found that where assessments of cultural values are made, they usually involve desktop reviews and reviews of government databases. In many cases, the assessments are also coupled with the assumption that 'cultural flow' values and requirements will be identified through consultations on draft plans.

Water planning often relies on individuals representing Indigenous interests. This may not adequately account for Indigenous systems and customary laws that dictate a broader base of involvement in decision making. A recent study of Indigenous participation in water planning and management (Jackson and Robinson 2009) identified a range of barriers to the effective implementation of the NWI requirements to provide for Indigenous access to water resources and include Indigenous representation in water planning. The barriers include:

- + difficulties in achieving appropriate Indigenous representation in local, regional and policy level decision making
- + technical difficulties in quantifying Indigenous water requirements
- + the absence of institutions and techniques to enable Indigenous participation in water planning and management
- + a low capacity for collaboration within the Indigenous sector and water planning agencies.

There has been progress in the provision of water for Indigenous use:

- + In Western Australia, assessments of Indigenous cultural values have resulted in groundwater being left in situ in the La Grange Groundwater Plan and in the South West Groundwater Areas Allocation Plan.
- + In Queensland, strategic Indigenous reserves have been allocated in declared wild rivers throughout the state, including in Cape York, the Gulf of Carpentaria and other inland river systems.
- + In the Northern Territory, a reserve for future Indigenous use has been incorporated in the Tindall Aquifer (Katherine) Water Allocation Plan and in draft water plans for the Oolloo Dolostone Aquifer, Daly Region, and the Tindall Limestone Aquifer, Mataranka.
- + In New South Wales, allocations for cultural access licences and commercial access licences are being included in new plans.

In other water systems, even where Indigenous cultural values have been clearly identified in water plans, the identification has not generally led to any additional water regime requirements beyond those specified for environmental needs.

To promote more substantive implementation of the NWI commitments to Indigenous access, the Commission established the First Peoples' Water Engagement Council (FPWEC) in 2010. The Commission has also supported a number of projects to assist jurisdictions to improve their engagement with Indigenous Australians and develop more effective mechanisms to identify and address Indigenous social, spiritual and customary interests (see Box 1.7).

Box 1.7: Indigenous water projects funded under the Commission's Raising National Water Standards Program

The Commission has invested in assisting the NWI parties and Indigenous communities to improve Indigenous engagement and consultation in water planning and management. Specific projects include the following.

Assessing Water Sharing Plan Aboriginal Performance Indicators: In partnership with the New South Wales Office of Water, this project is collating Aboriginal information into a central database to inform the development of new water sharing plans and reviews of existing plans. Baseline metrics will be developed to evaluate the effectiveness of water sharing plans in providing for Aboriginal cultural and commercial water.

Aboriginal Community Engagement and Consultation in Water Sharing Planning in New South Wales: In partnership with the New South Wales Office of Water, this project is building Aboriginal capacity to participate in water planning by improving understanding of water licensing, identifying specific cultural values and their water requirements for inclusion in all water sharing plans, and capturing baseline information.

Developing a Process to Define what Constitutes Cultural Water for Inclusion in Water Planning Policy: In partnership with the South Australian Department for Water and the South Australian Murray–Darling Basin Natural Resource Management Board, this project is developing a rigorous and accepted process to define the elements that constitute cultural water and establish water planning policy that achieves cultural water allocations.

Indigenous Water Resource Management: a Process for Consultation and Engagement for Water Resource Planners: In partnership with the Northern Territory Government, this project is developing guidelines and protocols for effective and collaborative engagement using the southern Daly River / Port Keats Aboriginal Land Trust region as a model for improved practice in the territory.

Indigenous Community Water Facilitators Network: Facilitators are working actively with Indigenous communities throughout northern Australia to build the capacity of the communities to participate in water planning processes undertaken by state and territory governments. Facilitators are based in the Fitzroy and Ord River catchments in Western Australia, in the Daly River catchment in the Northern Territory and in the Gulf, Mitchell and Wenlock River catchments in Queensland.

Indigenous Water Policy Group: The Indigenous Water Policy Group has been operating since 2006. It provides research-based policy advice on water reform initiatives as they affect Indigenous communities and their land holdings and provides advice and representation on all matters concerning water resources—including social, economic, environmental and cultural interests— and assists with the appropriate engagement of Indigenous interests in regional water planning in north Australia.

Identifying tools and processes to capture/articulate Indigenous social and economic aspirations with respect to water in Northern Australia: A sub-project of the North Australian Water Futures Assessment is developing knowledge and understanding on Indigenous social, cultural and economic aspirations with respect to land and water management and development in northern Australia.

In its submission to this assessment, the FPWEC 2011 noted that:

Aboriginal people face significant impediments to accessing water for economic, environmental and cultural purposes, and these impediments vary across jurisdictions and regions. There is also a generally inadequate level of Aboriginal participation in decision making relating to water and catchment management, and again this varies regionally.

The FPWEC recommended that Aboriginal people be given greater opportunity to be part of decision making and water planning by:

- + ensuring that they are given enough time to provide input and make decisions within each catchment
- + providing resources to build capacity, including culturally appropriate information about water resource management and planning, water infrastructure, water sharing plans, and market trading
- + establishing effective and collaborative partnerships between governments and Aboriginal people, enabling information sharing and capacity building
- + allowing adequate time for community consultation, decision making and comment on draft water plans.

The FPWEC also recommended that Aboriginal people have access to water through special Aboriginal water allocations for purposes to be determined by them, including cultural and economic purposes. In particular, it proposed that access be through special-purpose Aboriginal economic water allocations from the consumptive pool, and that culturally informed environmental priorities be addressed through a separate cultural flows allocation. The FPWEC also proposed the establishment of an Aboriginal water fund or trust that will fund, coordinate and facilitate the acquisition and management of special Aboriginal economic water allocations.

The Commission considers that there is significant room for improvement in engaging Indigenous Australians in water planning and developing strategies to address their interests. In particular, we agree with the FPWEC that greater effort needs to be made to build capacity in Indigenous communities and to incorporate Indigenous traditional knowledge in water management.

We also consider that the allocation of water entitlements to facilitate economic development is a legitimate strategy for contributing to the Australian Government's *Closing the Gap* agenda. In water systems that are fully allocated, the establishment of a fund to acquire appropriate rights could be considered. In systems that are not fully allocated, alternative approaches, such as setting aside strategic Indigenous reserves, may be more appropriate.

The Commission is concerned that the establishment of a special entitlement category may limit the potential for the trading of such entitlements and prevent the realisation of their full economic benefits. Nevertheless, some control on permanent trading may be appropriate to ensure that any trading has the full support of the community.

Appendix B (clauses 52-54) summarises how the NWI parties have addressed their commitments to Indigenous Australians.

Finding 1.5

Most jurisdictions have improved consultations with Indigenous communities in water planning and management, but have generally failed to incorporate effective strategies for achieving Indigenous social, spiritual and customary objectives in water plans, as envisaged under the NWI.

1.5 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 after 2014 (see Box 1.8). The framework was an important element of the initiative designed to give water access entitlement holders more certainty about how changes in water availability would be dealt with.

The framework assigns accountability for reductions in water availability resulting from a range of circumstances. Uncertainty (about the extent to which water users' entitlements will be affected by changes in water availability) reduces the value of entitlements as a secure tradeable commodity. The risk assignment framework was important in gaining the irrigation sector's support for the NWI in 2004. The framework applies to reductions additional to those identified for the purpose of addressing known overallocation or overuse. The initiative requires jurisdictions either to adopt the specific NWI risk assignment provisions or to devise an alternative approach agreed by water access entitlement holders, environmental stakeholders and the relevant government.

ii) periodic natural events such a	s bushfires and drought.								
	Water Access Er	ntitlemer	nt Holders: 1	00%					
NWI Clause 49: Risks of any rec knowledge of water systems' cap	luction or less reliable water pacity to sustain particular e	r allocation	on arising as 1 levels up to	s a result of bona fide improvements in the 2014.					
	Water Access Er	ntitlemer	nt Holders: 1	00%					
Risks arising under comprehensi	ve water plans commencing	g or rene	wed after 20	014 are to be shared over each 10 year period.					
Reductions up to 3%		Water A	ccess Entitle	ement Holders: 100%					
Reductions between 3% and 6%	State / Territory govern	nments: 3	33.3%	Commonwealth government: 66.6%					
Reductions greater than 6%	State / Territory gover	mments:	50%	Commonwealth government: 50%					
NWI Clause 50: Risks of any rec government policy (risks borne b	luction or less reliable water y the government whose po	r allocatio licy caus	on that is no ed the redu	t previously provided for, arising from changes ir ction).					
State / Territory gove	rnments: 100%	or		Commonwealth government: 100%					
NWI Clause 51: Alternatively, the environmental stakeholders and proposed in paragraphs 48–50 a	e Parties agree that where a the relevant governments ag bove, that this will be an ac	ffected p gree, on ceptable	oarties, inclu a voluntary I e approach.	iding water access entitlement holders, basis, to a different risk sharing formula to that					
proposed in paragraphs 48–50 above, that this will be an acceptable approach.									

Several jurisdictions have legislated risk assignment provisions:

- + The New South Wales *Water Management Act 2000* identifies risk sharing by water licence holders and provides a hierarchy of priority access to seasonal allocations (section 58), setting out the circumstances in which water sharing plans can be amended (s. 87) and adopting the risk management framework recommended in the NWI (s. 87AA).
- + The Commonwealth *Water Act 2007* provides a framework for assigning risks in the Murray–Darling Basin where the volume or reliability of water access entitlements is compulsorily reduced as a result of a reduction in sustainable diversion limits. The risk of such reductions is allocated between individual entitlement holders, the Commonwealth and the relevant state in each case, according to a risk allocation formula set out in the Act.
- + South Australia has adopted an alternative risk assignment framework under NWI clause 51. The state's *Natural Resources Management Act 2004* allows the Minister to make reductions in water on licence under certain circumstances, primarily when a water allocation plan is revised and less water is available for consumptive use under the revised plan. Licences can be altered to be consistent with the current water allocation plan.

Appendices A (indicator 6.1) and B (clauses 46–51) summarise how the NWI parties have addressed their commitments to implement NWI-consistent risk assignment provisions. Jurisdictions have agreed to publish information on how they will implement the provisions within 16 weeks of the release of the Murray–Darling Basin Plan.

In 2010, the Australian Government announced that it would 'bridge the gap' between current diversion limits and new sustainable diversion limits (SDLs), specified in the Murray–Darling Basin Plan, through purchases from willing sellers, and investments in infrastructure and irrigation efficiency. This provided some clarity about how the transition from extraction limits in existing water plans to the SDLs in the first Basin Plan would be managed.

Based on consultations for this and other assessments, concerns remain about how risk assignment provisions will be applied in the Murray–Darling Basin after the implementation of the initial SDLs. The Australian Government's commitment to 'bridge the gap' may create an expectation that it will also address any future gaps , with no costs to be borne by entitlement holders.

Both inside and outside the basin, it is important that water users and the market are clear about how and when the provisions will be applied, as this will ensure that market participants have confidence and certainty about the entitlements being traded.

Finding 1.6

There has been limited progress in formally adopting the risk assignment provisions of the NWI, and many stakeholders remain confused about the way those provisions will be applied in practice.

1.6 Water accounting and information

Parties to the NWI agreed to implement compatible water resource accounting systems to enable measurement, monitoring and reporting of the amount of water being traded, extracted for consumptive use, and recovered and managed for environmental and other public benefit outcomes across all jurisdictions (NWI clause 80–89). They agreed to a range of actions, including developing water accounting standards and metering consumptive water consistently. By providing practical, reliable and credible information and making it accessible to all stakeholders, these reforms are expected to improve water managers' and users' accountability for their decisions and performance and support public and investor confidence.

Since 2006, there has been significant investment in the development of systems and tools to support the compilation and dissemination of comprehensive water information. The Bureau of Meteorology is now responsible for the collection and publication of water data and information (see Box 1.9). The bureau's responsibilities under the Commonwealth *Water Act 2007* include:

- + issuing national water information standards
- + collecting and publishing water information
- + conducting regular national water resources assessments
- + publishing an annual National Water Account
- + providing regular water availability forecasts
- + giving advice on matters relating to water information
- + enhancing understanding of Australia's water resources.

The Australian Government is working with the state and territory governments to develop the National Water Market System to improve the efficiency of water registers and transactions and the availability of market information. The system is discussed in more detail in Chapter 2.

The importance of this ongoing investment in water data and information was noted in SunWater Limited's submission to this assessment, which stated that there are 'significant community and public benefits to be derived from enhancing the efficiency, effectiveness and consistency of reporting of water-related information throughout the water-using regions of Australia' (SunWater Limited 2010).

The bureau's water information program seeks to:

- + establish a national water data sharing framework by collating water data gathered by more than 200 organisations across the country and providing free online access to reliable water information
- + analyse trends in water availability and quality across the nation, and convey that information to the public via Australian Water Resources Assessments
- publicly disclose water entitlements, allocations, trades and take for all major urban and rural water supply systems in the annual National Water Account
- + provide effective and reliable streamflow forecasting services for high-priority water supply systems.

The bureau has completed the first inventory of all hydrologic monitoring sites in Australia, identifying more than 120 000 sites.

In collaboration with 33 organisations, the bureau has produced the National Water Account 2010. The first of three parts of the account was released in June 2011 and provided data for the Adelaide, Perth, Ord and Sydney regions. Data for Canberra, Melbourne, the Murray–Darling Basin and south-east Queensland will be available in upcoming releases. When complete, the account will cover the most significant water supply systems in Australia. Its development is an important milestone in the delivery of the water accounting commitments in the NWI.

Many of the elements required for effective, nationally consistent water accounting systems are being developed by the Water Accounting Standards Board (an independent advisory board to the Bureau of Meteorology), which released a draft of the Australian Water Accounting Standard in late 2010 and expects to finalise the standard in 2011. The draft standard sets out a common approach for reporting on water management and disclosing compliance, including environmental water commitments. A number of jurisdictions have progressed water accounting ahead of the National Water Account.

In a review conducted for this assessment, Inovact Consulting found that 'where accounting systems are in place, particularly at a regional level, they are having a positive effect on the information available to water planners and users'. As those systems are more widely implemented and managers' familiarity and experience with accounting information increase, the application of accounting to the adaptive management of water resources is likely to yield significant benefits.

Finding 1.7

Major investments in water data collection and accessibility and the development of water accounting standards are improving the information base on which water planners and managers can rely.

Box 1.9: The Bureau of Meteorology's role and responsibilities in water information

In 2006, a Commission-sponsored National Water Data Summit agreed on the need to develop open water data transfers between jurisdictions. The summit recognised that, while some hurdles remain, a wide range of benefits to Australian water users would flow from improved access to water data.

At its July 2006 meeting, COAG reaffirmed its ongoing commitment to the continuing water reform agenda and to the implementation of national water accounting and measurement standards. The Australian Water Ministers' meeting on 24 November 2006 endorsed the principle of open and efficient sharing of water data.

The Prime Minister subsequently earmarked \$480 million to improve the Bureau of Meteorology's capacity to measure and manage water data. To facilitate the bureau's new role, the Commission developed specifications for the Australian Water Resources Information System during 2006–07 to enable more rapid compilation and presentation of ongoing Australian water resource assessments. The system is now housed in the bureau.

In 2008, a national groundwater data and information workshop determined that a national groundwater information system was required to provide readily accessible information on aquifer boundaries and layers, aquifer characteristics, hydrogeologic units, groundwater management areas and bore characteristics, and all of their interrelationships. This system, which is under development, will give groundwater managers an essential tool to describe key groundwater stores and fluxes when assessing and accounting for water resources. It also will be the basis for hydrologic modelling, particularly for surface water – groundwater interactions.

The bureau is responsible for the collection and publication of water data and information. Under Part 7 of the *Water Act 2007* (Cwth), it is required to collect, hold, manage, interpret and disseminate Australia's water information. To facilitate that work, section 126 of the Act obliges persons specified in the Regulations to give certain water information to the bureau.

The bureau is working closely with CSIRO researchers on new science and technologies to improve water information across Australia. The partnership is funded through the five-year, \$50 million Water Information Research and Development Alliance.

The alliance's advances are complemented by research and development through the Centre for Australian Weather and Climate Research (an ongoing venture between CSIRO and the bureau) and the eWater Cooperative Research Centre involving 45 of Australia's leading water management, consulting and research organisations, supported by the Australian Government's Cooperative Research Centres Program.

More than 200 organisations across Australia currently collect and hold water resources information. The bureau is working closely with water managers to improve the accuracy and currency of water information, which will be made freely available to all Australians, including government, industry and the community.

Improving the quality and reliability of Australia's water information requires the upgrading of many monitoring and data transfer systems across the nation. The bureau administers the Australian Government's \$80 million Modernisation and Extension of Hydrologic Monitoring Systems Program. The program, which began in 2007 and will continue until 2012, helps agencies that collect water data to upgrade and expand their streamflow and groundwater monitoring and water storage measurement networks.

Australians have free online access to information about publicly owned water storages across Australia at a single website. Visitors are able to compare water storage levels for more than 260 dams, or over 94% of the nation's water storage capacity. Daily updates are available for most of Australia's water supply systems (www.water.bom.gov.au/waterstorage/awris/index.html).

1.7 Metering water extraction and use

Effective metering is important to improve the information base, market operations and water users' accountability for their consumption. Significant progress has been made in improving the accuracy of metering and extending metering coverage. However, coverage is still limited in many jurisdictions.

In the 2009 biennial assessment, the Commission found that considerable volumes of water from unregulated sources were still being extracted without any mechanism for metering or reporting. We continue to support the ultimate objective of universal metering of all surface water and groundwater extractions. A risk-based approach using the following criteria recognises the practical constraints on delivering that objective:

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

Metering upgrades are often undertaken as part of the broader modernisation of irrigation systems. Together, metering upgrades and irrigation modernisation provide opportunities for irrigation service providers and individual farmers to improve the efficiency of their business operations.

COAG has developed the National Framework for Non-urban Water Metering to establish a national standard for non-urban water meters, and to improve the accuracy and extent of metering. The framework came into effect on 1 July 2010, and delivers on NWI commitments in relation to metering standards. It provides an acceptable level of confidence that measurement performance in the field is within maximum permissible limits of error of plus or minus 5%. The framework is an important step towards improving the security of water entitlements and improving the accuracy and timeliness of water-use information.

Several jurisdictions have been developing and implementing non-urban metering plans. Appendix B highlights the progress of NWI parties in implementing their NWI water metering commitments, which includes the following:

- + Victoria has begun the staged implementation of its plan in order to provide time for water businesses and the metering industry to adjust to the requirements of the national framework. All new meters are to meet the new standards, and improvements in operation, maintenance and reporting are to commence in the next water planning period (beginning in 2013–14). This will allow Victorian rural water corporations to develop plans, resources and cost-recovery pathways. Victoria has 49 700 metered extraction sites. Extensive modernisation programs are underway; an estimated 18 924 meters will be upgraded and a further 7523 will be installed. The capital investment in non-urban water metering over the next 5–10 years is estimated to be \$370 million (Victorian Government 2010).
- + In Queensland, which finalised its implementation plan in February 2010, \$3.3 million of state funding will be spent over four years to install approximately 2900 water meters on non-urban properties across the state. Meters are being installed in line with regional priorities, in areas of high use and areas under stress. Queensland advises that about 10 500 meters may be required (Queensland Government 2010).
- + In the ACT, 100% of licensed extraction is metered. Stock and domestic use of surface water is not metered (ACT Government 2011).
- The implementation of Western Australia's metering plan has not yet been fully financed. Across the state, licensing policy requires that privately owned meters be fitted to draw points associated with licences with annual water entitlements of 500 ML or more. Lower thresholds may apply in priority areas, such as Carnarvon. Western Australia's metering program has installed 1267 state-owned water meters on privately owned licensed draw points across the Gnangara Mound (WA Government 2010).
- + South Australia completed its implementation plan in January 2009. Consistent with the state's metering policy, a condition attached to a licence may require that the volume of water taken be measured by a water meter rated by the manufacturer to an accuracy of plus or minus 2%. South Australia has advised that it is concerned that the benefits of implementing the new national standards and the Meter Assurance Framework are outweighed by the costs to the state and licensed water users, and that it is taking a risk-based approach to implement the new national standards where there is strategic value and where funds are available (SA Government 2010).
- + Tasmania has prepared a draft non-urban metering implementation plan, which is currently being considered by the Tasmanian Government. Water meters are being rolled out to all remaining unmetered urban areas, particularly in southern Tasmania (Tasmanian Government 2011).
- + The Northern Territory metering implementation plan is expected to be completed in 2011 (NT Government 2010).

+ New South Wales has released interim water meter standards that will guide the selection and approval of water meters until the full national standards are able to be implemented (NOW 2009). New South Wales has also begun the modification of the administrative and legislative arrangements that will enable the national water meter standards to be fully enforced for non-urban water extraction. The state's implementation plan aims to meter approximately 95% of water usage in all water sources (New South Wales Government 2011).

New South Wales recently obtained funding from the Commonwealth to begin installing government water meters in the upper Murray Valley. This is a pilot of the full \$221 million New South Wales Metering Scheme, which will install meters throughout the state's part of the Murray–Darling Basin. Currently in New South Wales most of the regulated river systems are metered, about 50% of extraction in groundwater systems (predominantly inland alluvial aquifers) is metered, and very few unregulated river systems are metered. New South Wales is close to completing a Commonwealth capital program to install meters that are compliant with the national standards in the Hawkesbury–Nepean system, covering 95% of extractions.

Funding shortfalls are impeding the implementation of metering programs even in areas where the benefits to be gained, such as more detailed and accurate water information and enhanced security for water entitlements, clearly outweigh the costs. To the extent that there are private benefits to be gained, there is an argument for recovering at least part of the cost from water users, in a manner consistent with NWI pricing principles.

Finding 1.8

The extent of water metering has increased. Additional investment is underway, and a new national standard for non-urban water metering has been agreed. Achieving the ultimate objective of universal metering of all surface water and groundwater extractions will require extensive ongoing effort.

1.8 Compliance and enforcement

Monitoring compliance with water allocations and an effective enforcement capability are fundamental to confidence in water management, protecting user rights and delivering planning objectives. In 2010, the Australian Government committed \$60 million over five years to improve compliance and enforcement.

The National Framework for Compliance and Enforcement Systems for Water Resource Management seeks to combat unlawful water use on a national scale. At 30 June 2011, seven jurisdictions (the exception is Western Australia) had approved the framework and signed implementation plans. Over \$2.3 million has been provided to six states and territories under the framework.

Under the framework, states and territories agree to develop best practice approaches to compliance and enforcement and to address gaps in their systems. There are five key aspects to the framework:

- + analysis of the offences and sanctions for water theft in current state and territory legislation, and amendments to support the national approach
- + risk analysis of water resources, using available data to determine areas with higher risk of unlawful use of water in each state or territory
- improvements to compliance capability by ensuring that compliance officers complete minimum competency standards, that they have modern systems and processes to locate and identify breaches, and that they are supported to take action against offenders and stop further breaches
- + increasing monitoring by making more resources available for monitoring on the ground and by using intelligence data and risk analysis
- + increasing public awareness by educating stakeholders and the public about the effects of water theft, its impact on water resources and the consequences for offenders.

The Commission acknowledges that the development of a national framework is an important step towards improved compliance and enforcement however, there is as yet no evidence of improvements in practice.

Finding 1.9

The full and timely implementation of new compliance and enforcement measures under the National Framework for Compliance and Enforcement Systems for Water Resource Management is necessary to increase confidence in water management, protect user rights and deliver planning objectives.

1.9 Science and skills

The NWI parties agreed to identify the key knowledge-building priorities to support the implementation of the initiative, and to coordinate a national knowledge-building effort that reflects those priorities.

Some valuable projects are underway. For example, the Commission's Raising National Water Standards Program funds high-priority activities to advance the NWI and improve Australia's national capacity to measure, monitor and manage its water resources.

The program targets projects to improve national outcomes and to support national consistency where appropriate. More than 170 Raising National Water Standards projects have been funded so far under 11 themes:

- + water accounting
- + emerging water markets
- + water planning and management
- + irrigation and other rural water
- + water-dependent ecosystems
- + integrated urban water management
- + groundwater
- + northern rivers
- + national assessment of water resources
- + northern futures
- + knowledge adoption and capacity building.

In addition, initiatives such as the CSIRO Water for a Healthy Country Research Flagship (see Box 3.1 in Chapter 3), cooperative research centres in natural resource management and agriculture, and centres of excellence in desalination and water recycling are contributing significantly to the body of research driving policy change.

Water science in Australia lacks:

- + clear mechanisms for the development of research priorities nationally and at the regional scale
- + a coordinated framework to efficiently manage limited resources where multiple governments are seeking scientific answers to common problems
- institutional arrangements that promote deeper engagement between scientists, policy managers and operational water managers, which would enable researchers to better anticipate changing management priorities, and policymakers and managers to benefit from the insights of researchers.

In the urban water sector, a new collaborative group, the Australian Water Research and Development Coalition, has been set up to bring together key research and development knowledge brokers in the Australian water community. The aim is to share information on research and development and to promote research knowledge and adoption to the industry. This is a promising development.

A number of existing water research institutions are coming to a close, creating a very real risk that total investment in water science and knowledge will decline in the short to medium term. Investment in water science is a core government responsibility in so much as it primarily delivers public good benefits and is a crucial component of governments' role as the overarching stewards of water resources.

In 2009, the Commission called for a nationally coordinated water science strategy and for more effective mechanisms to facilitate engagement between science, policy and water management. Coordination at the national level has the potential to target scarce research resources more efficiently to areas of high priority. While some work in the area of coordination has begun, progress has been disappointingly slow.

Finding 1.10

Investments in science, data and knowledge since 2004 have contributed substantially to delivering the NWI commitment to address the knowledge needs of reform implementation. There remains an ongoing need to maintain investment to ensure that water policy and management are able to respond adaptively to changing circumstances. NWI parties have yet to implement effective coordination of the national water knowledge effort.

Box 1.10: Source Rivers

Source Rivers (previously known as River Manager) is a next-generation river modelling capability developed by eWater CRC and its partners. It combines best available hydrological science with state-of-the-art software engineering to assist practitioners in water planning and management. This capability comprises the major part of the larger suite of tools that form the Source Integrated Modelling System, which is to be released in early 2012.

Source Rivers is designed as a complete river systems modelling package for river management organisations across Australia, and to be useful for the next 15–20 years. It is designed to support planning and operational aspects of river system management at a range of spatial and temporal scales and will support management agencies to:

- + develop, implement and monitor water sharing plans
- + make daily operational decisions and develop seasonal operating plans
- + predict the combined impacts of various drivers (such as the environment, climate, land use, farm dams, irrigation, water savings, water trading and groundwater development) on water resources and water allocations
- + model water availability (historical, present and future) across the whole of Australia using models that are consistent at catchment, regional and continental scales



+ assess the impact of land use and water management on water quality variables such as salinity.

Source Rivers comes fully supported with online documentation, including a scientific reference guide and user guide, as well as training for users at all skill levels, delivered both online and face to face.

Current water planning and management modelling packages rely on systems developed over two decades ago. While those models have proved satisfactory to date, limitations are now being experienced in their use for complex operational and planning needs required for water reform protocols, such as environmental demand, land-use change and climate change scenarios. The prolonged drought, water scarcity and competition for resources have compounded the requirement for a 'new generation' approach to river modelling that is robust, defensible and consistent. This critical need is the driver behind the Source Integrated Modelling System.

Source Rivers is funded by several organisations, including eWater CRC partners, the Department of Sustainability, Environment, Water, Population and Communities, and the Commission. Additional funding recently provided by the Commission will extend the model nationally.

Importantly, the suite of tools has been developed from the outset in close collaboration with state and territory water managers, to ensure that it is fit for purpose and to meet the needs of the jurisdictions.

Source Rivers has national applicability and for the first time will provide a consistent modelling approach for the entire Murray–Darling Basin, with the flexibility to support NWI-consistent water sharing arrangements, accounting systems and management rules. The overall Source Integrated Modelling System package will provide a common modelling platform that promotes national consistency and communication in river system management and water planning. Elements of the package, such as the Catchment Water Yield Estimation Tool (also funded under the Raising National Water Standards Program) also have national applicability.

This modelling platform facilitates key elements of the NWI, such as the recognition of surface water – groundwater connectivity, transparent water planning and the provision of the best available science for water planners.

Box 1.11: National Centre for Groundwater Research and Training

In its 2007 biennial assessment, the Commission expressed considerable concern about the management of groundwater resources throughout Australia. The assessment identified the need for urgent additional work on addressing the overallocation of certain groundwater resources, managing groundwater and surface water as a connected resource, establishing measurement standards and improving monitoring arrangements.

In response, the Commission (\$15 million) and the Australian Research Council (\$15 million) co-funded the establishment of the National Centre for Groundwater Research and Training in June 2009 as a centre of excellence. The centre was awarded an additional \$15 million over four years to develop groundwater research infrastructure as part of the Australian Government's Super Science (Marine and Climate) initiative, funded by the Education Infrastructure Fund and administered by the Department of Innovation, Industry, Science and Research. In addition, the 20 partners in the centre are contributing a total of around \$10 million in cash and over \$20 million in in-kind contributions to the centre (staff time, and the use of equipment and facilities). The total value of the funding for the centre is more than \$70 million (over five years).

For the first time, researchers and professionals from many disciplines are pooling their expertise in five major research programs to unlock the secrets of Australia's subsurface water systems. These programs reflect extensive consultations with state governments and industry. Currently there are 24 postdoctoral fellows, 34 doctoral students and 17 honours students enrolled. In addition, 20 world-class scholars have agreed to work with the centre. The centre also delivers well-attended short courses with an industry focus on a range of needs for improved groundwater knowledge and management.

The NWI also acknowledges the need to identify capacity-building priorities to support implementation of the agreement. A national audit of labour and skills shortages in the water sector commissioned by COAG in 2008 identified a significant emerging skills gap (ICEWaRM 2008). It noted that nearly half the estimated number of staff needed in the water sector in 2018 will need to be recruited over the next 10 years, and that many of them will require tertiary training. It found that key skills shortages will exist in science and engineering, management, and technical and trades areas, and that shortages can be expected to continue into the foreseeable future.

In response to the audit, COAG developed and agreed on the National Water Skills Strategy (DEWHA 2009). The strategy provides a sound basis for industry and jurisdictions to consider the options available to them in dealing with skills shortages in the sector. Leadership of the strategy was handed to the Water Industry Skills Taskforce, led by the Australian Water Association, in December 2009. The taskforce finalised the business plan in March 2011 in consultation with the Australian Government and state and territory governments and with input from the water sector and education and training providers (AWA 2010a). The Australian Water Association has carriage of the strategy and business plan.

The objectives of the National Water Skills Strategy are to:

- + attract and retain skilled staff in the water industry, while giving due consideration to the effects of market forces on staff availability, including in rural and regional areas
- + augment the technical skills base in the water industry by actively promoting skills development and training
- + improve the training and skills support base for rural water managers (such as councils and property managers)
- + develop a capacity-building strategy for remote and regional communities, particularly Indigenous communities, to build practical skills in water resource management and planning.

The Commission believes that the National Water Skills Strategy and business plan are important steps in enabling the water sector to manage what is likely to be a long-term skills challenge. However, we are concerned that the implementation of planned initiatives will require greater commitment, including financial resources, from government and, importantly, from water service providers. There appear to be opportunities in the urban water sector for larger providers to contribute in-kind capacity to help smaller providers establish and develop skills and competency requirements and access relevant training.

Box 1.12: Environmental water manager community of practice

The Commission funded a two-year project for the Australian Water Association to develop a community of practice for environmental water managers. In a survey about the community of practice, respondents concluded that its establishment has helped the profession to define itself and to develop a sense of identity, and that it has improved professional networks.

An evaluation of the project indicates that it contributes to the enhanced professional standing of environmental water management. The project also played a role in supporting the emerging discipline and was highly valued by the membership, which has grown strongly since 2008. The evaluation also found that through the development of key partnerships throughout the project and the delivery of events and activities, the community is now known as a conduit for those wanting to communicate, consult or engage with environmental water managers nationally.

The network now established for this emerging profession provides a channel through which environmental water managers can connect with one another and stakeholders can connect with them. A core of very active participants has emerged. They are committed professionals who have embraced the role of community leaders. The community of practice is not yet self-sustaining, and the individuals making up the community will need the support of institutions to make the transition to a vibrant community of professionals able to share skills, knowledge and better practices (NWC and AWA 2011).

Finding 1.11

The water sector is facing a continuing skills challenge as a result of such factors as an ageing workforce, competing demand from other sectors of the economy and particular factors facing smaller regional providers. The development of the Water Industry Skills Strategy has been important in raising the profile of these issues and creating a plan for addressing them. Renewed support, including financial support, from governments and water businesses is necessary if the skills challenge is to be managed successfully.

1.10 Accountability and nationally compatible approaches

The NWI has played an important role in maintaining the focus on water reform in a number of ways, including by clearly articulating a reform action agenda, providing a mechanism for rigorous and public accountability for delivering those actions, and creating a structure within which jurisdictions can develop standards of better practice and national consistency, where that is relevant.

The NWI has been a focal point for the improvement of water management arrangements across Australia, notwithstanding the failure of Western Australia and the Northern Territory to implement NWI-consistent legislative reforms. The principles in the NWI have been used as an authoritative reference point since 2004 in a range of forums, both intergovernmental and with other stakeholders. The NWI principles have served as an agreed starting point, provide the foundation for dialogue and information exchange, and provide the basis for peer competition, which can drive policy innovation.

The NWI includes a set of principles, a set of specific actions (see Appendix B) and a timeline for those actions to be completed. The actions and timelines are benchmarks for jurisdictions' performance, but what we have seen is that the actions require a level of resource commitment and involve a level of complexity that may not have been fully anticipated when the NWI was signed. We are concerned that NWI parties have not always devoted the necessary resources and leadership to fully deliver their commitments.

A primary function of the Commission has been to assess performance rigorously and publicly against the NWI actions and their intended outcomes. The Commission's independent assessment role has ensured a continuing focus on the reform agenda and issues affecting performance or posing future risk. The Commission is independent, takes a truly national perspective, and publicly reports its findings.

To meet its statutory obligations and drive reform, the Commission has produced a differentiated and targeted suite of outputs for the use of governments, stakeholders, industry and the general public:

- + assessments of water reform progress, such as this report
- + transparency products to provide robust evidence and spur improved industry performance, such as the Australian water market reports series and the National performance reports for the rural and urban water sectors
- + thought leadership products to catalyse action on specific issues, such as our position statements and our work on future directions for urban water
- + practical tools to fill knowledge gaps, inform decision making and improve water management, such as the products of our investment in groundwater science and modelling.

To achieve the aim of improved consistency, efficiency and effectiveness in Australia's water management systems, the NWI formally prescribes a number of specific actions and reporting mechanisms. It has also been a driver for the development of national standards and collaboration. These measures have assisted governments in streamlining their approval processes, making cross-jurisdictional arrangements more compatible and sharing information, tools and experiences—all of which help to improve the efficiency and effectiveness of water management.

By facilitating the development of benchmarks, guidelines and support tools and the public reporting of performance information, the NWI has had a positive impact on the efficiency and effectiveness of government systems and processes for the benefit of water users.

Examples of national water management principles and guidelines that have been developed include:

- + NWI Pricing Principles (DSEWPaC 2010a)
- + COAG National Urban Water Planning Principles (DSEWPaC 2011b)
- + Draft NWI Policy Guidelines for Water Planning and Management (COAG 2011)
- + Green Plumbers, a national training and community participation program
- + the Integrated Water Resource Planning Model for Water Planners
- + the Australian Drinking Water Guidelines
- + the Australian Guidelines for Water Recycling.

Public reporting on the performance of water businesses promotes accountability. For example, clause 75 of the NWI requires states and territories to benchmark the pricing and service quality performance of their metropolitan, non-metropolitan and rural water delivery agencies every year, and to publicly report the findings.

The Commission, with the assistance of the jurisdictions and the Water Services Association of Australia, publishes annual National performance reports for urban utilities and rural service providers. The reports benchmark performance; indicators include pricing, capital expenditure, asset maintenance, customer service, and environmental, health and financial performance.

By driving benchmarking and reporting, the NWI has improved the operational accountability of service providers and increased the transparency of their service delivery performance.

Finding 1.12

Since 2004, NWI parties have developed benchmarks, guidelines and support tools and enhanced public reporting of performance information. These mechanisms are improving the way governments are managing water resources and delivering greater national consistency and transparency.

Summary of findings

Finding 1.1

Water access entitlement reform has delivered significant benefits for water users and water management by creating a more secure, recognised property right to water. There are opportunities to realise further benefits by extending those reforms, particularly through the creation of NWI-consistent entitlements in Western Australia and the Northern Territory.

Prioritisation of groundwater areas and unregulated surface water areas that would benefit from the development of NWI-consistent water access entitlements by state and territory governments would enable entitlement holders in those areas to realise the benefits of such an asset.

Finding 1.2

The standard, quality and extent of water planning have improved across Australia since 2004. However, the following areas warrant further effort:

- + Western Australia and the Northern Territory should enact legislation to provide for statutory NWI-compliant water plans in those jurisdictions.
- + Greater transparency should be provided about decision making processes used to set planning priorities and make judgments about where the level of demand on the resource does not yet warrant a plan.
- + Objectives specified in plans need to be clear and measurable.
- + Plans should be informed by rigorous assessments of non-consumptive social values and by socioeconomic analysis.
- Plans should be stress-tested for extreme conditions to ensure that they can operate in all foreseeable circumstances, and should better articulate the processes to be adopted when unanticipated events arise.
- + Water and catchment management planning and implementation should be more closely aligned.

Finding 1.3

While some progress has been made, NWI parties have not fulfilled their commitments to bring all significant interception of water within the planning and entitlement frameworks. This is a major weakness in current arrangements.

Finding 1.4

Most jurisdictions have made progress in incorporating mining and extractive industries into NWI-consistent planning and management arrangements; however, the arrangements for dewatering and managing cumulative impacts remain a challenge. The rapid growth and significant potential impacts of the coal-seam gas industry on water resources represent a risk to sustainable water management in a number of regions.

Finding 1.5

Most jurisdictions have improved consultations with Indigenous communities in water planning and management, but have generally failed to incorporate effective strategies for achieving Indigenous social, spiritual and customary objectives in water plans, as envisaged under the NWI.

Finding 1.6

There has been limited progress in formally adopting the risk assignment provisions of the NWI, and many stakeholders remain confused about the way those provisions will be applied in practice.

Continued on next page

Finding 1.7

Major investments in water data collection and accessibility and the development of water accounting standards are improving the information base on which water planners and managers can rely.

Finding 1.8

The extent of water metering has increased. Additional investment is underway, and a new national standard for non-urban water metering has been agreed. Achieving the ultimate objective of universal metering of all surface water and groundwater extractions will require extensive ongoing effort.

Finding 1.9

The full and timely implementation of new compliance and enforcement measures under the National Framework for Compliance and Enforcement Systems for Water Resource Management is necessary to increase confidence in water management, protect user rights and deliver planning objectives.

Finding 1.10

Investments in science, data and knowledge since 2004 have contributed substantially to delivering the NWI commitment to address the knowledge needs of reform implementation. There remains an ongoing need to maintain investment to ensure that water policy and management are able to respond adaptively to changing circumstances. NWI parties have yet to implement effective coordination of the national water knowledge effort.

Finding 1.11

The water sector is facing a continuing skills challenge as a result of such factors as an ageing workforce, competing demand from other sectors of the economy and particular factors facing smaller regional providers. The development of the Water Industry Skills Strategy has been important in raising the profile of these issues and creating a plan for addressing them. Renewed support, including financial support, from governments and water businesses is necessary if the skills challenge is to be managed successfully.

Finding 1.12

Since 2004, NWI parties have developed benchmarks, guidelines and support tools and enhanced public reporting of performance information. These mechanisms are improving the way governments are managing water resources and delivering greater national consistency and transparency.



2

More productive and efficient water use

NWI elements discussed in this chapter



2 More productive and efficient water use

Summary of impacts

Water markets now enable water in many rural areas to move to more productive and efficient uses and have resulted in economic gains at the community, regional and national levels. Water trading has become a vital tool for irrigators responding to variable water availability and market factors.

Water trading is more streamlined after the removal of many artificial barriers to trade, the facilitation of interstate trade and the implementation of better service standards and transactions systems.

Surface water trading in the Murray–Darling Basin is an increasingly mature market, but could still benefit from further reforms to improve market dynamics. Outside the basin, and for groundwater systems, improvements can be made to the regulatory infrastructure to allow trading to develop and grow.

Pricing and institutional reforms have been beneficial. Consumption-based and cost-reflective pricing has encouraged more efficient water use, although during the recent drought the pricing signal was less significant in urban systems than water restrictions and other demand management strategies.

The recovery of full efficient costs means that many water businesses are now better placed to fund necessary new investment. Independent economic regulation and consumer protection frameworks are improving transparency and accountability while protecting disadvantaged customers.

One of the NWI's central aims is to increase the productivity and efficiency of Australia's water use. It recognises that past policies and practices often discouraged the efficient and sustainable use of water, leading to poor management of the resource, uneconomic or delayed investment in water supply infrastructure, and adverse environmental impacts.

Irrigators, irrigation service providers, households, businesses and urban water providers have implemented measures to increase the efficiency of water use. Improved on-farm techniques, piping irrigation networks, lining open channels, advanced irrigation network control technologies, reducing urban network leakage and installation of water saving household or business equipment all have contributed to water savings.

There remains the potential for further improvements in technical water use efficiency in many parts of Australia. However, water use efficiency cannot be pursued in isolation from the other factors of production such as capital and energy.

Decisions about investment in water savings measures are influenced by factors including:

- + economic factors, such as the value of available water relative to the cost of investment
- + government initiatives to subsidise investments to promote water saving, including for the purposes of recovering water for the environment (see chapter 3.4)
- + measures to improve information about the water efficiency of household water using products and on-farm techniques (see chapter 4).

The fundamental objective of the NWI is to optimise economic, social and environmental outcomes. The Commission remains concerned that subsidised water efficiency investments are often undertaken without a clear assessment of their full costs and benefits or of alternative options, and that some investments have long term sustainability risks arising from inadequate consideration of ongoing operation and maintenance costs.

The NWI seeks to encourage more productive and efficient use of water by establishing clearer signals to investors about the costs and benefits of water use options. This chapter focuses on the two key NWI reform measures to encourage water use productivity and efficiency:

- + developing efficient, well-functioning water markets to facilitate water trading
- + reforming water pricing in line with the principles of full cost recovery and the user-pays principle.
Water markets and water trading enable scarce water resources to be efficiently allocated between competing uses, and ensure that water can move to its highest value use without government intervention. Overall, pricing reforms aim to improve the economic efficiency of water use and the industry as a whole (for example, in investment, operations and asset management), including by ensuring that consumers are protected from overpricing in natural monopoly markets. Efficient water pricing helps ensure that production and consumption decisions across Australia's economy reflect the efficient costs of water as an input.

For the 2011 biennial assessment, the Commission examined the impact of the NWI on the efficiency and productivity of water. Specifically, we assessed whether, as a result of the NWI, there have been improvements in water markets, water trading and water pricing, and flow-on economic benefits. We also identified the areas in which further reform should be prioritised to extend or enhance those benefits, or mitigate risks to them.

2.1 Efficient water markets and water trading

The NWI parties agreed to make a range of changes to their water markets and trading arrangements to increase efficiency in their operation and improve opportunities for trading (NWI clauses 58–63).

For this assessment, the Commission focused on whether implementation of the NWI has led to:

- + the continued development and growing maturity of water markets across Australia
- + improved productivity and efficiency of water use in the irrigated agriculture sector in the Murray–Darling Basin, in which most water trading occurs.

We found that water markets have continued to develop and mature since the commencement of the NWI, and that participation in the markets has increased substantially. We also found strong evidence that this has led to increases in the productivity and efficiency of water use in the southern Murray–Darling Basin, and has increased the options available to irrigators responding to changes in water availability and commodity prices. Overall, we consider that NWI-driven reforms to water markets and trading have delivered significant economic benefits to Australia, and to the Murray–Darling Basin in particular.

2.1.1 Continued development of water markets

Australia's water markets have developed steadily since the introduction of water trading in the early 1980s. Since 2007–08, the Commission has produced annual reports on the operation of water markets across Australia. In 2009–10, water worth \$3 billion was traded (NWC 2010e).

There are two types of water trade transaction:

- + the transfer of an entitlement (the perpetual right to take and use water)
- + the transfer of a water allocation (an annual allocation of a volume of water against an entitlement).

Water entitlement trading is generally driven by changes in long-term demand and in the nature and location of water-using industries. Entitlements can be purchased as an investment or risk management tool, and entitlement trading may also reflect shifts between agricultural sectors, or the exit of participants from irrigated agriculture.

Water allocation trading generally assists water users to respond to seasonal conditions and other short-term events by reallocating water between users within a particular year. There are also emerging examples of irrigators using the allocation market as part of their long-term business strategy.

Appendix A (indicator 5.1) provides more detailed information on the progress of jurisdictions in the development of water markets.

Trade within the Murray–Darling Basin

The Murray–Darling Basin is Australia's main water market, making up 93% of the volume traded across Australia in 2009–10. A turning point for the market occurred in 1995 with the establishment of a cap on total extractions in the Murray–Darling Basin. The cap, which limits the volume of water available for consumptive use, meant that new surface water demand could only be satisfied through trading.

Allocation trade

The volume of allocation trade in the Murray–Darling Basin has continued to grow over time, reaching 1652 GL in the southern Murray–Darling Basin (2301 GL across the entire Murray–Darling Basin) in 2009–10 (Figure 2.1).





Note: Includes only trades of regulated water from the Lower Darling, NSW Murray, Murrumbidgee, SA Murray, Victorian Murray, Goulburn and Campaspe–Loddon systems. The *Australian water markets report* series uses approximate values from the Murray–Darling Basin Commission for the years before 1997–98. Sources: NWC (2008, 2009b, 2010e).

There has been a broadly inverse relationship between water allocation levels and the proportion of water allocations traded (Figure 2.2). As the volume of water allocated fell from 1998–99 to 2006–07, the percentage of the total allocation that was traded tripled, going from approximately 5% to 15%.



Figure 2.2: Water allocation levels and proportion traded, southern Murray–Darling Basin, 1998–99 to 2009–10

Sources: NWC (2008, 2009b, 2010e).

Relatively minor allocation volumes were traded interstate from 1998–99 to 2005–06; however, much greater interstate trade occurred from 2007–08 to 2009–10, in particular from New South Wales into South Australia and Victoria. South Australia was a net importer of water from 2007–08 to 2009–10, and Victoria imported relatively large volumes in 2008–09. New South Wales has been a net exporter since 2006–07; the most substantial volume was exported in 2008–09.

The water allocation market has proven to be responsive to short-term market impacts, such as allocation and carryover announcements, suggesting that the market is relatively mature and informed. In 2009–10, for example, the average price of water allocation trades was \$150/ML, compared to \$630/ML in 2007–08, reflecting the greater availability of water.

Entitlement trade

The water entitlement market has also grown steadily since the early 1980s, particularly in the southern Murray–Darling Basin (figures 2.3 and 2.4).



Figure 2.3: Entitlement trade volumes in the southern Murray–Darling Basin, 1983–84 to 2009–10 (ML)

Note: Includes only trades of regulated water from the Lower Darling, NSW Murray, Murrumbidgee, SA Murray, Victorian Murray, Goulburn and Campaspe–Loddon systems. The *Australian water markets report* series uses approximate values from the Murray–Darling Basin Commission for the years before 1997–98. Sources: NWC (2008, 2009b, 2010e).



Figure 2.4: Entitlement trade volumes in the northern Murray–Darling Basin, 2007–08 to 2009–10 (ML)

Note: Data for trade outside the southern Murray–Darling Basin before 2007–08 was not available for this report. Only regulated trades are shown. Sources: NWC (2008, 2009b, 2010e).

The mix of entitlement types traded has also changed in the past three years. In 2007–08, more than 10% of total entitlement purchases were for lower reliability entitlements (Figure 2.5). By 2009–10, the proportion of lower reliability entitlements had more than halved, to less than 5%. The change may reflect changing market expectations about the reliability of lower reliability entitlements in dry conditions: in drought years, lower reliability entitlements have received very low allocations and this has affected expectations about their long-term reliability.



Figure 2.5: Total entitlement trade in the southern Murray–Darling Basin, 2007–08 to 2009–10, by reliability class

Note: Higher reliability entitlements include Victorian high-reliability water shares, New South Wales high-security water access licences (WALs) and South Australian high-security water entitlements. Lower reliability entitlements include Victorian low-reliability water shares and New South Wales supplementary WALs. General reliability entitlements are New South Wales general security WALs. Data for trade outside the southern Murray–Darling Basin before 2007–08 was not available for this report. Only regulated trades are presented.

Sources: NWC (2008, 2009b, 2010e).

Unlike the water allocation market, the water entitlement market is generally driven by long-term concerns, such as broad structural change in the irrigated agriculture sector, entry or exit decisions or changes to irrigators' agricultural mixes. Changes to policy and regulation (such as water market and water charge rules) have also driven entitlement trading.

Prices for entitlement trades have generally been less volatile than prices for allocation trades. This is to be expected: entitlements prices are based on the net present value of expected future allocations of water, while allocations prices reflect seasonal variations. However, the average price varies significantly between reliability classes. The variation reflects expectations about the average amount of water likely to be allocated within a year. The concordance between reliability and price suggests that market participants understand the differences between the products being traded. There has been no clear trend in average prices for entitlement trades within reliability groups; some reliability classes in some jurisdictions have increased in price, while others have decreased.

Water markets outside the Murray-Darling Basin

Water markets outside the Murray–Darling Basin typically have a much lower level of trading activity than those within the basin, for the following reasons:

- + In some areas of the country, there is not yet significant scarcity pressure on water resources, and rights to unallocated water are still being issued.
- + In some areas, the level of irrigated agricultural development is not sufficient to support a water market.
- + There is much less connectivity, both natural and engineered, between water systems outside the Murray–Darling Basin than between systems within the basin. In many cases, this means that holders of entitlements or allocations in smaller water systems are restricted to trading with others in those systems. Where systems contain homogeneous users with similar demand profiles, there may be limited gains from trading in the short term, as all potential buyers and sellers face the same climatic and market conditions.
- + Enabling mechanisms for trading, such as the unbundling of water rights from land, or statutory water plans are often incomplete.
- Reforms to administrative and institutional arrangements for water trading are less developed outside the Murray–Darling Basin.
 Market mechanisms such as registers, trading platforms, trade processing and market information are also often much less developed.
 This can result in thin markets with lower transparency, which may discourage participation.
- + Water markets have been operating for a much shorter time outside the Murray–Darling Basin, meaning that the market has not necessarily been accepted by irrigators in those areas as a business and risk management tool.

However, water trading has occurred outside the Murray–Darling Basin in recent years. Parts of South Australia, Western Australia, Tasmania and Queensland have all experienced trade. While trading is possible in both the ACT and the Northern Territory, very little or no trading has occurred in those jurisdictions to date.

Allocation trading outside the Murray–Darling Basin from 2007–08 to 2009–10 remained steady (Figure 2.6). While there were reductions in allocation trading activity in Victoria, there was an observable increase in trading in Queensland. The decline in allocation trade volumes in Victoria is partly a result of decommissioning the Wimmera irrigation zone in 2007–08.



Figure 2.6: Allocation trade outside the Murray-Darling Basin, 2007-08 to 2009-10 (GL)

Note: Data for trading outside the southern Murray–Darling Basin before 2007–08 was not available for this report. Sources: NWC (2008, 2009b, 2010e).

The volume of entitlement trades fell by 35% from 2008–09 (202 GL) to 2009–10 (131 GL). Reductions occurred in Queensland, New South Wales, Victoria and Tasmania, while the volume of trade in South Australia and Western Australia grew (Figure 2.7).



Figure 2.7: Entitlement trade outside the Murray–Darling Basin, 2007–08 to 2009–10 (GL)

Note: Data for trading outside the southern Murray–Darling Basin before 2007–08 was not available for this report. Sources: NWC (2008, 2009b, 2010e).

Finding 2.1

Water markets have grown substantially for both allocation and entitlement trading in the Murray–Darling Basin, and are evolving in a number of other parts of Australia.

2.1.2 Improved productivity and allocative efficiency within the Murray–Darling Basin

Given the significantly greater extent of water trading in the Murray–Darling Basin, the Commission's analysis of the productivity and efficiency impacts of water trade developments focused on that region. We found that water trading has:

- + helped to maintain the productive capacity of the irrigation sector during the recent severe drought, and allowed water to move to higher value uses
- + given individual irrigators greater flexibility to respond to changes in water availability
- + helped irrigation-dependent communities to remain viable.

In June 2010, we published *The impacts of water trading in the southern Murray–Darling Basin* (NWC 2010g), which is the most comprehensive analysis of the economic, social and environmental impacts of water trading in Australia yet published. It estimated that water trading in the southern Murray–Darling Basin increased Australia's gross domestic product by more than \$220 million in 2008–09, and increased the southern Murray–Darling Basin's gross regional product by more than \$370 million in that year, thus helping to maintain productive capacity in the region at a time of severe drought. Modelling also shows that each of the southern Murray–Darling Basin states benefited from trading—New South Wales by an estimated \$79 million, South Australia by \$16 million and Victoria by \$271 million in 2008–09.

Measures of productivity

In a study commissioned for this assessment, Marsden Jacob Associates used inflation-adjusted gross value of irrigated agricultural production (GVIAP) data to identify the value of crops per unit of water used (Figure 2.8) and compared that data to water consumption levels by crop over a similar period (Figure 2.9). The comparison suggests that during the drought the volume of water consumed in producing the highest value crops per unit of water—such as vegetables, fruit and grapes—remained steady or fell slightly. In contrast, the water consumed in producing lower value crops—such as rice and cotton—decreased significantly. Limitations to the use of GVIAP are explored in detail in Box 2.1, and were noted by Marsden Jacob Associates in their analysis.





Sources: ABS (2010a) and Marsden Jacob Associates.



Figure 2.9: Index of water consumption in the Murray–Darling Basin, by agricultural commodity, 2000–01 to 2008–09

Sources: ABS (2010a) and Marsden Jacob Associates.

Box 2.1: Gross value of irrigated agricultural production—some limitations

The gross value of commodities is their wholesale value in the marketplace. The Australian Bureau of Statistics cautions the public about the limitations of this measure in reflecting net economic benefits. However, it is a useful indicator for tracking progress over time.

The gross value of irrigated agricultural production (GVIAP) has been used in this assessment as a broad indicator for the economic health of Murray–Darling Basin irrigation communities. GVIAP is a core component of the Water Account Australia, which is produced every four years by the bureau, although it is still identified by the bureau as an 'experimental estimate'.

Unless adjusted for inflation, estimates of GVIAP are usually presented in current prices.

GVIAP does not refer to the value that irrigation adds to production or to the net effect that irrigation has on production. Rather, it simply describes the gross value of agricultural commodities produced with the assistance of irrigation. Therefore, GVIAP is not a measure of productivity.

Changes in GVIAP can also be attributed to seasonal conditions, such as water availability, and variability in global commodity prices.

Source: ABS (2010b).

Additional analysis by the Risk and Sustainable Management Group at the University of Queensland modelled 2008–09 data to estimate the efficiency benefits of water trading in the Murray–Darling Basin (see Box 2.2). The model simulated scenarios with and without NWI policy changes that influence the scope and nature of water trading in the basin. It produced an estimate of economic benefits in the Murray–Darling Basin under those scenarios, assuming that other external factors remained the same and that trade occurred free of impediments.

The modelling concluded that:

- + if there were no changes in commodity prices and if trade were unimpeded across the Murray–Darling Basin, the net economic benefit from water trading in the basin would be around \$300 million per year
- + over the medium term, water trading could allow water use to increase in the New South Wales and Queensland broadacre farming industries to take advantage of more flexible farming systems that can provide productivity benefits, particularly during wet and normal seasons (under the assumptions of technology and land availability reflected in available data).

The modelling supports the findings of the *Impacts of water trading* report that water trading has provided flexibility to reallocate irrigation water during seasons of low water availability, and that where there is greater flexibility to respond to changes in seasonal conditions, such as in the Murrumbidgee region, the return for irrigation from water trading is greater in the medium term (NWC 2010g).

Box 2.2: Modelling the economic benefits of the National Water Initiative in the Murray–Darling Basin

The Murray–Darling Basin Optimisation Model was initially developed in 2004 by the Risk and Sustainable Management Group at the University of Queensland, funded by the Australian Research Council under Federation Fellowships. It is an integrated economic–hydrological model of resource use, farm production and externalities in the Murray–Darling Basin.

The model incorporates risk and uncertainty in water-use decisions using a state-contingent approach, in which allocation decisions reflect water availability under different weather scenarios, such as drought, wet or normal years. This treatment of uncertainty enables the explicit representation of variability of both inputs, such as water, capital and management, and the outputs from agricultural, environmental and urban uses, as influenced by the various weather scenarios.

In this way, the model can produce estimates of the expected benefits at catchment and whole-of-basin levels from a range of economic activities that use water. Further details of the model are provided in Appendix E.

Despite the recognised limitations to each of these analytical tools, when considered in combination the findings strongly suggest that NWI-facilitated water markets, where they have been established and are mature, move water to higher value uses and thereby produce a net positive change in rural productivity and efficiency.

Responding to change

Consultations with irrigators for the *Impacts of water trading* report indicate that water allocation trading helps individual irrigators (buyers and sellers) to manage and respond to external drivers (including changes in seasonal water availability, commodity prices, input costs, government water policies and social trends) by giving them more flexibility in their production decisions. This has improved their cash flow, debt management and risk management.

For example, water buyers are able to maintain production during drought and keep permanent plantings alive, preventing the loss of longlived horticultural assets. Water sellers are able to use revenue from sales to buy alternative inputs (such as fodder), manage debt or make investments.

In addition, water entitlement trading is helping farmers make longer term changes, including deciding to sell entitlements and move to dryland farming. Sellers of entitlements have turned to more opportunistic irrigation, or ceased irrigation altogether, whereas purchasers of entitlements have developed new irrigation activities or improved their supply security.

One participant in the field work for the Impacts of water trading study suggested that:

It's helped manage this particular drought because instead of having to sell the back paddock we are able to sell water. And if we get reasonable amounts of water again, we can buy that on the temporary market. It's a better option than selling the back paddock. (NWC 2010g).

Water trading has assisted individual irrigators in making complex, long-term decisions in the context of drought and the possible effects of climate change. For example, a citrus grower in the New South Wales Murrumbidgee region noted:

We grew vegetables till the drought set in and the water market price went up. Out of the four or five years we barely broke even. It was far more profitable for us to trade water out and we actually made a profit for a change. I haven't finished developing my property yet, so I have quite a parcel of water available to trade. When my property's fully developed, I will need all the water I've got. Water trade actually allowed me to stay and continue—otherwise I think I would have been bankrupt.

Our report concluded that there is evidence that individual irrigators have become more aware of the benefits of water trading and are more sophisticated in their use of markets (NWC 2010g).

Analysis by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), drawing on data collected in its survey of irrigation farms in the Murray–Darling Basin over the period from 2006–07 to 2008–09, also highlighted the benefits of water trading in allowing irrigators with relatively lower value uses to generate income by selling to irrigators with higher value uses. ABARES concluded that in some instances purchases of water have prevented large-scale economic losses for irrigators with permanent plantings that would otherwise have been lost to water stress.

Results from the surveys showed that there was an increase in the proportion of farms involved in water trading from 2006–07 to 2008–09, and that around half of all surveyed irrigators engaged in allocation trading each year (Table 2.1). While only a small proportion of farms traded permanent water entitlements, that proportion doubled during that period.

Horticulture farms, particularly farms buying water, had the largest proportional increase in temporary water trading. The proportion of dairy and broadacre farms buying temporary water decreased during the period, while the proportion selling water more than doubled.

		Dairying			Broadacre			Horticulture		All irrigation farms		
Type of trade	2006 07	2007 08	2008 09	2006 07	2007 08	2008 09	2006 07	2007 08	2008 09	2006 07	2007 08	2008 09
Permanent entitlements	7	12	10	2	6	6	2	4	2	3	6	5
Temporary irrigation water	45	47	54	30	41	43	33	57	52	34	51	50

Table 2.1: Percentage of Murray–Darlin	Basin irrigation farms trading water, by	agricultural sector, 2006-07 to 2008-09
--	--	---

The ABARES analysis also provided data for five regions where the number of sampled farms participating in temporary water trading was high enough to produce reliable estimates: Murrumbidgee, Murray, Goulburn–Broken, Loddon–Avoca and Eastern Mount Lofty Ranges.

In 2006–07, the proportion of horticulture farms that were net sellers of temporary irrigation water was higher than the proportion of net buyers. The situation was reversed in 2007–08 and 2008–09 when more horticulture farms were net buyers (see Figure 2.10).

Dairy farmers were mainly net buyers of temporary irrigation water in 2006–07 but, as traded water prices rose, many became net sellers in 2007–08 and 2008–09 (Figure 2.10). Nevertheless, a relatively large number of dairy farmers continued to be net buyers of irrigation water. Broadacre farms were prominent net sellers of temporary irrigation water over the three years.

Overall, ABARES concluded that water trading was effective in reallocating water among users between 2006–07 and 2008–09. The ability to trade water appears to have helped some irrigators to avoid substantial financial losses in that period, either by obtaining income from water sales or by purchasing water to maintain production. (Ashton, Oliver and Formosa 2011).



Figure 2.10: Proportion of water trading farms that bought or sold water, by industry, 2006–07 to 2008–09

Source: Ashton, Oliver and Formosa 2011

The Commission's recent report, *Australian water markets: trends and drivers 2007–08 to 2009–10* (NWC 2011g), provides some analysis of the interaction between the three major agricultural production types in the southern Murray–Darling Basin—rice growing, horticulture and dairying—and water markets. The analysis demonstrates the influence that production decisions and water price changes have on water movement across the region. Those factors, as they affect rice farming, are discussed in Box 2.3.

Box 2.3: Production choices and water movement in the southern Murray–Darling Basin—the case of rice growing

Rice production is highly water intensive and, in Australia, is very sensitive to water availability and the price of water. Rice farmers are better off selling their water allocations and not planting when water prices reach a particular point. Rice has a gross margin of approximately \$100–200/ML, which means that once the price of water exceeds that amount rice growing can become unprofitable and rice growers may make a higher return from selling water allocations. Most rice production occurs in the New South Wales Murray and Murrumbidgee zones.

As shown in Figure 2.11, the price of allocation water in the Murrumbidgee was more than \$500/ML in 2007–08 and remained high in 2008–09 (\$380/ML). Correspondingly, the level of rice production was very low, and a large volume of water was traded out of the Murrumbidgee in 2007–08 and 2008–09 and out of the New South Wales Murray in 2008–09.

In 2009–10, when allocation prices fell to \$155/ML, rice production picked up and outward trade fell substantially.



Figure 2.11: Rice production, rice prices and water allocation prices, Murrumbidgee, 2005-06 to 2009-10

In submissions to this assessment, several stakeholders supported these findings on the impact of reforms to water markets and trading. For example, the National Farmers' Federation noted that trade reforms have improved agricultural productivity and efficiency, particularly in times of drought when farmers are able sell entitlements and allocations to offset low incomes received from primary production (NFF 2011).

Finding 2.2

Water markets have facilitated increased productivity, improved flexibility for individuals and businesses, and resulted in positive economic gains at the community, regional and national levels. Irrigators are increasingly sophisticated in their use of water trading as a business tool.

2.1.3 Facilitating water markets and trading

A number of important legislative and administrative reforms to improve the efficiency of water markets have commenced in the Murray–Darling Basin.

The Water Act 2007 gives the Commonwealth Minister and ACCC key roles in developing and enforcing water charge and water market rules.

Exit fees (tied to entitlement sales) are now illegal in the Murray–Darling Basin. There is currently strong and effective regulation of termination fees through the ACCC's role in monitoring and enforcing compliance with the Water Charge (Termination Fee) Rules under the Water Act. The rules regulate the fees or charges payable to an operator for terminating access to the operator's network. The rules set maximum charges for termination fees based on a multiple of the total fixed network access charge (ACCC 2010a). The ACCC has begun monitoring compliance with the rules, which has provided an incentive for irrigation infrastructure operators to use more cost-reflective pricing (ACCC 2011).

The ACCC's first report on regulated water charges, transformation arrangements and compliance with the water market rules and the water charge rules, released in April 2011, concluded that even at that early stage it was possible to observe market outcomes produced by the rules (ACCC 2011). The report noted a general reduction in the termination fees imposed by irrigation infrastructure operators and an improvement in operators' processing times for transformations. The ACCC concluded that compliance with the rules has generally been good.

The ACCC report also identified considerable transformation and termination during 2009–10: 192 GL of irrigation rights was transformed and 106 GL of water delivery rights was terminated in New South Wales and South Australia, and a further 627.8 ML per day of water delivery rights was terminated in Victoria. For particular infrastructure operators, there was very significant transformation and termination; for example, as much as 12% of irrigation rights were transformed and 10% of water delivery rights were terminated for Central Irrigation Trust. There was also significant transformation, termination or both in Murray Irrigation Limited, Murrumbidgee Irrigation and Renmark Irrigation Trust.

A more detailed discussion of Murray–Darling Basin water trading, market and charge rules implemented since 2009 is at Appendix E.

2.1.4 Further reform opportunities

Further reform effort in a range of areas will strengthen water markets and make water trading more efficient. Continued effort is needed to:

- + fully remove artificial barriers to trading
- + develop groundwater trading
- + improve trade price information
- + improve allocation announcements
- + increase the efficiency of trade approval processes
- + address real or perceived conflicts of interest
- + strengthen water markets outside the Murray–Darling Basin.

The Commission's *Strengthening Australia's water markets* report, released in June 2011, provides a detailed analysis of key factors affecting the development of water markets (NWC 2011h).

Full removal of artificial barriers to trade

Under the NWI, states and territories agreed to the immediate removal of barriers to permanent trade out of irrigation areas, up to an annual threshold limit of 4% of the total water entitlement of each area. The 4% limit was established as an interim measure to allow irrigation communities time to adjust to the potential for water access entitlements to be traded out of irrigation areas.

The NWI required the 4% limit to be reviewed in 2009, with a move to full and open trade by 2014 at the latest, except in the southern Murray–Darling Basin (NWI clause 60(iv)). In the southern Murray–Darling Basin, the impact of trade under the interim threshold was required to be reviewed in 2009, with a view to raising the threshold to a higher level if considered appropriate.

During the operation of the NWI, other artificial barriers to trade have been in effect:

- + The New South Wales Government embargoed the sale of entitlements for environmental purposes. The embargo was lifted on 24 September 2009.
- + The Victorian Government imposed a 10% limit on ownership of entitlements by non-water users (this was removed in September 2009).
- + A temporary embargo on allocation trade from the Murrumbidgee Valley into the Murray Valley operated from 1 July 2009 until 21 January 2010.
- + In April 2011, the Victorian Government suspended intervalley water allocation trading in and out of some catchments, stating that trade and carryover arrangements could not operate effectively under seasonal conditions of high inflows and near full storages (see Box 2.4).

Box 2.4: Victorian allocation trade suspension

On 11 April 2011, Victorian water trading rules were amended to suspend the water allocation trade from New South Wales to Victoria, from the Goulburn, Campaspe and Loddon systems to the Victorian River Murray system, or to interstate. The suspension was stated to have resulted from high storage levels, large volumes of unused irrigation water, and Victoria's carryover rules, which created challenges to the management of allocation trading.

The Commission is concerned that the operation of carryover provisions appears to have necessitated a suspension of water trading. We note that the Victorian Government's announcement appears to suggest that the suspension was required because of the combination of incentives created by differing carryover provisions in Victoria and New South Wales and by circumstances of high inflow and storage levels. Different regulatory arrangements can affect the value of assets and undermine the efficient operation of the market.

Effective carryover specifications and management should be in place to enable the delivery of commitments under all inflow scenarios. Furthermore, trade suspensions are not a desirable method of managing delivery constraints and have the potential to reduce confidence in the market.

The 4% limit has been the subject of Commission attention because of its impact on Victorian irrigation districts, where it is now constraining the trade of water out of many districts. The 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.

Although the 4% limit is argued to be a protection for irrigators, once the limit is reached for a district, willing sellers are prevented from realising the full market value of their entitlements (because subsequent transfers are restricted to 'within district' sales). Those irrigators are therefore financially penalised by their government's policy.

The significance of the 4% limit was highlighted by a High Court challenge initiated by South Australia against Victoria in 2009. Since South Australia's decision to pursue a legal challenge, Victoria has agreed to remove its 10% absolute cap on water trade out of a district and struck an agreement with the Australian Government to allow the purchase of water for environmental purposes. The Victorian Government also agreed to give South Australia the right to purchase water from Victoria to meet any potential shortfall in the supply of water for critical human needs. Victoria has reaffirmed its commitment to remove the 4% annual cap by 30 June 2014. On 14 June 2011, South Australia and Victoria settled the legal challenge to Victoria's trading rules.

The ACCC has recommended that the Murray–Darling Basin Plan water trading rules provide for the 4% limit (and other, similar limits) to be immediately and completely removed throughout the Murray–Darling Basin (ACCC 2010b). The Commission strongly supports the implementation of Basin Plan water trading rules that give effect to that advice.

See Appendix B (clause 63) for further detail on the progress of NWI parties in removing barriers to water trading.

Developing groundwater trade

The scale of groundwater trading in Australia is relatively minor compared to the scale of trading in regulated river sources. In the five jurisdictions in which groundwater trade is permitted (New South Wales, South Australia, Victoria, the Northern Territory and Western Australia), the total volume of groundwater entitlement traded has historically been about 100 GL per year, and the volume of groundwater allocation traded is not much more, at 210 GL per year (NWC 2010e). Those markets make up about 5% of all water entitlement trade and about 10% of all allocation trade nationally. Only in New South Wales, South Australia and Western Australia are significant volumes of groundwater entitlement traded. Groundwater allocation trading is most common in New South Wales.

In many jurisdictions, groundwater licences bundle access and use rights and are of short duration. Complex and restrictive trading rules and inadequately defined trading zones may be impeding the development of an efficient market.

The Commission, in partnership with the National Groundwater Working Group, has been working to develop a framework for managing and developing groundwater trading. The draft framework provides a structure for market establishment or development in a range of situations across jurisdictions. It sets out principles for establishing markets and determining the appropriate management arrangements to put into place, grouped into three areas: specifying market boundaries, assessing potential market activity, and establishing appropriate management regimes.

While groundwater systems can be more complex than surface water systems, there are likely to be cost-effective opportunities for groundwater trading to be established in more areas across Australia. This is particularly important because demand for groundwater is increasing while sustainable levels of use have been reached or are being approached in many aquifers. In an increasing number of groundwater areas, scarcity and demand are likely to be great enough to support the establishment of markets to allocate resources efficiently.

In our *Strengthening Australia's water markets* report, we have suggested that state and territory water management agencies identify and prioritise groundwater areas that would benefit from groundwater trading. A criteria-based approach, in combination with benefit–cost analysis, should be used for prioritising areas and implementing the required reforms (NWC 2011h).

Improving trade price information

Price disclosure allows market participants to monitor prices and form an understanding of a commodity's value under a range of market conditions. The provision of price information is particularly critical in emerging markets, such as the water market, where the underlying value of the commodity can be unclear. Information deficiencies can have a number of adverse implications for water markets, including reduced confidence to trade, higher search costs, over-reliance on brokers for valuation advice, and difficulties in detecting possible market aberrations.

The ACCC has examined the adequacy of price information disclosure as part of its advice on water trading rules to the MDBA for the Basin Plan (ACCC 2010b). It found that there has been a marked improvement in price data collection in the Murray–Darling Basin since 2006. Price data on trades of water entitlements is now collected by the Queensland, New South Wales, Victorian and South Australian governments as part of the trade approval process and/or on the registration of trades, and is recorded on public registers. Similarly, three states (New South Wales, Victoria and South Australia) are now collecting price information for allocation trades as part of the trade approvals process.

The National Water Market System (NWMS) project is a COAG water reform initiative. The Australian, state and territory governments are developing the NWMS as part of the *Water for the Future* initiative. Successful implementation of the NWMS will strengthen Australia's water markets through the efficient management of improved state and territory water registers and water transactions and wider availability of market information. The NWMS website will publish trade price and volume information in a standard format. When completed, the system is intended to be an authoritative source of price information. The objectives of the NWMS are to ensure that:

- + up-to-date information about the water market is easily accessible and readily available, increasing market transparency and allowing for more informed water trading decisions
- + each jurisdiction has a high-performing water register that accurately records water rights and supports water accounting and resource management
- + transaction times for trades and other dealings are not limited by water register processes or functions.

Delays in the implementation and completion of the NWMS would be a significant barrier to the provision of increasingly accurate pricing information.

The Water Regulations 2008 give the Bureau of Meteorology the authority to collect price and volume information from a range of 'named persons' and to publish that material on the NWMS website. However, some gaps will remain because not all irrigation corporations, trusts and cooperatives have systems in place to collect price information for trades of irrigation rights and allocations executed by their members. The Water Regulations do not compel irrigation infrastructure operators to collect price information, even though the operators are the authorities responsible for approving trades within their irrigation areas.

Further improvements in price information are necessary to strengthen both emerging markets and the more mature markets operating in the southern Murray–Darling Basin. Our consultations have found that rural stakeholders feel disadvantaged by delays in price data disclosure from environmental water entitlement purchasing programs. In its submission to this assessment, the National Farmers' Federation supported that view, noting that the full benefits of trading continue to be limited by the lack of timely availability of price information (NFF 2011). While more accurate and complete pricing information is highly desirable, there will be some cost in relation to the collection and verification of that information.

Improve allocation announcements

Efficient market operation requires that water access entitlements be clearly specified, and that requires robust and transparent methods and processes for determining and announcing annual allocations of water. There is also a need for all market participants to have equivalent opportunity of access to market-sensitive information at the same time, to guard against insider trading or other situations in which some traders gain a market advantage by having prior access to allocation decisions.

The coordinated timing of allocation announcements in New South Wales, Victoria and South Australia, which began recently, is a positive development. However, consultations for the Commission's *Strengthening Australia's water markets* report suggested that:

- + there are still deficiencies in allocation announcements and accompanying information
- + the processes for determining allocations are not transparent enough and, in some cases, may not be robust (NWC 2011h).

Information accompanying allocation announcements is often inadequate to allow market participants to understand the factors influencing allocations, and some may also have difficulty assessing the long-term reliability of entitlements. This is likely to affect their ability to predict, with some certainty, the amount of water available against their entitlements over the course of a season or over the longer term.

Remedying deficiencies in allocation processes where they exist is likely to increase confidence in the market and reduce the potential for regulatory risk in relation to announced allocations (risks that cannot be readily foreseen or managed by water traders). Poor transparency in allocation processes could lead to higher than necessary transaction costs in the market, as traders and their advisers are forced to invest time and effort in searching for relevant information.

Improvements in the transparency of allocation frameworks used by authorities could include the dissemination of key information inputs used to determine allocations, the publication of changes to frameworks and the issuing of communiqués to accompany allocation announcements.

Increase the efficiency of trade approvals

Most trades and transfers of rights in water markets require prior regulatory approval from a government water agency, or the relevant infrastructure operator or rural water authority, before they can be executed and registered. The administrative processes involved in trade approvals should be as simple as possible, to keep transaction costs and approval times to a minimum. Transaction costs include the direct fees and charges levied on water traders, as well as the inconvenience of having to complete forms and search for information.

We commissioned a study into the transaction costs of water trading as part of this assessment. The study used publicly available information to assess the relative cost of making water purchases (of both entitlement and allocation and both permanent and temporary). The study found substantial variation in the processes and costs between jurisdictions. Costs include the total transaction cost for both the buyer and seller, including search, transaction, registration and conveyance costs, plus stamp duty where applicable. Based on a trade of 100 ML, the cost ranges from \$135 (ACT) to \$669 (plus stamp duty, Queensland).

There have been recent improvements in trade processing times. Since 2009, the Murray–Darling Basin jurisdictions have been required to report publicly on entitlement and allocation trade processing times against COAG service standards (see Box 2.5). The COAG Reform Council's report on the 2009–10 trading year indicates that the jurisdictions' performance was variable but generally moving in the right direction, and that performance for entitlement trades was marginally better than for allocation trades (COAG Reform Council 2010).

See Appendix A (indicator 5.2) for further detail on jurisdictions' performance on water trade approval times.

Box 2.5: COAG service standards for processing water trades

South Australia, New South Wales, Victoria, Queensland and the ACT have adopted service standards for processing allocation and entitlement trades. The standards are based on the percentage of trades of particular types that are processed within a specified number of business days. They are published on the websites of water management agencies and/or the trade approval authority in each jurisdiction.

Service standards for processing allocation trades

Service standards applicable from 1 July 2009 are:

- + intrastate trade—90% of allocation trades within 5 business days
- + interstate trade—90% of allocation trades within 10 business days (this period applies to all interstate trades except for those with South Australia – refer below).

For trades with South Australia:

- + intrastate trade—90% of allocation trades within 10 business days
- + interstate trade—90% of allocation trades within 20 business days.

A new set of service standards will apply when the National Water Market System is operational:

- + intrastate trade—90% of allocation trades within 5 business days
- + interstate trade—90% of allocation trades within 5 business days.

Service standards for processing entitlement trades

Service standards applicable from 1 July 2009 are:

- + approval stage—90% of entitlement trades within 20 business days
- + registration stage—90% of entitlement trades within 10 business days.

In consultations for the *Strengthening Australia's water markets* report, stakeholders raised a range of matters in relation to approval processes. Particular concerns were raised about interstate trades and some intrastate entitlement trades between different Murray–Darling Basin trading zones, including concerns about:

- + the transparency and accessibility of trading rules
- + the transparency of the approvals process and the basis on which authorities approve or reject a trade
- + the nature and scale of inefficiencies caused by the involvement of multiple approval authorities in assessing applications to trade
- + the levels and types of inconsistencies in administrative processes adopted by different Murray–Darling Basin jurisdictions (and/or authorities in the same jurisdiction) for processing identical trades
- + the transparency of the fees and charges for executing a trade, particularly in circumstances where there are multiple steps to the transaction and multiple approval authorities involved (NWC 2011h).

Addressing conflicts of interest

Some organisations are performing a mixture of commercial, regulatory and operational functions in the water market. Brokers may act for both the buyer and seller in the same transaction. These multiple roles may give rise to potential or perceived conflicts of interest. A perception of conflict can undermine participants' confidence in institutional and governance arrangements.

While the Commission has found no examples of conduct compromised by a conflict of interest, public disclosure of potential conflicts and the measures used to prevent them can dispel perceptions in the market that conflicts exist. The ACCC's advice to the MDBA on the trading rules component of the Basin plan specifies that an approval authority should be required to disclose any direct interest that it has in a trade to all parties to the trade, before it approves or rejects the trade. The ACCC has also advised that approval authorities should be required to provide reasons for rejecting a trade, and to report on their own trading activity. It recommends that parties look at ways of appropriately managing conflicts of interest, including structural separation.

Some market participants have expressed concern that the Australian Government faces conflicts of interest because it plays multiple roles. They suggest that its roles of making and administering water policy, owning water entitlements, actively participating in the market as a buyer (and potentially as a seller), setting trading rules in the Murray–Darling Basin and funding infrastructure renewal projects are not compatible.

There are institutional and governance arrangements in place to separate the government's roles and functions, and the Commission acknowledges that views expressed by participants may be mistaken. Nevertheless, that perception may damage confidence and participation in the market. Greater clarification of the operations of the Commonwealth Environmental Water Holder (CEWH), its powers, functions and responsibilities and its independence from the Department of Sustainability, Environment, Water, Population and Communities would benefit the market. This is particularly important as the CEWH role matures.

Market participants would also benefit from clear guidance on how future trading activities will be conducted, including the CEWH's objectives for trading, trading protocols and decision making, and the disclosure of trading activities. The CEWH has advised that it is currently developing a water trading framework and operating rules that will clarify its powers, functions and trading objectives and the manner in which it intends to operate in the water market. The water trading framework and operating rules are expected to be made available for public consultation in the second half of 2011.

Strengthening markets outside the Murray-Darling Basin

Water markets operating within the southern Murray–Darling Basin are the most active and developed. This is partly due to the substantial effort invested to date in establishing the fundamental institutional elements for a market to operate, and partly due to the large, connected surface water systems in that part of Australia.

There are other existing or emerging water markets outside the Murray–Darling Basin in Queensland, New South Wales, Tasmania, Western Australia, South Australia and the Northern Territory. In some jurisdictions, such as Queensland and New South Wales, water trading practices and processes are well established, while in Tasmania, Western Australia and the Northern Territory water markets are in the formative stages, with minimal trading taking place.

Emerging markets outside the Murray–Darling Basin have not necessarily benefited from the same focus on market development and do not have the necessary institutional infrastructure in place to facilitate efficient trade, despite trade being possible in many cases.

For example, a report prepared for the Western Australian Department of Water estimated that there is significant potential for increased water trade in that state (KPMG 2008). It identified a potential trade volume of 80 GL per year, given the right institutional and legislative settings, and estimated the benefits to the state to be in the tens of millions of dollars. Increasing demand in the face of reduced rainfall (as has been observed over the past 35 years) underlines the need for flexible trading mechanisms in Western Australia, particularly as the Department of Water is forecasting a 45% increase in water demand by 2030 (DOW 2009).

Western Australia has advised that water trading policies have recently been amended to increase flexibility in trading and promote water market intermediaries in the state.

Most of the principles of good water management provide for the fundamental elements of an effective water market. The effective implementation of water planning and management principles in the first instance can provide benefits and efficiencies for the implementation of water trading. Where trading has been identified as physically possible, water plans should incorporate well-defined trading rules and contain contingencies for a wide range of conditions. Unbundling and the implementation of NWI-consistent entitlements are still required in many areas. Careful planning is required to ensure that no artificial trade restrictions are created and that governance and administrative arrangements for trade are both effective and efficient.

Finding 2.3

There are opportunities to improve the efficiency of existing markets and for productivity and efficiency benefits to be derived from the further development of water trading outside the Murray–Darling Basin. Opportunities include:

- + improvements in price disclosure
- + greater transparency, including about allocation announcements, trade approval processes, the basis for fees and charges, and the roles of approval authorities
- + reviewing inconsistencies in administrative processes between Murray–Darling Basin jurisdictions for identical trades.

2.2 Pricing and institutional reform

Pricing and associated institutional reform has been a major component of the national water reform agenda over the past two decades.

Before water reforms, water pricing was used to achieve a mix of political and social objectives. This reduced the ability of the industry to operate and invest efficiently and the incentives for it to do so, and encouraged excessive, inefficient and unsustainable water use (NWC 2011e). Over the past two decades, national pricing reforms have aimed to overcome those practices and drive improved economic, environmental and social outcomes.

Those reforms began in 1994 under the COAG Water Reform Framework (COAG 1994) and have continued to evolve under the 2004 NWI best practice pricing and institutional arrangements and, most recently, the 2010 NWI pricing principles (DSEWPaC 2010a). They aim to ensure that pricing is used primarily to achieve economically efficient water use and water service provision, and to ensure the financial viability of water service providers. The agreed pricing reforms entail addressing:

- + the overall level of prices—to ensure that prices recover the full efficient cost of providing water services from customers (also referred to as 'full cost recovery'), with any government subsidies made transparent and gradually removed where possible
- + *the structure of tariffs*—to introduce consumption-based charges to provide a signal for efficient water use, and to ensure that fixed charges reflect the fixed costs of service provision (rather than being based on property values, which makes them more akin to a tax)
- + price-setting processes and related institutional arrangements—to move towards independent economic regulation of water prices, with regulators aiming to ensure that only efficient costs are recovered through prices, and that those costs are sufficient to provide the levels of service that customers are willing to pay for and maintain the economic viability of the service provider in the long term.

Table 2.2 shows the functions and coverage of Australia's independent economic regulators.

Table 2.2: Pricing functions and coverage of independent economic regulators

Jurisdiction and regulator	Pricing function	ons		Coverage			
	Review	Recommend	Determine	Metropolitan urban	Regional urban	Rural	
NSW—IPART ^a	\checkmark	\checkmark	\checkmark	\checkmark	×b	√°	
Vic.—ESC ^a	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	
QId—QCA ^d	\checkmark	\checkmark	x	\checkmark	x	\checkmark	
SA—ESCOSAd	\checkmark	x	×	\checkmark	\checkmark	×	
WAERA	\checkmark	\checkmark	×	\checkmark	\checkmark	×	
ACT—ICRC	\checkmark	\checkmark	√e	\checkmark	x ^f	× ^f	
Tas.—OTTER ^d	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	x	
NT—Utilities Commission	\checkmark	\checkmark	x	\checkmark	\checkmark	x ^f	
ACCC	\checkmark	\checkmark	√g	x	x	\checkmark	

a Ongoing and formalised role in price setting.

b The New South Wales government's Best Practice Management of Water Supply and Sewerage Guidelines 2007 provide for the pricing of water supply, sewerage and trade waste.

c Only for State Water for bulk water services and for water planning and management activities. Privately owned irrigation authorities are not currently subject to state-based price regulation.

d Arrangements currently in transition. South Australia's significant rural service providers are located in the Murray–Darling Basin and subject to applicable ACCC regulation.

e This power applies only if stated in terms of reference issued by the Minister.

f Sector is relatively small in this jurisdiction.

g Applies to larger infrastructure operators.

Source: Frontier Economics (2011), updated.

To inform this assessment, the Commission reviewed the implementation, effectiveness and impact of the pricing and institutional reforms embodied in the NWI. The findings of the review were published in the *Review of pricing reforms in the Australian water sector* in April 2011 (NWC 2011e).

Where pricing reforms have been implemented, they are making a positive contribution to achieving their intended outcomes. Governments and regulators have also strengthened customer protection measures for vulnerable customers, helping to limit any unexpected or adverse impacts. Nevertheless, significant opportunities remain to extend or enhance the benefits by completing or building on the agreed reforms and preventing the erosion of reforms.

Chapter 4 discusses the impacts of pricing reforms on urban communities, including the effects of stronger customer protection measures.

2.2.1 Progress in implementing pricing reforms

Since 1994, there has been good progress with the implementation of water pricing reforms, including major achievements in most key reform commitments and at least some progress in all jurisdictions. However, implementation has varied among jurisdictions and between the metropolitan water, regional urban water, and rural water (irrigation services) sectors. In general, the urban water sector moved faster in implementation, but pricing in the urban sector coped less well with the recent drought than pricing in the rural sector, where complementary water market reforms played a key role in efficient resource allocation and use.

See Appendix B (clauses 64–77) for further detail on the progress of NWI parties in implementing pricing reforms.

Separation of service provision from policy and regulatory roles

Governments have largely met their commitments to separate service delivery from government and to give water businesses a stronger commercial focus. Separate entities are now responsible for policy and service-delivery functions. In most cases, the government-owned water businesses that deliver services have a commercial focus and independent boards that are responsible for managing them at arm's length from government.

Some institutional reforms involved the amalgamation of regional water services to gain a more commercial focus and realise economies of scale. In several parts of Australia, governments have devolved the management of irrigation schemes to local bodies. For example, private operators in New South Wales run several irrigation schemes, and in Western Australia a farmer-led organisation, Harvey Water (formerly South West Irrigation), now owns and operates the formerly government-owned irrigation schemes in the south-west of the state.

Tasmania and Queensland (in the south-east of the state) have implemented institutional reforms in recent years to urban water services previously delivered by multiple local councils. The aim is to increase the commercial focus of water businesses. Changed arrangements announced this year in south east Queensland enabled local councils to retake control of urban water supply services, partially reversing those institutional reforms.

Independent economic regulation

Jurisdictions have made mixed progress in implementing independent economic regulation. While all comply with the NWI commitments in a technical sense, it is clear that some have gone further in achieving the underlying objective of the NWI in this area.

One key difference is in pricing functions among regulators or reviewing bodies. In New South Wales, Victoria and the Australian Capital Territory, independent economic regulators determine the water prices charged by water businesses. In contrast, other jurisdictions have independent bodies with pricing functions that are largely limited to providing advice to governments (which ultimately set or approve prices), or to reviewing price-setting processes.

Another key difference between jurisdictions is the coverage of economic regulation. For example, in New South Wales the Independent Pricing and Regulatory Tribunal (IPART) determines prices for the metropolitan businesses, bulk water services provided by State Water, and water planning and management charges, but not the prices charged by local water utilities in regional areas. In contrast, in Victoria, the Essential Services Commission (ESC) determines prices for all metropolitan, regional and rural water services.

In some cases, the limited coverage of price regulation reflects the fact that private entities provide some rural water services. For example, in New South Wales, South Australia and Western Australia, private irrigation providers set infrastructure charges paid by customers.

In recent years there has been progress in Tasmania, South Australia and Queensland in strengthening independent economic regulation in the water sector as those jurisdictions transition to new institutional arrangements.

Urban water pricing

Recovery of efficient costs

Most metropolitan areas in Australia have arrangements in place to achieve upper-bound cost recovery. However, the levels of cost recovery can differ depending on the accuracy of a number of underlying assumptions (for example, about demand forecasts or projected costs) and government policies (such as specifying the weighted average cost of capital).

Changes to the *South-East Queensland Water (Distribution and Retail Restructuring) Act 2009* announced in April 2011 will cap distribution and annual retail water and sewerage price increases at the consumer price index, which currently stands at 2.7%, for two years from 1 July 2011 to 30 June 2013. The proposed arrangements appear to be inconsistent with fully efficient cost recovery and independent economic regulation. While the changes may reflect a concern about the 'shock' of significant price movements, a transparent pricing pathway subject to independent economic regulation would be a more appropriate strategy.

The degree to which regional urban water businesses achieve full cost recovery varies widely across Australia:

- + In Victoria, the ESC regulates the prices of regional water businesses, which are progressing towards upper-bound cost recovery.
- + In Queensland and New South Wales, local councils providing regional urban services are not subject to economic regulation. Unlike regulated businesses, which have their prices closely scrutinised, local government businesses have generally had their compliance with cost recovery assessed by way of reporting against guidelines and benchmark returns issued by government, such as the New South Wales Best Practice Management of Water Supply and Sewerage Guidelines 2007.
- + In South Australia, Western Australia and the Northern Territory, many non-metropolitan systems do not achieve full cost recovery, and governments have adopted uniform state pricing policies and fund revenue shortfalls. Western Australia is currently phasing in more cost-reflective charges for country commercial and high-use residential customers.
- A recent review of cost recovery by the three regional water businesses in Tasmania (Ben Lomond, Southern Water and Cradle Mountain Water) suggests that 'all three corporations are generating rates of return well below full cost recovery levels' (OTTER 2011). This is a legacy issue, as the businesses started operations in July 2009 after a major restructure of the water industry, and the recent raising of the water and sewerage charge price cap to 10% is a positive sign of transition to full cost recovery.

Consumption-based pricing

Jurisdictions have largely met commitments to introduce two-part tariffs for urban water, replacing water charges based on property values and 'free allowances'. All Australian capital cities (apart from Hobart) and many regional urban areas have adopted two-part tariffs for potable water supply, with metered usage and fixed service fee components.

In a notable development since the Commission's 2009 biennial assessment, Tasmania is now rolling out water meters to all remaining unmetered urban areas, particularly in southern Tasmania. Two-part pricing based on consumption is to be in place across the state from July 2012.

Recycling and stormwater reuse pricing

Progress in the development of pricing policies to promote the efficient use of and investment in recycled water and stormwater reuse has also been mixed. New South Wales and Victoria have the most developed policies for recycled water and stormwater pricing. However, there has been some progress in other jurisdictions.

The NWI pricing principles endorsed in 2010 include principles for recycled water and stormwater reuse. The principles are intended to provide broad policy guidance to stimulate efficient water use in urban and rural settings, no matter what the water source.

In New South Wales and Victoria, recycled water is subject to economic regulation.

Rural water pricing

While there has been progress in moving to lower-bound cost recovery, some rural systems, particularly in Queensland, have not yet achieved it.

Tasmania has reported that rural systems have lower-bound pricing. Water charges for existing Tasmanian irrigation schemes include an asset renewal levy, where appropriate, sufficient to maintain the continuing service capacity of the schemes for the foreseeable future. For the refurbishment of schemes, annuities are charged closer to the time of investment. For long-lived assets, such as pipelines and dams, no funds are set aside for future capital spending.

In June 2010, New South Wales' IPART released its final determination for State Water's bulk water prices. The determination included substantial increases in prices for many customers. IPART noted:

On average across all valleys, water prices will be around 28% higher in 2013/14 than in 2009/10. Higher costs contribute 11% to this increase and lower than expected water sales contribute 15%. The largest contributor to higher costs is the return on capital component (10%). This increase reflects both a larger asset base and a higher rate of return. (IPART 2011:1).

All jurisdictions have adopted consumption-based charging in the rural sector. In general, consumption-based charges account for a modest proportion of total revenue, reflecting the high fixed costs of irrigation water supply. For example, in 2010 the Commission's *National performance report: rural water service providers* noted:

Revenue collected by rural water service providers may be in the form of consumptive charges, infrastructure access charges, customer service fees, area service charges, water entitlement charges and additional levies for service. Approximately \$316 million in revenue was collected by rural water service providers for the provision of water services in 2009–10. This was an increase of 6% from 2008–09 (\$297 million), principally reflecting the increase in volumes supplied as a result of the increase in water availability.

As a result of drought and the associated reductions in water availability, total revenue decreased between 2006–07 and 2007–08, before increasing steadily over the remainder of the period as water availability began to gradually improve in 2008–09 and 2009–10 (NWC 2011d).

Finding 2.4

There has been progress in the implementation of the water pricing and institutional reforms envisaged under the NWI and the 1994 COAG Water Reform Framework. However, implementation has been patchy, varying across jurisdictions and between the metropolitan, regional urban and rural sectors.

2.2.2 Efficient water use

Urban sector

The purpose of consumption-based pricing is to encourage more efficient water use by aligning water bills and water consumption. In many cases, water businesses have increased the proportion of costs recovered through usage charges to provide signals to consumers about the long-term implications of water use for supply augmentations.

Our analysis of urban pricing reforms over the past two decades found a consistent pattern of reduced water consumption following the introduction of consumption-based pricing and the removal of free allowances in most metropolitan and regional urban areas before the 2000s. The impact of those pricing reforms on water consumption in the 1990s was often strong and separable from the impacts of other factors, such as water restrictions and conservation campaigns.

While the pricing reforms in the 1990s moved urban water markets towards more efficient levels of consumption, the drought throughout much of Australia in the 2000s presented new challenges. In particular, there was a change in emphasis from reducing inefficient water use to ensuring water supply security.

It is difficult to attribute reductions in residential water consumption during the drought to pricing reforms alone. In fact, it is likely that a combination of persuasion (water conservation programs, education and awareness building), restrictions and investments in technical water-use efficiency had a much greater influence than pricing reforms. However, it is likely that increases in volumetric prices, particularly through inclining block tariffs and movements towards full cost recovery, also played a role.



Figure 2.12: Residential water consumption, 2004–05 to 2009–10 (kL/property)

Source: NWC (2010b).

Pricing reform aims to provide signals for efficient investment in new infrastructure, including new supply augmentations. Current pricing models fix relatively stable prices over a number of years rather than in response to changes in supply (for example, dam levels). Therefore, price signals played a limited role in signalling new investment during the drought. In fact, governments often made supply decisions through planning and investment processes, as opposed to water businesses responding to commercial imperatives.

Given the absence of strong price signals for potable water during the drought, pricing also played a limited role in influencing investment decisions about new and alternative sources, such as rainwater collection tanks and recycled water. Regulations and private responses to water restrictions (in some cases aided by government rebates) drove investment in rainwater tanks. For example, several state governments have put in place water-use efficiency standards (such as BASIX) that require new homes to be fitted with tanks.

Similarly, prices did not drive investment by water businesses in recycled water. While there has been an increase in the volume and percentage of effluent recycled, that has been due to government policies (such as recycling targets) and water restrictions rather than price. For example, during the 2000s the Victorian Government imposed a target of recycling 20% of Melbourne's wastewater by 2010. Supply diversification is an aspect of South Australia's *Water for Good* strategy, which includes actions and targets to increase stormwater and wastewater recycling. Adelaide's stormwater harvesting capacity will exceed 20 GL per annum by 2013 and the South Australian government has set a target of 35 GL of stormwater to be harvested per annum by 2025. In the ACT, the *Think Water, Act Water* strategy has a target to increase recycled water use in Canberra to 20% of 2004 sewage volume by 2013.

Efficient delivery of water and wastewater services

A key aim of water pricing and institutional reforms is the efficient delivery of water and wastewater services in line with customers' willingness to pay and any government policies relating to non-commercial objectives.

Our analysis of the urban water sector found that reforms have had a number of positive impacts on efficient service delivery.

Real operating costs for water and wastewater in major cities generally decreased during the early years of reform (the 1990s and early 2000s). More recently, however, operating costs per property have increased, reflecting large increases in operating expenditure.

The financial benefits from increased scrutiny from economic regulators in places such as Victoria and New South Wales appear to have been significant. An analysis of price determinations in those states in the second half of last decade found examples where the revenue approved by the regulator was much below that proposed by the water businesses. Those determinations suggest that independent regulation is contributing to cost savings in water service delivery (NWC 2011e).

There is evidence that the urban water industry in regional Victoria, which underwent institutional reforms and amalgamation during the 1990s, exhibits higher levels of technical efficiency than the industry in New South Wales, which remains dominated by local councils. This may be due to the achievement of economies of scale and a stronger commercial focus through institutional separation from government.

Since the introduction of pricing reforms, several states have introduced explicit community service obligation payments to cover government policies to subsidise smaller supply systems and achieve other social objectives. In 2009–10, for example, community service obligation payments in the Western Australian Water Corporation service areas of Albany, Mandurah and Kalgoorlie–Boulder were 33%, 30% and 64% of revenue, respectively. In South Australia, they accounted for 50% of revenue in SA Water country areas.

Wastewater discharges, particularly from trade waste customers, can include contaminants that drive treatment costs and potentially limit reuse opportunities. Water businesses in several jurisdictions apply trade waste charges that reflect the contaminant load and quantity of wastewater discharged.

In general, there has been progress in managing trade wastes to reduce impacts on the environment. However, it is difficult to separate the effects of pricing from those of other regulatory measures, such as the introduction of licence conditions and policies directed at reducing waste at the source or increasing wastewater reuse.

In the late 1980s and 1990s, metropolitan water businesses all generally achieved positive real rates of return and in some cases possibly earned rates of returns above competitive market rates (leading to concerns that governments were using utilities to raise funds for general government use).

Water Services Association of Australia reports for the early 2000s also showed positive rates of return for metropolitan businesses (Figure 2.13).





Source: NWC 2011i).

The Commission's *National performance report: urban water utilities* indicates that real rates of return for several metropolitan businesses fell during the late 2000s but remained positive (Figure 2.14; NWC 2011i). For some businesses, particularly in New South Wales and Victoria, real rates of return are well below those achieved in the 1990s. This possibly reflects reduced revenue from water sales and increased costs due to drought, an increase in the asset base following investment, or both. It may also reflect improved price regulation to the extent that the returns of some businesses in the 1990s were excessive.





Source: NWC (2011i).

Compared to major metropolitan water utilities, regional water services often earned low and sometimes negative real rates of return before water reforms began in the mid-1990s. For example, in 1989–90, the average real rate of return for country water businesses in Australia was 0.8% compared to 2.8% for metropolitan water providers. In Western Australia and South Australia, real rates of return were -1.3% and -1.7%, respectively (Industry Commission 1992).

In recent years, non-major urban water utilities have shown large variations in their rates of return; many recorded negative rates.

See Appendix A (indicator 8.8) for further detail.





Source: NWC 2011i.

Investment in new or refurbished infrastructure

Robust and transparent approaches to investment in new or refurbished water infrastructure help to ensure that levels of services are aligned with customers' willingness to pay and hence likely to remain financially viable into the future. They also help to ensure that investment decisions consider non-market values (such as ecological costs and benefits). Under the NWI (clause 69), the parties agreed to ensure that proposals for investment in new or refurbished water infrastructure would continue to be assessed as economically viable and ecologically sustainable before the investment is made.

Governments use a number of measures to promote efficient infrastructure investment, including:

- + independent economic regulation
- + environmental approvals processes
- + formal investment evaluation guidelines and processes
- + public reporting and consultation processes and requirements.

Since 2004, there has been a notable increase in infrastructure investment (actual and announced) in both the urban and rural sectors, including investments in:

- + desalination plants in several metropolitan areas (for example, Sydney, Perth, Melbourne, the Gold Coast and Adelaide)
- + upgrades of irrigation infrastructure in rural areas, often to share water savings between rural, urban and environmental uses (for example, upgrades associated with the Victorian Foodbowl project)
- + large-scale recycling and reuse schemes
- + pipe networks to increase connectivity between water systems and sources (as in south-east Queensland and Victoria).

In many cases, pressures such as severe drought and reductions in inflows over a long period have driven such investments. It is clear that governments have continued to play a central role in investment decisions, either by directly influencing infrastructure planning or by subsidising the cost of infrastructure. Through its *Water for the Future* initiative, the Australian Government has played an increasing role in funding large rural and urban water infrastructure projects.

Various recent reports have highlighted concerns about the potential for government intervention and grants to distort investment decisions in the urban and rural sectors. In 2009, the Commission noted:

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. (NWC 2009a)

The Australian 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.

Similarly, the Productivity Commission has noted:

While it may be appropriate for governments to preside over major investment decisions that have broad economic, social and environmental impacts, this should not encroach unduly on the independence of utilities. Intervention into the management decisions of utilities can create a disconnect between responsibility and accountability. (PC 2008)

The provision of extensive public grants for water infrastructure investments has the potential to deter private investment. Moreover, it is very likely that government grants and subsidies already conflict with the stated objective of full cost recovery for urban water provision. 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.

Institutional separation of policy and service delivery and independent regulation and scrutiny of investments are key principles for ensuring that water businesses have clear objectives and a commercial focus and make efficient investments. Without those clear roles and responsibilities, there may be insufficient scrutiny of investment decisions.

For example, a 2010 Victorian Auditor-General's report on government-funded irrigation infrastructure programs, including the Northern Victoria Irrigation Renewal Program, observed:

Victorian Government decisions to invest around \$2 billion in irrigation efficiency and related projects between 2004 and 2007 were poorly informed. Whether these projects represent the best solution to achieve the government's policy objectives of saving water and securing Victoria's water, remains unclear.

This was particularly evident for the Northern Victoria Irrigation Renewal Program, where the decision to commit \$1 billion was based on advice about water savings and cost assumptions that had not been verified, technology that had not yet proven itself and the feasibility of the project, which was unknown. As a consequence, assumed water losses have been significantly revised down, making the achievement of intended water savings less certain (Victorian Auditor-General 2010).

In the ACT in 2009, the Independent Competition and Regulatory Commission (ICRC) investigated the projected costs of the Enlarged Cotter Dam project to provide enhanced water security for the territory. The ICRC's review highlighted that the estimated cost of the project included in the price determination for ACTEW, the territory's water utility, was \$145 million. However, by 2010, those costs had risen to \$363 million. The ICRC noted:

From its review of ACTEW's assessment processes and advice to the Board in August 2009, the Commission cannot find that the decision to proceed with the [Enlarged Cotter Dam project (ECD)] as an independent project was prudent in terms of meeting the standard principles and tests ...

The precautionary approach may prove in the light of future climate outcomes to have been appropriate in terms of the 2009 decision to invest in the ECD. However, at the time the decision was taken the evidence supported by the analysis undertaken by ACTEW and provided to the Commission, was insufficient to justify the decision to proceed with the ECD as the first option. (ICRC 2010)

These examples highlight just some of the challenges, caused by drought, in assessing new infrastructure. However, water infrastructure development in Australia has always tended to be driven by drought, and it is likely that improvements can be made in the processes, assessment methods and institutional arrangements for infrastructure planning and investment decisions.

Given the 'noise' created by government intervention and the limitation of long-run marginal cost pricing, the role of pricing in promoting efficient investment during the past decade appears to have been modest.

Rural sector

Before reform, pricing practices in irrigation districts were largely the outcome of past social and development policies rather than commercial decisions. The legacy of those policies was that charges generally made little provision for the renewal of assets or a return on assets. While states took actions to refurbish run-down public infrastructure, decisions often did not take into account the viability of those systems in the face of cost-reflective pricing and expanded water trading.

Reforms to give effect to the user-pays principle and to achieve pricing transparency, with the aim of encouraging more commercially focused management of water service provider businesses, included:

- + improved accountability mechanisms for public operators, including the introduction of economic regulation and requirements for full cost recovery
- + transparent funding of community service obligations to achieve specific social objectives (to replace ad hoc grants or cross-subsidies between customers)
- + devolving management of irrigation systems to regional bodies to give them more say in investment decisions and increase commercial discipline for investment
- + a greater emphasis on robust economic and ecological investment evaluations.

There is evidence that devolving responsibility for the management of irrigation systems to local bodies has helped promote efficient service delivery.

In 2006, Young, Shi and McIntyre produced case studies on the effects of high-level water reforms on irrigation investment and practices in four irrigation areas; the Nogoa–Mackenzie region in Fitzroy Basin in Queensland, the Murrumbidgee Irrigation Area in New South Wales, the Kerang–Pyramid Hill–Boort region in Victoria, and the Lower South East region in South Australia. They found that:

All the people we consulted, reported very positively about the benefits of local management—including those in the South East's groundwater system. None proposed that they would prefer a return to management by an entity over which a government had control. (Young et al. 2006:21)

Young et al. also suggested that higher level water reforms, such as devolving the management of irrigation systems, may have contained price increases in the Murrumbidgee:

Delivery price charges set by Murrumbidgee Irrigation have remained below inflation with no major price movements since privatisation. Water delivery costs by the Company have risen by an average of 1% per year since 1999 which has largely been driven by increases in environmental and engineering services, and bulk water costs which have increased by an average of over 5% per year. This containment of prices of water delivery to producers can perhaps be marked up as a benefit of reform. (Young et al. 2006:49)

Before pricing reform, there were concerns that rural water businesses were failing to make positive economic rates of return. Many continued to record negative rates of return. Although the introduction of reforms would be expected to improve the situation, the effects of drought are likely to have affected returns in recent years through either increasing operating costs or reducing revenue.

Finding 2.5

Overall, there is evidence of benefits from pricing and institutional reforms:

- + Residential water consumption declined following the introduction of two-part tariffs and the removal of free allowances in the 1990s.
- + Independent economic regulation of urban and rural water services has provided increased transparency, accountability and scrutiny of water businesses' expenditure, resulting in cost savings for customers.
- + The movement to recovery of full efficient costs means that many water businesses are now better placed to fund major new investments from customer revenue than they would otherwise have been.

However, the role of pricing in promoting efficient investment in urban water supply augmentation during the past decade appears modest.

Pricing reforms in irrigation distribution networks have facilitated more efficient water trading and helped to manage the distributional impacts of decreasing customer numbers on remaining irrigation customers.

Government interventions in pricing and investment decisions undermine the efficacy of water pricing reforms that are designed to encourage economically efficient water use and service provision. The blurring of institutional roles and responsibilities can distort and reduce incentives for water businesses to plan and invest efficiently. It can also create uncertainty and undermine the confidence of private sector investors.



Trickle tape irrigation

2.2.3 Other elements of the NWI

Cost recovery for water planning and management activities

Under the NWI (clause 67), jurisdictions agreed to bring into effect consistent approaches to pricing and attributing costs of water planning and management by 2006, involving:

- + the identification of all costs associated with water planning and management and performance monitoring and benchmarking
- + the identification of the proportion of costs that can be attributed to water access entitlement holders, consistent with the principles that charges exclude activities undertaken for the government (such as policy development, and ministerial or parliamentary services) and are linked as closely as possible to the costs of activities or products.

Pricing and attributing the costs of water planning and management help to ensure that water users face the full cost of water planning and management activities attributable to them. It also provides scope for assessing through independent review whether such activities are undertaken as efficiently as possible. Historically, government water management agencies have imposed different types of charges to recover the costs of water planning and management.

The Water Act provides the Minister for Water with the power to make water charge rules that relate to regulated water charges in the Murray–Darling Basin, including charges for water planning and management activities. The Water Charge (Planning and Management Information) Rules 2010 came into effect on 30 June 2011. The rules require persons determining charges for water planning and management activities to publish information about those charges, including the amounts and the process applied to determine them (see Appendix E).

With the exception of New South Wales, no jurisdiction has fully met NWI commitments designed to recover the efficient costs of water planning and management from water customers. New South Wales has expressed concern that there is a competitive disadvantage to irrigators in New South Wales due to the other states' failure to implement the cost-recovery commitments in the NWI.

The extent to which such charges are subject to independent review is limited. For example, IPART in New South Wales is the only regulator to set prices explicitly for those activities. In Victoria, the ESC allows authorities to pass on the cost of the environmental levy set by the Water Minister to customers (based on a percentage of total revenue). In some other jurisdictions, regulators may undertake ad hoc reviews of water planning and management charges.

In February 2011, the Western Australian Economic Regulation Authority released the final report of its inquiry into water resource management and planning charges, recommending a structure for the recovery of those costs (ERA 2011). The state government is now developing a position and a response to the recommendations in the report.

See Appendix B for further detail on the progress of NWI parties in implementing cost recovery for water planning and management activities.

Pricing environmental externalities

Under the NWI (clause 73), the states and territories agreed to:

- + continue to manage environmental externalities through a range of regulatory measures (such as through setting extraction limits in water management plans and by specifying the conditions for the use of water in water use licences)
- + continue to examine the feasibility of using market-based mechanisms, such as pricing, to account for positive and negative environmental externalities associated with water use
- + implement pricing that includes externalities, where that is found to be feasible.

Effective management of environmental externalities helps ensure that water use, water infrastructure and wastewater disposal do not have an undue impact on third parties (such as other water users or the wider community), which in turn helps to maximise the net benefits from resource use.

Externality pricing typically involves imposing a specific charge or tax to reflect the external costs associated with an activity, with the aim of encouraging more socially beneficial behaviour. In practice, however, there are very few examples of externality pricing in the urban or rural water sectors. This is largely because governments and water businesses have sought to address externalities through environmental standards and regulations, which have in turn promoted investment in infrastructure works and other management activities. For example, water businesses invest in sewerage and treatment infrastructure to meet regulatory environmental standards for discharging wastewater to the environment.

One of the few examples of an externality charge is the ACT's water abstraction charge, which includes a component related to the environmental costs of extracting water from water systems. However, the charge has been subject to a legal challenge, and the Commission remains concerned about its lack of transparency.

To promote progress on NWI commitments relating to externality pricing, the Commission recently published *Externality pricing in the Australian water sector* (Frontier Economics 2011). The report notes that, while pricing is one of many options for addressing externalities, in most cases externalities associated with the urban water cycle are already being managed through non-price means. It concluded that there have been significant improvements in the management of some externalities in urban water during the past decade, and that this has limited the circumstances in which additional externality pricing is likely to be worthwhile.

In many cases, the preconditions for externality pricing in the water sector do not exist. In the Commission's view, a careful assessment of existing arrangements for managing externalities is still required, to determine whether they are optimal. In particular, the states and territories should transparently and rigorously determine externalities of concern to the community, the party with accountability for each externality, and the effectiveness of existing and alternative approaches (including externality pricing) for managing the externality.

See Appendix B for further detail on the progress of NWI parties in implementing pricing for environmental externalities.

2.2.4 Future pricing reform opportunities

Where pricing reforms have been implemented, they are contributing to the achievement of their intended outcomes. However, key areas of reform are yet to be consistently implemented by NWI parties, and shortcomings have emerged during the recent drought.

Pricing should encourage economic efficiency in service delivery, investment and water use. While the initial pricing reforms focused on achieving technical or productive efficiency, the drought has highlighted shortcomings in the dynamic (investment) and allocative (sourcing and use) efficiency aspects of urban water management. By contrast, complementary rural water market reforms helped to allocate limited resources efficiently.

In addition, governments, regulators and water businesses now need to consider pricing in a more competitive institutional framework, where customers' needs are increasingly diverse, where water systems are more complex and integrated, and where a host of external factors will place pressure on the sector to provide the right mix of services at the lowest possible cost.

The heavy reliance placed on non-price instruments, such as restrictions and conservation campaigns, to balance supply and demand during the recent drought was not optimal. Efficient price signals had a limited role in influencing the timing and extent of new investment in supply-side augmentations, which were often made by governments outside the normal planning processes.

The clear separation of policy, regulatory and service delivery roles has also been undermined. Government intervention compromises the development of a principled approach that uses water pricing as an instrument to encourage economically efficient water use and service provision. Such blurring can distort and reduce incentives for water businesses to plan and invest efficiently, and can create expectations that lobbying will be fruitful in the future. It can also create uncertainty and undermine the confidence of private sector investors.

As a result of those developments, the Commission is concerned about the national architecture for implementing reform. While the specific challenges and the right mix of reforms will vary across Australia, in our *Review of pricing reform in the Australian water sector* (NWC 2011e) we proposed a framework for renewed reform that includes:

- + a recommitment by COAG to the fundamental objectives and principles of pricing reform, including extending independent economic regulation across all water systems and continued pricing adjustments to enable the recovery of efficient costs
- + consideration of new approaches to pricing frameworks to better signal the value of the resource and enable greater customer choice
- + improved institutional arrangements, particularly for planning and investment
- + recommitment to action on cost recovery for water planning and management activities.

Finding 2.6

The objective of water pricing to encourage economic efficiency in service delivery, investment and water use remains valid. Changes to the context in which our urban water sector operates mean that governments, regulators and water businesses now need to consider pricing in a more competitive institutional framework, in which customers' needs are increasingly diverse and water systems are more complex and integrated.

Summary of findings

Finding 2.1

Water markets have grown substantially for both allocation and entitlement trading in the Murray–Darling Basin, and are evolving in a number of other parts of Australia.

Finding 2.2

Water markets have facilitated increased productivity, improved flexibility for individuals and businesses, and resulted in positive economic gains at the community, regional and national levels. Irrigators are increasingly sophisticated in their use of water trading as a business tool.

Finding 2.3

There are opportunities to improve the efficiency of existing markets and for productivity and efficiency benefits to be derived from the further development of water trading outside the Murray–Darling Basin. Opportunities include:

- + improvements in price disclosure
- greater transparency, including about allocation announcements, trade approval processes, the basis for fees and charges, and the roles of approval authorities
- + reviewing inconsistencies in administrative processes between Murray–Darling Basin jurisdictions for identical trades.

Finding 2.4

There has been progress in the implementation of the water pricing and institutional reforms envisaged under the NWI and the 1994 COAG Water Reform Framework. However, implementation has been patchy, varying across jurisdictions and between the metropolitan, regional urban and rural sectors.

Finding 2.5

Overall, there is evidence of benefits from pricing and institutional reforms:

- + Residential water consumption declined following the introduction of two-part tariffs and the removal of free allowances in the 1990s.
- + Independent economic regulation of urban and rural water services has provided increased transparency, accountability and scrutiny of water businesses' expenditure, resulting in cost savings for customers.
- + The movement to recovery of full efficient costs means that many water businesses are now better placed to fund major new investments from customer revenue than they would otherwise have been.

However, the role of pricing in promoting efficient investment in urban water supply augmentation during the past decade appears modest.

Pricing reforms in irrigation distribution networks have facilitated more efficient water trading and helped to manage the distributional impacts of decreasing customer numbers on remaining irrigation customers.

Government interventions in pricing and investment decisions undermine the efficacy of water pricing reforms that are designed to encourage economically efficient water use and service provision. The blurring of institutional roles and responsibilities can distort and reduce incentives for water businesses to plan and invest efficiently. It can also create uncertainty and undermine the confidence of private sector investors.

Finding 2.6

The objective of water pricing to encourage economic efficiency in service delivery, investment and water use remains valid. Changes to the context in which our urban water sector operates mean that governments, regulators and water businesses now need to consider pricing in a more competitive institutional framework, in which customers' needs are increasingly diverse and water systems are more complex and integrated.



Sustainable water management

NWI elements discussed in this chapter



3 Sustainable water management

Summary of impacts

The NWI has embedded into water management across Australia the imperative to manage water resources sustainably, to articulate more clearly environmental objectives, and use best available science in decision making.

The water plans and environmental management arrangements established under the NWI are improving Australia's capacity to maintain important environmental assets and ecosystem functions and to support economic activity. They have not yet had time to deliver fully their intended outcomes or to demonstrate their efficacy over the long term, including during periods of climatic extremes.

Governments are using a number of NWI-consistent mechanisms to start to address overallocation or overuse, particularly in the Murray–Darling Basin. They have used water markets established under the NWI as an important mechanism to recover water for the environment while maintaining the security of water users' access entitlements.

Despite the effort to recover water for the environment in some areas, many water resources are still not being managed sustainably. Nationally, there has been disappointingly slow progress in the explicit identification of overallocated and overused systems and in restoring those systems to sustainable levels of extraction.

There has been some progress across jurisdictions in the development of environmental management institutions and their capacity to deliver environmental water. However, accountability for environmental outcomes remains weak. In particular, monitoring capacity is often inadequate, the necessary science to link environmental watering with ecological outcomes is generally weak and there is a lack of transparent reporting of results.

Water is part of Australia's natural capital and serves a number of important objectives, including environmental objectives. In committing to the NWI, all of Australia's governments acknowledged their responsibility to ensure that water is allocated and used to achieve social and economic objectives in a manner that is environmentally sustainable. This included commitments to improve the health of river and groundwater systems by establishing clear pathways to return overallocated systems to environmentally sustainable levels of extraction, to maintain other systems at environmentally sustainable levels of use, and to identify and protect high conservation-value systems.

Under the NWI, the parties agreed to identify environmental and other public benefit targets in water planning, and to develop and implement management practices and institutional arrangements that would achieve them. In particular, they agreed to be as specific as possible about objectives, to establish environmental water managers with the necessary authority and resources to achieve the objectives, and to provide water cost-effectively for that purpose (clause 78).

To assess the achievement of those commitments, the Commission reviewed whether:

- + our understanding of surface water and groundwater systems and the identification of high conservation-value ecosystems have improved
- + water planning clearly specifies environmental objectives and the pathways for achieving them, including by returning overallocated and overused systems to sustainable levels of extraction
- + mechanisms are in place to recover water for the environment where required
- + the security and management of environmental water have improved
- + monitoring, evaluation and reporting arrangements are adequate.

3.1 Understanding water resources

The NWI parties agreed that decisions made in water planning processes would be informed by the best available scientific information (NWI clause 36). They also agreed that the knowledge base for decisions about the environment's requirements for water and water allocations should be clearly stated (NWI Schedule E, clause 1v) to provide transparency.

Robust scientific information is essential for determining the environmental water required to maintain water-dependent ecosystems. It is not possible to wait for the perfect set of information for each system, so decisions need to be made on the best information available at the time. When plans are reviewed, they should take account of newer information.

Information on groundwater systems is particularly important to improve our capacity to manage them sustainably, as both the science and policy for managing them is less developed in Australia than for surface water systems. Water managers must also recognise the connectivity between surface water and groundwater systems, and manage connected systems as a single resource.

3.1.1 Investments in improving knowledge

There has been significant investment in developing the body of knowledge and tools available to environmental water managers, water planners and community members:

- + During 2007 and 2008, CSIRO undertook a basin-wide water resource assessment on an unprecedented scale for the groundwater and surface waters of the Murray–Darling Basin, reporting on current and future climate scenarios and possible land management changes. The Murray–Darling Basin Sustainable Yields project was funded through the Commission. It included reports on 18 regions and an overall basin report. Similar assessments have also been undertaken in northern Australia, Tasmania and parts of Western Australia, and a current project is underway in the Great Artesian Basin. All of the projects take into account the potential significance of development and climate change, and also particular regional or jurisdictional pressures, such as reliance on groundwater in south-west Western Australia, drought-proofing policies in Tasmania, and the pressure of development in the north. The results of the Murray–Darling Basin Sustainable Yields project, together with other information available to the MDBA, are being used to develop sustainable diversion limits for the basin.
- + The eWater CRC has worked with a range of partners since 2005 to develop a suite of products and tools, including Source Rivers, a nationally applicable hydrologic modelling platform for water planning, to help water managers make confident decisions that are based on good, transparent science in line with the NWI (see Box 1.9 in Chapter 1).
- + Following a review of existing frameworks for classifying and managing high conservation value aquatic ecosystems (HCVAEs) in 2007, jurisdictions have been working together to develop a national framework for that purpose.
- + Valuable efforts are being made to improve understanding of water resources in northern Australia and their management, some of which are being funded or co-funded by the Commission. This work includes the Tropical Rivers and Coastal Knowledge (TRaCK) research hub, a project of the Commonwealth Environmental Research Fund co-funded by the Commission, which provides the science and knowledge that government, communities and industries need for the sustainable use and management of Australia's tropical rivers and coasts (see Box 3.2).
- + National working groups have been formed to deliver improved outcomes in water management, including a community of practice for environmental water managers and a water planning website (see Box 1.11 in Chapter 1).

These research projects provide governments and industry with an unprecedented level of water information to guide future resource planning, management and investment.

Box 3.1: CSIRO Water for a Healthy Country National Research Flagship

The CSIRO Water for a Healthy Country National Research Flagship is the largest research partnership focusing on water in Australia. The flagship is a partnership between CSIRO and scientists, research institutions, private enterprise, community groups, and government and non-government organisations to address the sustainable management of water resources and deliver relevant and effective water management options. The flagship aims to provide Australians with solutions for water resource management, creating economic gains while protecting or restoring our major water ecosystems. It includes regional research to manage water in rural Australia, water for healthy ecosystems, urban water and the integration of water information systems.

Research funded through the Water for a Healthy Country Flagship supports major water policy and strategies, including the:

- + National Water Initiative
- + Reef Water Quality Protection Plan
- + Living Murray Initiative
- + Water for the Future Program
- + Murray–Darling Basin Plan.

Sources: CSIRO (2011a, 2011b).

The Commission considers that sustained investment in science to produce better information and tools to support water managers and water planners would contribute to improved management decisions for the sustainable management of our water resources, as well as greater efficiency in the delivery of environmental water.



Box 3.2: Improving our understanding of water resources in Northern Australia

The Commission is funding or co-funding work to deepen our knowledge of water resources in northern Australia and to improve their management.

Tropical Rivers and Coastal Knowledge

The Tropical Rivers and Coastal Knowledge (TRaCK) consortium draws together more than 70 of Australia's leading social, cultural, environmental and economic researchers to focus on the tropical north of Australia from Cape York to Broome. TRaCK recognises that the only way to make good decisions about the management of a water resource is to have information on the values and needs of its aquatic ecosystems, Indigenous communities, and agricultural and industrial users. It has gathered and analysed those values and potential threats to them to inform decision makers working towards the sustainable management of northern Australian water systems.

The Northern Australia Water Futures Assessment

The Northern Australia Water Futures Assessment was established by the Australian Government in response to renewed interest in the development of northern Australia, and is jointly funded by the Commission and the Department of Sustainability, Environment, Water, Population and Communities. It comprises four programs—Water Resources, Ecological, Cultural and Social, and Knowledge Base—which will provide the science needed to inform the development and protection of northern Australia's water resources, so that development is ecologically, culturally and economically sustainable.

For those key assets identified as most at risk across the north, the Ecological program is:

- + improving understanding of water-dependent ecological assets
- + identifying high ecological value aquatic ecosystems
- + identifying ecological assets most at risk from hydrological changes that might occur as a result of climate change, future development or other factors
- + assessing the development and climate change risks to water resources.

In catchments that are subject to water resource development, the Cultural and Social program is working with jurisdictions, Indigenous groups and organisations to:

- + identify sociocultural values, beliefs and practices as they relate to water
- + conduct location-specific case studies to understand sociocultural values, beliefs and practices as they relate to water, including patterns of usage, religious implications, economic activities, and social and political issues.

The program is also identifying tools and processes to articulate water-related Indigenous social and economic aspirations and will recommend directions and priorities for future research.

The Northern Australia Sustainable Yields project

The Northern Australia Sustainable Yields project was established in response to a decision by COAG in 2008 to undertake a comprehensive scientific assessment of water yield in all major water systems across the country. Funded by the Commission, the project provides critical information on historical, recent and likely future water availability in northern Australia, which is renowned for its high rainfall, pristine tropical ecosystems and relatively undeveloped state. That information is helping governments, industry and communities to consider the environmental, social and economic aspects of the sustainable use and management of the water assets of the north (CSIRO 2011a).

While governments and water managers know more about ecosystems than they did at the commencement of the NWI, the Commission has found a lack of ecosystem understanding at the scale that is most useful in water planning and managing for planned and unplanned environmental watering events. Aquatic ecosystem science has frequently been focused at the species or group level rather than at the ecosystem level and has often been conducted at a local scale, leading to a lack of the systems-level understanding required to achieve water planning and management objectives.

There are large gaps in our knowledge about ecology and the response of ecological communities to changes in flow. There are shortcomings in past and current approaches to the collection and analysis of ecological, hydrological and water-quality data and its use to demonstrate cause-and-effect relationships between changes in flow and ecological responses. One major concern is the scarcity of long-term, continuous, spatially explicit datasets of major ecosystem drivers linked to a range of key ecological response variables.

In 2008, the Commission funded an 18-month study of the ecological results of flow regimes in the Murray–Darling Basin (Colloff et al. 2010). The study found that the management of environmental water allocations to achieve ecological outcomes for important environmental assets is not yet supported by a comprehensive, evidence-based, scientifically rigorous predictive framework. Given that the most comprehensive flow–ecosystem datasets in Australia are for systems in the Murray–Darling Basin, there is likely to be a serious deficiency across Australia in long-term, continuous, spatially explicit datasets for major ecosystem drivers linked to key ecological response variables.

Australia now possesses a suite of modern hydrological models designed to predict flow regimes under different management and climatic scenarios. However, there are still weaknesses in modelling at the low-flow end of the hydrograph. A Commission-funded project, Investigating Low Flows for Improved Water Planning and Management, is working to address that gap in collaboration with the jurisdictions. The absence of predictive ecosystem models, based on a scientific understanding of flow–ecosystem response relationships, remains a weakness in Australia's toolkit of water management models.

Each jurisdiction monitors aquatic ecosystem health using protocols that are specific to that jurisdiction. In the past, it has proven very difficult to assemble the datasets from the disparate monitoring programs into a comprehensive Australia-wide picture of ecosystem health. In conjunction with jurisdictions and the Department of Sustainability, Environment, Water, Population and Communities, the Commission has funded the development of the Framework for the Assessment River and Wetland Health (FARWH), which allows existing jurisdictional ecosystem data collections to be reported in a nationally consistent manner.

The FARWH model has been tested successfully using existing jurisdictional data collections in Queensland, New South Wales, Western Australia, Victoria, Tasmania and northern Australia, showing that FARWH can be used to provide nationally consistent assessments of aquatic ecosystem condition using existing data.

Regular reporting on ecosystem condition using a nationally consistent mechanism such as FARWH has the potential to support the development of a national baseline to measure change over time.

Understanding ecosystem responses to both environmental watering events and natural climate variability is central to good environmental water management, especially in systems in which water resources are highly contested, such as overallocated systems. Sound knowledge of the links between flows and levels in groundwater systems and of ecosystem outcomes will enable more efficient and effective environmental water decisions and will contribute to greater social acceptance of environmental water allocations.

Finding 3.1

Since 2004, there has been a material improvement in knowledge and understanding of Australia's water resources. There remains a significant gap in our knowledge of ecosystem responses to changes in flow. This knowledge is critical to the capacity of environmental water managers to effectively plan, monitor and review environmental watering.
Understanding groundwater systems

There has been rapid development of groundwater resources over recent decades, driven by increasing population pressures in many coastal and rural communities and rising demand from many new and existing industries. Much of inland Australia is dependent on groundwater for water supply.

Prior to the NWI, groundwater was often overlooked in the national water debate. The failure to adequately invest in groundwater data and knowledge, appropriate monitoring and tools and networks, has resulted in an inadequate understanding of the resource and overallocation in many aquifers. Recognising these issues, the Commission established the National Groundwater Action Plan (GAP) in 2007 as a first step to improve groundwater knowledge and to progress groundwater reforms under the NWI. Under GAP, projects have been conducted in all jurisdictions and are contributing to the improved understanding and management of groundwater resources across the country (see Box 3.3).

The NWI recognises the importance of identifying groundwater systems of high conservation value and managing these systems to protect and enhance those values. A recently released Commission report, *Evolving issues and practices in groundwater-dependent ecosystem management* (SKM 2011), found that each jurisdiction has developed environmental policy and management practices to account for and provide for groundwater-dependent ecosystems. The report uses seven case studies to illustrate the available range of management tools and the effectiveness of water planning policy controls in protecting such systems. In most cases, groundwater-dependent ecosystem management is only now being written into water plans, and there is much room for improvement in determining appropriate environmental water provisions. The report notes that ecological monitoring and evaluation of these systems are critical but deficient, and cautions that groundwater-dependent ecosystem management should not be held back by a lack of data or uncertainty in the science.

At the national level, our understanding of groundwater systems and the ecological values they support is much less developed than for surface water. This is reflected in differences in the way sustainable levels of extraction are determined. For surface water, sustainable levels are defined by taking into account flow magnitude, frequency, duration, timing and rates of change. In contrast, the initial approach for groundwater sets a single annual extraction limit derived from the hydrogeological concept of 'safe yield', which is the quantity of groundwater that can be extracted without depleting the storage. On its own, that approach does not take adequate account of impacts on ecosystems or the dynamic interconnectedness of systems. Without robust studies of the water requirements of groundwater-dependent ecosystems, water managers rely on expert opinion.

While our understanding of groundwater resources is less robust than our understanding of many surface water systems, it is no less important that they be managed using the best available science. Where understanding of the system is poor, managers should set conservative extraction limits and not continue to base future allocations on historical levels of extraction.

The Commission has recently completed the development of a methodology and toolkit that can be used by water managers to provide scientifically rigorous estimates of recharge and discharge rates in areas where detailed investigations have not been conducted. The toolkit was developed by CSIRO and Geoscience Australia in collaboration with the states and territories. Five jurisdictions (New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory) have trialled the tools and expressed interest in integrating them into their water planning processes. The toolkit represents a step forward in quantifying the effect of groundwater–surface water interactions on the water balance.

Finding 3.2

Over recent years, considerable effort has been made to increase our knowledge of groundwater systems from what was a low base. Continued investment in groundwater science and knowledge to improve management practices remains a priority.

Box 3.3: The Commission's Groundwater Action Plan

The Commission initiated the \$82 million National Groundwater Action Plan (GAP) in 2007 to improve the knowledge and understanding of Australia's groundwater resources by investing in improved data and information and building groundwater skills and management capacity.

Data and information about groundwater resources

GAP has funded hydrogeological investigations to help overcome groundwater knowledge gaps and improve groundwater management. The plan has invested more than \$16 million in targeted aquifer assessments nationally and has funded the development of a suite of practical tools for management.

For example, in Queensland, GAP funded the development of a groundwater operational modelling package that allows management rules to be incorporated into modelling runs, something that has been routine for surface water models but has until now been a major gap in groundwater planning capacity. The package was used in the development of the Pioneer Catchment Water Resource Plan and Resource Operations Plan and is now being applied more widely.

In Tasmania, a GAP-funded groundwater information management system has become operational. For the first time in Tasmania, a centralised system exists to record all information about the State's groundwater resources and related infrastructure. It is used by departmental staff for capturing new groundwater data, resource assessments and monitoring programs.

In the Northern Territory, GAP funded technical investigations in the economically and ecologically significant Oolloo Dolostone aquifer have resulted in the discovery of a previously unidentified geologic unit and have enabled the Northern Territory to quantify the contribution of the Oolloo Dolostone aquifer to baseflow in the Daly and Katherine rivers.

Projects have filled knowledge gaps in specific areas that presented impediments to water planning and management. Nationally, the number and quality and groundwater plans has improved and the ability of some states to manage the resource has been greatly advanced.

Connectivity

Although groundwater and surface water systems are often closely connected, they have historically been managed separately. Sound knowledge of groundwater and surface water connectivity is vital for sustainable management of both resources. The Commission has been working with state and territory agencies to build information on connected systems and has improved understanding and management of groundwater – surface water connectivity in key areas.

The Mapping Potential Surface Water/Groundwater Connectivity project undertook catchment-scale analyses and determined the potential connectivity of groundwater resources along river reaches in more than 50 surface water catchments. It provided water managers with a visual indication of areas of potentially high connectivity between systems to enable better water management decisions and developed an analytical assessment method applicable to most of Australia.

The Commission has also developed groundwater – surface water connectivity guidelines to aid integrated management and provide more explicit and equitable sharing of the benefits and impacts of abstraction across connected water systems. The framework provides overarching direction on how to develop integrated plans in connected systems.

Skills and capacity

The Commission contributed \$15 million to establish the National Centre for Groundwater Research and Training at Flinders University in South Australia. The Centre's primary goal is to build a high-quality, integrated program of groundwater research, and to train the next generation of expert hydrogeologists and groundwater specialists. For further information about the centre, see Box 1.11 in Chapter 1.

3.1.2 Surface water – groundwater connectivity

The NWI objectives include the recognition of the connectivity between surface water and groundwater systems, and management of connected systems as a single resource in an integrated way (clause 23(x) and Schedule E: clause 5(ii)). Where systems are connected, extractions and other actions in one system can influence the functioning of the other. Connectivity needs to be taken into account when identifying the ecological values and assets covered by a water plan, setting the plan's ecological objectives, and choosing the management tools to implement the plan.

Since 2004, the number of water plans that recognise the connection between surface water and groundwater has increased significantly in all jurisdictions. The need to manage connected systems as single resources is recognised in legislation or policy instruments in all states and territories.

However, the degree to which water sharing plans include specific provisions to ensure sustainable levels of extraction is variable. The nature of those provisions depends on the hydrological characteristics of the system, the level of demand, knowledge of the resource and, where knowledge is lacking, the capacity to monitor the impact of extraction on both surface water and groundwater. Approaches to managing interconnectivity include the following:

- + In the absence of a good understanding of the system, the water plan for Western Davenport in the Northern Territory limits surface water diversions to no more than 5% of natural flows.
- + The Eastern and Western Mount Lofty water allocation plans in South Australia propose the quarantining of the estimated groundwater contribution to stream base-flow and pool maintenance.
- + In the Peel Alluvium water source in New South Wales, cease-to-pump rules for groundwater bores are linked to surface water flows in nearby streams.
- + The water sharing plan for the Bellinger River regulated and alluvial water sources in NSW treats highly connected surface water and groundwater as a single resource.
- + The water resource plan for Whitsunday in Queensland states that water management rules must consider groundwater flows and the contributions from aquifers to the flow of water in watercourses.
- + The water allocation plan for the Tindall Limestone Aquifer in the Northern Territory protects groundwater-dependent ecosystems through provisions relating to water levels in the Katherine River (SKM 2011).

The Commission acknowledges the significant commitment that jurisdictions have made to managing surface water and groundwater systems as single resources, particularly since 2004. Improving the management of connected systems hinges on the jurisdictions' continued commitment to building knowledge, funding and implementing appropriate monitoring, and adaptively managing systems where new information indicates that management is necessary.

In 2009, the Commission expressed concern about unrecognised surface water – groundwater connectivity. We remain of the view, expressed at the time, 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%.

Further information on NWI parties' progress in recognising the connectivity between surface water and groundwater resources is in appendixes A (indicator 10.1) and B (clause 79).

Finding 3.3

While all jurisdictions have developed policies for managing connected surface water and groundwater systems, the implementation of effective conjunctive management remains limited and the understanding of connectivity in individual systems is still inadequate in many areas.

3.2 Identifying environmental objectives and water regimes

Water planning is the main mechanism established in the NWI to achieve environmentally sustainable water management. Good water planning depends on a solid understanding of the interdependence between ecosystems and social and economic values, the clear specification of intended outcomes, and clarity about the water regime required to deliver results at an agreed level of risk.

In our review of a sample of recent water plans, we identified some good examples of specific, measurable objectives for the environment in some plans. We found that, generally, the methods used in most recent water plans to determine environmental water regimes have improved and that more credible science and more holistic methods are being applied. For many recent plans, jurisdictions have undertaken studies to identify the environmental values associated with water-dependent ecosystems covered by the plans and to estimate the water regime required to maintain these values, although the level of rigour of the studies varied substantially. Examples of improving practice include the following:

- In the Northern Territory, the recently completed Tindall Limestone Aquifer, Katherine, water allocation plan provides a good example of transparent, measurable objectives. The plan outlines its objectives in a table that also clearly identifies the logic behind the plan. The table links outcomes, objectives, strategies and performance indicators, providing a high level of transparency and clarity about the plan's purpose, what it is intended to achieve, how that will be achieved, and how progress will be monitored and measured.
- + The South Australian Department for Water has sought to increase the transparency of environmental water determinations by developing guidelines for environmental water requirements and provisions. While the guidelines are still in the final stages of preparation, they are already being applied in developing all new water allocation plans in South Australia. Importantly, material that provides the technical background on methods and processes for defining environmental water requirements is publicly available (South Australian Government 2010).

While practice is improving, many currently operational water plans do not set out objectives in a way that can be clearly understood and measured. In many cases, the plans express objectives very broadly—for example, to 'sustainably manage water resources', 'protect ecosystems' and 'share water equitably'. They do not give any indication of acceptable levels of risk to ecosystems, the target level of water supply security for entitlement holders, and the way the available water will be shared in wet, average and dry years.

Embedded at lower levels, some plans have measurable objectives that do relate to outcomes. Those objectives can be hard to find, may lie within strategies or performance indicators, and may not be well linked to plan objectives. For communities, the lack of clarity about how a plan will achieve its objectives and clear measures of plan performance can lead to confusion and reduced confidence in water planning. Very broad objectives make it extremely difficult to measure whether a plan is successful or not.

Objectives can also be obscured by the complexity of planning mechanisms and documentation. For example, in Victoria, planning is stipulated through a number of different documents with differing degrees of detail. This makes it difficult to see clear links between the environmental objectives identified in a plan and the specific management activities to deliver those objectives.

Finding 3.4

The specification of objectives in water planning is continuing to improve. Some recent water plans articulate clear environmental water objectives that are measurable and connected to other provisions in the plans. Nationally, there continue to be inadequacies in the transparency of plan objectives.

3.3 Returning systems to sustainable levels of extraction

The NWI parties agreed to identify and make substantial progress towards addressing all currently overallocated or overused systems and to establish pathways to return those systems to environmentally sustainable levels of extraction by 2010 (NWI clause 23(iv)). Box 3.4 outlines the Commission's working definitions of environmental sustainability, overallocation and overuse.

Box 3.4: Environmental sustainability—some definitions

The Commission considers *environmental sustainability* to mean the:

maintenance of key assets and functions in a condition, which may be less than pristine, but which provides a balance between current environmental requirements and other consumptive demands on water resources while maintaining options for an uncertain future. (NWC 2010a)

This definition recognises consumptive uses, uncertainty in the climate and other factors, and the critical importance of ecosystem assets and functions to people's livelihoods. The definition also acknowledges that balancing environmental requirements and consumptive demand for water requires some form of agreement. The NWI relies on water planning to achieve that agreement, and on the monitoring of water plan implementation to ensure that the balance is achieved.

Overallocation refers to situations in which, with the full development of water access entitlements and all other forms of authorised use in a particular system, the total volume of water *allowed to be extracted* at a given time exceeds the sustainable water extraction regime for that system.

Overuse refers to situations in which the total volume of water *extracted* from a particular system at a given time exceeds the sustainable water extraction regime for that system.

Choices about which environmental assets to protect, how strongly to protect different ecosystems, sustainable levels of extraction and acceptable levels of risk cannot be determined by science alone. They are inherently social decisions that depend on changing circumstances (such as climate change or extremes of weather) and cultural preferences, as well as scientific knowledge.

Systems that are overallocated or overused should be clearly and publicly identified. The Commission notes that there is still no agreed national list of overallocated or overused systems. This not only makes it difficult to know whether adequate steps have been taken to deal with overallocation, but also jeopardises other aspects of the NWI, such as the risk assignment and interception provisions, which rely on that identification. The Department of Sustainability, Environment, Water, Population and Communities advises that jurisdictions have agreed to develop a framework to assess systems at risk of unsustainable use by the end of 2011, and will then conduct the assessment biennially. Table 3.1 outlines the NWI parties' performance against Natural Resource Management Ministerial Council performance indicators in this area.

Jurisdiction	Indicator	Number of water systems for which a water plan has been completed that:				
		has overal and has	has been assessed as overallocated / overused and has a pathway in place		has been assessed as overallocated / overused, but has no pathway in place	
		2009	2011	2009	2011	
ACT	4.1 (overallocation)	0	0	0	0	
	4.2 (overuse)	0	0	0	0	
NSW	4.1 (overallocation)	n.p.	n.p.	n.p.	0	
	4.2 (overuse)	n.p.	n.p.	n.p.	0	
NT	4.1 (overallocation)	0	0	0	0	
	4.2 (overuse)	0	n.p.	0	0	
Qld	4.1 (overallocation)	n.p.	3	n.p.	0	
	4.2 (overuse)	n.p.	5	n.p.	0	
SA	4.1 (overallocation)	1	3	8	3	
	4.2 (overuse)	1	1	5	1	
Tas.	4.1 (overallocation)	0	0	0	0	
	4.2 (overuse)	3	0	0	0	
Vic.	4.1 (overallocation)	n.p.	n.p.	n.p.	n.p.	
	4.2 (overuse)	n.p.	n.p.	n.p.	n.p.	
WA	4.1 (overallocation)	8	9	0	0	
	4.2 (overuse)	n.p.	9	0	0	

Table 3.1: Jurisdictional responses on performance indicators for overallocation and overuse

n.p. = not provided.

Note: This information relates only to those water systems that were managed at the time in accordance with available water plans. Some management areas in the table are both overallocated and overused. An expanded version of this table is in Appendix A (Table A.8).

Victoria has advised that it does not explicitly identify systems as being overallocated or overused, but instead manages the needs of the environment through its water planning framework. However, Victoria's sustainable water strategies appear to indicate overallocated or stressed systems and how they will be treated:

- The Central Region Sustainable Water Strategy (page 34) states that 'some groundwater management areas are already over-allocated. In those cases "water supply protection areas" are declared according to provisions in the *Water Act 1989* and management plans are developed to reduce over-use in these areas.' Fourteen water systems in the region are declared water supply protection areas.
- + The Northern Region Sustainable Water Strategy, released in 2009, stated that 'in highly stressed systems, the water sharing arrangements or the total licensed volume committed from the resource may need to be revised. In these cases, a [water supply protection area] will be declared in accordance with Section 32 of the *Water Act 1989* and a management plan prepared which may change licence conditions prior to the renewal of the licence.' There are currently five declared water supply protection areas in the region.

New South Wales reports that, in areas with water sharing plans, the extraction limits and the environmental water rules are designed to ensure that systems are not overused. Allocations vary from year to year depending on the volume of water available for consumptive use.

In the absence of explicit acknowledgment of overallocation and overuse in water plans, the Commission reviewed 159 plans, including 40 plans activated since 2009, to determine the extent to which the plans manage systems as though they are overallocated, overused or approaching full allocation, and the extent to which the plans identify the return of the system to environmentally sustainable levels of extraction as a management objective.

With few exceptions, the allocation status of an area was implicit rather than explicit in water plans. For example, systems in which no further entitlements were permitted or in which there was no unallocated water available were assumed to be fully allocated. Similarly, overuse was usually implied through management arrangements in the plans. Those arrangements ranged from the control of non-entitlement water users, water inception activities and illegal use, to improved monitoring of water uses. We characterised a plan area as overallocated or overused if the whole area covered by the plan, or a water system or subsystem contained within the plan area, was identified in the plan as being in one of those categories. This review repeated a similar assessment undertaken in 2009.

The 2009 assessment identified overallocation (either of the whole area covered by the plan or of a subsystem) in 19 systems. A further 47 systems were identified as fully allocated.

Our 2011 review identified 104 systems as overallocated, overused or fully allocated (see Table 3.2). The increase results from a greater recognition of system stress, which is a necessary first step in addressing overuse and overallocation. It is mainly attributed to the commencement of new Victorian sustainable water strategies and New South Wales macro plans that cover multiple water sources. There are potentially another 11 overallocated systems in Victoria (where water recovery measures are planned), and 18 overallocated or overused systems in New South Wales (identified stressed rivers).

Jurisdiction	Status	2009	2011
ACT	Overallocated and/or overused		_
	Fully allocated		_
NSW	Overallocated and/or overused	7	8
	Fully allocated	28	34
NT	Overallocated and/or overused	-	-
	Fully allocated	_	1
Qld	Overallocated and/or overused	1	5
	Fully allocated	7	4
SA	Overallocated and/or overused	5	8
	Fully allocated	5	5
Tas.	Overallocated and/or overused	-	-
	Fully allocated	4	2
Vic.	Overallocated and/or overused	9	18
	Fully allocated	3	10
WA	Overallocated and/or overused	2	9
	Fully allocated	_	_
Total		71	104

	Table 3.2: Numbers of overallocate	d, overused and full	y allocated s	vstems identified in water	plans, 2009 and 2011
--	------------------------------------	----------------------	---------------	----------------------------	----------------------

Most plans identifying systems as overallocated, overused or fully allocated also include provisions and pathways to return the systems to sustainable levels of extraction. The likely effectiveness of the approaches identified varies.

South Australia is incorporating a range of measures to address overallocation in its more recent water plans, including, for example, reductions in existing licensed use and water recovery through irrigation efficiencies such as bore capping and rehabilitation.

Some water sharing plans in New South Wales include pathways to return systems to sustainable levels of extraction through the phasing out of supplementary water and the cancellation of licences over the course of the water plan (in effect, reducing entitlements). However, many other New South Wales water plans for fully allocated systems note that action to reduce entitlements will be taken in future, once the actual extraction level exceeds the long-term sustainable diversion limit. Extraction is managed by annual allocations rather than reduced entitlements.

Some Victorian water plans seek to address the overallocation of groundwater systems by capping the seasonal water allocations allowable where the system is over-entitled, rather than by reducing the consumptive pool volume to a diversion limit that is sustainable in the long term.

Responses that rely on annual allocation processes to avoid overuse may mitigate degradation in the short term but in effect undermine the reliability of water access entitlements and allocations in the longer term.

The challenge of overallocation and overuse in the Murray–Darling Basin was recognised by governments through the establishment of the MDBA and the passage of the Commonwealth Water Act. The 2004–2007 Sustainable Rivers Audit found that the ecosystem health of the vast majority of river valleys in the Murray–Darling Basin was poor to very poor. The Murray–Darling Basin Plan (see Box 3.5) is a historic opportunity to improve water management across Australia's most important water system, to deliver on the NWI commitment to achieving sustainable levels of extraction and to create an enduring framework for managing valuable water resources through climate variability. Meeting the challenge will be a critical test of the commitment of all Murray–Darling Basin jurisdictions. In many ways, the failure to address overallocation in the Murray–Darling Basin prior to these recent reforms was the result of a lack of real leadership as much as any weaknesses in the then existing governance arrangements. Success under the mechanisms established by the Water Act will still depend on the capacity of all governments to show strong leadership in making difficult decisions in the public interest across the Basin.

Box 3.5: The Murray–Darling Basin Plan

In developing a basin-wide plan for managing the Murray–Darling Basin, Australia has embarked on an undertaking unique in scale and scope. The Basin Plan will set new sustainable diversion limits for the basin's water resources and provide a mechanism to deliver more effectively economic, social and environmental outcomes across all catchments of the basin.

Completing the Basin Plan will boost Australia's capacity to manage water in an environmentally sustainable way, and will potentially produce profound benefits. The benefits will be felt nationally. If done well, the planning process is likely to become a model both in Australia and internationally.

In the Commission's 2009 biennial assessment, we recommended that the MDBA further clarify the intended planning processes and ground rules for developing the Basin Plan. We also identified the need for effective consultation with affected parties on what the plan will involve, in order to manage their expectations, provide some certainty and facilitate cooperation. In particular, we suggested greater public consultation, progressive releases of background and issues papers, and interim guidance from the MDBA on specific environmental, economic and social objectives or outcomes likely to be targeted in the plan.

In October 2010, the *Guide to the proposed Murray–Darling Basin Plan* was released. The subsequent intense community debate exposed the highly contested nature of the planning process and the fragility of the community support that is essential for the plan to be effective.

In December 2010, the Commission called for a renewed effort by stakeholders to engage with the basin planning process. On 1 April 2011, Murray–Darling Basin ministers agreed on the need to better align Commonwealth and state programs and policies aimed at improving water-use efficiency with infrastructure programs, recovery of water for the environment, and environmental water use in infrastructure. The ministers also resolved that principles be urgently explored to strengthen the involvement of local communities in the design and rollout of Commonwealth and state programs, and to explore opportunities for a more flexible approach to the delivery of programs.

We welcome the commitment of governments to engage with local communities, both in plan development and in plan implementation. However, we note that the return of the Murray–Darling Basin to a sustainable level of extraction will require real commitment by the MDBA and governments, and buy-in by communities, to change how the basin states manage the basin's water resources and to manage the resulting inevitable community adjustment.

Finding 3.5

While there has been improvement in recent water plans, jurisdictions remain reluctant to explicitly identify overallocated and overused systems and to fully implement measures to move them to sustainable levels of extraction. The development of the Murray–Darling Basin Plan is a historic opportunity to address overallocation at a whole-of-basin scale.

3.4 Recovery of water for the environment

The NWI sets out principles for recovering water where necessary to achieve environmental objectives (NWI clause 79(ii)).

The jurisdictions are following these principles by using a variety of options to achieve environmental outcomes, including purchasing water and improving water-use efficiency through infrastructure investments. Investments in works and measures can also improve the efficiency of the use of environmental water.

Most water recovery programs are directed at the Murray-Darling Basin.

The Sustainable Rural Water Use and Infrastructure Program is part of the *Water for the Future* initiative. Funded by the Australian Government, the program is investing up to \$5.8 billion in rural water infrastructure to improve the efficiency and productivity of rural water use and management, help secure a long-term sustainable future for irrigation communities, and deliver substantial and lasting returns of water to the environment. Water recovered through investments made by the program is shared between the Commonwealth (for environmental use), water providers and/or irrigators or is otherwise retained in the local area. Table 3.3. summarises state priority projects funded by the program.

Jurisdiction	Priority project description
Vic.	Stage 2 of the Northern Victoria Irrigation Renewal Program (up to \$1 billion). This is expected to save 200 GL of water, of which 100 GL will be returned to the Commonwealth for environmental use. It is proposed that savings above 200 GL will be shared equally between the Victorian and Australian governments.
SA	Coorong, Lower Lakes and Murray Mouth Project (\$200 million).
	Lower Lakes Integrated Pipeline Project (\$120 million)—completed.
	Riverine Recovery (\$100 million).
Qld	Community Irrigation (on-farm program) (\$115 million)—also called 'Healthy HeadWaters Water Use Efficiency Project'.
	Coal Seam Gas (\$5 million)—includes the Coal Seam Gas Water Feasibility Study.
NSW	\$221 million to upgrade the accuracy of water metering.
	\$50 million to improve the management of water on floodplains.
Commonwealth-led projects	NSW Private Irrigation Infrastructure Operators Program (\$650 million)—Round 1 funding of up to \$263 million, with the aim of recovering 65 550 ML.
	South Australia Private Irrigation Infrastructure Program (\$110 million)—expected to recover 875 ML from the first round of projects (\$3.4 million).

Table 3.3: State priority projects funded under the Sustainable Rural Water Use and Infrastructure Program

Note: Additional projects will be funded in the future in line with commitments made under the 2008 Intergovernmental Agreement on Murray-Darling Basin Reform.

The Restoring the Balance in the Murray–Darling Basin Program, another part of the *Water for the Future* initiative, is investing up to \$3.1 billion to purchase water entitlements so that the water allocated to them can be used for the environment. This water buyback program is providing immediate action for the basin's waterways. Water recovered under the program totalled some 1 000 GL at 31 May 2011 (Table 3.4).

Catchment	Entitlement type	Secured purchases (ML)	Expected average annual volume of water available for the environment (ML)	Average price per trade (\$/ML)
QId Border Rivers	Medium security	6 832	2 255	2 276
Campaspe	High reliability	5 710	5 425	2 299
	Low reliability	395	194	173
Condamine-Balonne	Water purchase tender closed on 21 I	Vlay 2010. Applica	nts have been advised of the ou	utcomes of their tenders.
Barwon–Darling	Unregulated	22 273	22 273	836
Goulburn–Broken	High reliability	119 570	113 592	2 232
	Low reliability	10 264	3 592	196
Gwydir	General security	88 520	31 867	2 239
	Supplementary	19 101	3 629	1 045
Lachlan	High security	733	733	n.a.
	General security	81 671	34 302	683
Loddon	High reliability	1 614	1 533	2 065
	Low reliability	644	174	200
Macquarie	General security	57 631	24 205	1 268
	Supplementary	1 888	397	161
Murrumbidgee	High security	103	98	2 400
	General security	111 107	71 108	978
	Supplementary	20 821	2 915	218
Namoi	General security	6 203	4 776	2 050
NSW Murray	General security above the choke	162 334	131 490	1 277
	General security below the choke	37 541	30 408	1 197
	High security below the choke	908	863	2 248
Ovens	High reliability	50	48	n.a.
SA Murray	High security	64 853	58 368	2 217
Vic. Murray	Above choke—high reliability	39 565	37 586	2 121
	Below choke—high reliability	113 404	107 733	2 209
	Above choke—low reliability	5 406	1 297	193
	Below choke—low reliability	5 762	1 383	199
Warrego	Unregulated	8 106	8 106	n.a.
Total		1 001 999	708 820	

Table 3.4: Water recovered under the Restoring the Balance buyback program (to 31 May 2011)

n.a. = not available

Source: DSEWPaC (2011h).

Water recovered for the environment from these programs is managed by the Commonwealth Environmental Water Holder. In 2009–10, annual allocations of water against entitlements were low compared to long-term averages. Despite that, the increased size of Commonwealth environmental water holdings allowed deliveries of environmental water to increase to 154 GL from 12.7 GL in 2008–09.

The Living Murray First Step Initiative was funded by Murray–Darling Basin states and the Australian Government. The initiative had a target for water recovery of an average 500 GL (long-term cap equivalent) of water per year. Significant progress has been made, and 478.97 GL has now been recovered and listed on the Environmental Water Register (see Table 3.5). A further 7.1 GL is to be recovered from projects still being implemented. The initiative also includes an environmental works and measures program to improve the health of the River Murray system by making the best use of water for the environment (MDBA 2011a).

State / authority	Type of project	Title of water recovery measure	Volume (GL; LTCE)
SA	Market-based	Securing Government Held Water and Purchases from Willing Sellers	17
SA	Market-based	Securing Government Held Water for Environmental Use	13
SA	Market-based	Purchase from Willing Sellers	5
NSW	Market-based	Murray Irrigation Limited Supplementary Water Access Licence	17.8
NSW	Infrastructure	Pipe-it	0.16168
NSW	Market / infrastructure	NSW Package B	561
NSW	Market-based	NSW Market Purchase Measure	115.27
NSW	Infrastructure	NSW Wetlands Water Savings Stage 1	0.550
NSW	Market-based	Tandou Limited Supplementary Water Access Licence	9.3
Vic.	Regulatory / infrastructure	Goulburn Murray Water Recovery Package	144.9
Vic.	Infrastructure	Shepparton Irrigation Area Modernisation Project	29.3
Vic.	Infrastructure	Lake Mokoan	28.12
DSEWPaC	Infrastructure	Water Through Efficiency Tender	0.17577
MDBA	Infrastructure	Ricegrowers' On-farm Water Efficiency Round 2	6.274
MDBA	Market-based	Living Murray Water Purchase	18.646
MDBA	Infrastructure	Ricegrowers' On-farm Water Efficiency Round A1	1.1856
MDBA	Market-based	Pilot Market Purchase Measure	13.285
MDBA	Market-based	Sustainable Soils & Farms On-farm Reconfiguration Demonstration	3.026
Total volume on E	478.97		

Table 3.5: Water recover	y measures listed on	The Living Murra	y Environmental	Water Register
--------------------------	----------------------	------------------	-----------------	----------------

DSEWPaC = Department of Sustainability, Environment, Water, Population and Communities; LTCE = long-term cap equivalent. Source: MDBA (2011a).

The states also manage and fund water recovery programs, in some cases in partnership with other governments:

- + The New South Wales Rivers Environmental Restoration Program (\$181.12 million) has recovered more than 100 GL of water. Subprograms include the New South Wales Riverbank, which is purchasing water entitlements for the environment, and Pipeline New South Wales which is replacing open channels and dams with piped systems, tanks and troughs. Other investments are in science, infrastructure, community engagement and the purchase of land to maximise the benefits of the water purchased.
- + The New South Wales Wetland Recovery Program (\$26.8 million), a partnership between the New South Wales Government and the Australian Government's *Water for the Future* initiative, has purchased more than 9.3 GL of water for the Gwydir Wetlands and the Macquarie Marshes.
- + The Water for Rivers program established by the New South Wales, Victorian and Australian governments has acquired around 263 GL of water for the Snowy and Murray rivers.
- + The Northern Victorian Irrigation Renewal Project is recovering water by upgrading infrastructure in the Goulburn–Murray Irrigation District. This investment aims to recover long-term average annual water savings of 425 GL by increasing irrigation water-use efficiency. A third of Stage 1 water savings (75 GL) and half of Stage 2 water savings (estimated to be 100 GL) will be used for the environment.

While the Commission strongly supports water recovery measures, we remain concerned that water recovery initiatives to date are often being undertaken without a clear target level determined through water planning. This means that the extent of overall adjustment can be unclear for entitlement holders. Even where a recovery target exists, it has often not been determined through the transparent trade-off process undertaken as part of water planning to balance environmental needs with economic and social needs.

The Murray–Darling Basin Ministerial Council at its 27 May 2011 meeting asked the MDBA to consider aligning the commencement dates for sustainable diversion limits (SDLs) through catchment water resource plans in all states to 2019. Under such an arrangement, it will be important to give entitlement holders clarity about how the Commonwealth's water recovery programs will operate at the catchment scale to deliver the SDLs identified in the Basin Plan during the period to 2019.

Government investment in infrastructure renewal is a significant component of the main mechanisms adopted by the Australian Government and some state governments to recover water for the environment. Such investments involve a cost per unit of water materially greater than the purchase of water entitlements in the market. While they may deliver public or private benefits beyond the recovery of water for the environment, decision making on the use of such interventions is not always transparent and their net benefit to the community is generally not demonstrated.

In 2009, the Commission articulated a set of principles for government subsidies of irrigation assets (NWC 2009a). They remain valid:

- + Government contributions to investments should be proportional to the value of the public benefits produced by the investments, and the public benefits should be transparently estimated.
- + Where government provides capital funding for investments that produce private benefits, the full costs (including a return on capital) should be recovered from the beneficiaries over the life of the project using consistent methods.
- + Water users should be fully informed about the immediate and future implications for water charges and should be engaged in the decision making process.

Finding 3.6

There has been a substantial increase in the level of water recovery for environmental purposes, most significantly through the Commonwealth's buyback.

Irrigation infrastructure investment is unlikely to be the most economically efficient mechanism for water recovery. While there may be benefits unrelated to water recovery from such investments, a rigorous economic assessment of the full benefits and costs (including external benefits and costs) should be undertaken to demonstrate to taxpayers that those investments are worthwhile.

3.5 Increased security of environmental water

The parties to the NWI agreed that statutory recognition of the environment's requirements for water is a crucial step towards increasing the security of environmental outcomes (NWI Clause 23(iii)). Recognising the environment as a legitimate user of water helps ensure that water-dependent ecosystems are considered in management decisions.

All jurisdictions have legislated for the statutory provision of environmental water for surface water and groundwater systems (Box 3.6, Table 3.6). This is often defined in water plans. In some cases, environmental water is not specifically defined, but is provided for through rules in the plans. In those cases, under an active water plan the environmental water is as secure as entitlements. In some jurisdictions environmental water requirements are met through a combination of held and planned water in the one system. Non-environmental or consumptive entitlements can be delivered in a way that contributes significantly to the environmental water requirements of a system. The increasing number of statutory water plans that are operational, and the improvement in the specification of the water regime under those water plans, mean that greater security is being provided to environmental water.

Box 3.6: Planned and held environmental water

Planned environmental water

Jurisdictions commonly make their environmental water provisions through the establishment of annual allocation limits (or caps) on extraction and access rules, in both surface water and groundwater systems. Allocation limits and access rules constrain the volume that can be extracted, usually under water access entitlements, in a set period (usually a water year). The limits and rules are a significant form of environmental water commitment, constraining the consumptive use of the resource to leave enough water to meet in situ environmental water requirements. In addition to allocation limits, jurisdictional water plans can include a suite of water allocation criteria and transfer rules to help achieve sustainable management of the resource.

Environmental water is commonly documented in water plans as rules-based commitments (such as cease-to-pump rules, flow sharing arrangements, passing flow releases, environmental water allowances and storage operation rules). All jurisdictions have documented environmental water commitments (in varying degrees of detail) in their water plans. It can be difficult to determine the extent to which planned environmental water is being made available, as most reporting methodologies suit water managed through entitlement provisions.

Held environmental water

Aside from rules-based management, in some jurisdictions entitlements have been set aside in water plans, purchased or created through water savings, to be used for environmental purposes where a high level of competition for water resources exists within a system. Entitlements may be held on behalf of the environment (in some cases, designated as environmental entitlements), to be used to contribute to specific environmental objectives for a system or a site. The water allocations that accrue to those entitlements are delivered to achieve environmental outcomes specified on an annual basis, typically under advice from an environmental watering working group (such as The Living Murray Environmental Watering Group, environmental water advisory groups in New South Wales, catchment management authorities and natural resource management boards). In the case of the CEWH, environmental outcomes may be specified on a immediate (operational), intermediate (rolling annual) and long-term basis, in consultation with state governments and other environmental water holders, catchment management authorities, local site managers and community organisations.

Table 3.6: Methods fo	r defining and	l providing	environmenta	water
-----------------------	----------------	-------------	--------------	-------

Jurisdiction	Method
ACT	Planned: planned environmental water is defined through the statutory Environmental flow guidelines.
NSW	Planned: statutory water sharing plans establish extraction limits and environmental water rules.
	Held: water licences have been purchased or recovered for environmental purposes.
NT	Planned: statutory water allocation plans must include an environmental allocation that is within the estimated sustainable yield.
Qld	Planned: the concept of 'environmental water' is not explicitly defined. However, statutory water resource plans must include environmental flow and water allocation security objectives, while statutory resource operations plans contain rules that achieve environmental objectives. In practice, resource operations plans incorporate a range of rules that are consistent with 'planned environmental water'.
SA	Planned: planned environmental water is not explicitly defined. However, statutory water allocation plans contain rules that achieve environmental objectives.
	Held: environmental water is also secured through The Living Murray and Commonwealth Environmental Water Holder programs. Volumes may be donated from private holdings. Water allocations under water allocation plans can specify an environmental purpose.
Tas.	Planned: water management plans and issues of entitlements under the state's Water Management Act 1999.
Vic.	Planned: groundwater management plans establish permissible consumptive volumes and streamflow management plans establish sustainable diversion limits to define environmental water.
	Held: environmental water is secured through environmental entitlements and passing flow obligations in systems with bulk entitlements.
WA	Planned: mostly groundwater systems that deliver environmental outcomes through the use of allocation limits.

Source: Adapted from NWC (2010f).

The recent extended drought put pressure on all systems and exposed weaknesses in water planning and management under conditions of extreme water shortage. In some areas, existing water plans did not provide appropriate arrangements for the prevailing conditions, and emergency interventions resulted in the suspension of water plans or the 'qualification' of entitlements as discussed in Chapter 1 (see also Appendix A, indicator 1.1).

While such emergency measures may have been necessary, the Commission remains concerned that the security of entitlements (including entitlements for consumptive use and entitlements for the environment) will again be severely reduced in the next dry period. If plans cannot respond effectively to extreme conditions and do not transparently articulate how they will operate outside planning assumptions, then the security of water for the environment is diminished.

We also note that there have been some instances in which emergency decisions involving the reallocation of environmental water were not clearly justified. For example, in the Wimmera River in Victoria, the timing of environmental water releases was constrained because preference was given to the delivery of water for stock and domestic purposes. In August 2006, there were significantly low storage levels in the system and much community pressure to reallocate environmental water to consumptive users. The Victorian Government decided to withhold releases of environmental water so that the water was available for use in emergency supply scenarios. This resulted in a significant decline in river health (Christie 2007). However, the Victorian Auditor-General found that the environment had been unnecessarily put at risk by a lack of action and limited accountability by the water controller (Victorian Auditor-General 2010).

See appendixes A (indicator 3.2) and B (clause 35) for further detail on how NWI parties have addressed their commitments to improve the level of security of water for environmental and other public benefit outcomes.

Finding 3.7

NWI statutory reforms for water planning and entitlements have improved the security of environmental water. However, some plans were unable to respond effectively to the recent drought. These weaknesses need to be addressed if NWI parties are to implement fully their commitment to providing equal security for environmental and irrigation entitlements.

3.6 Environmental water management

Under the NWI, the parties agreed that delivering environmental and other public benefit outcomes requires:

- + the establishment and equipping of accountable environmental water managers with the necessary authority and resources to provide sufficient water at the right times and places (clause 78(ii))
- + the periodic independent audit, review and public reporting of the achievement of those outcomes and of the adequacy of the water provision and management arrangements (clause 79(i)(d)).

For this assessment, the Commission focused on whether the key requirements for managing environmental water effectively are being met, including whether:

- + accountable environmental water managers have been established, with the necessary resources and authority to manage environmental water effectively
- + effective monitoring, evaluation and reporting arrangements are in place.

During our assessment, it was clear that while the NWI has influenced the development of frameworks and systems for improved water management across Australia and that many of the frameworks, policies and strategies agreed to in the NWI are in place, the full impact of those arrangements will not be seen until there is another extended dry period.

3.6.1 Accountable environmental water managers

All jurisdictions have environmental water holders or managers responsible for administering environmental water, either within a new organisation or in an existing organisation (see Table 3.7). Because environmental water managers usually operate within government agencies, they often have a variety of roles and responsibilities in addition to managing environmental water; that arrangement may affect their authority and independence.

Jurisdiction	Environmental water manager
Commonwealth	Commonwealth Environmental Water Holder, MDBA (The Living Murray)
ACT	Environment Protection Authority (Department of the Environment, Climate Change, Energy and Water)
NSW	Office of Environment and Heritage
NT	Department of Natural Resources, Environment, the Arts and Sport (Controller of Water Resources)
Qld	Department of Environment and Resource Management
SA	Department for Water
Tas.	Department of Primary Industries, Parks, Water and Environment
Vic.	Catchment management authorities / Melbourne Water, Victorian Environmental Water Holder
WA	Department of Water

Table 3.7: Environmental water managers for each jurisdiction

Source: Adapted from NWC (2010f).

In the 2009 biennial assessment, the Commission found that in many jurisdictions the identity, role and responsibilities of the environmental water manager were not clear to stakeholders and the community in general, and this reduced its accountability for its performance. Since then, some improvements are evident—particularly in Victoria, which has created the Victorian Environmental Water Holder, and in the heightened profile of the Commonwealth Environmental Water Holder (CEWH).

The Victorian Environmental Water Holder was created under legislation passed during 2010, and commenced operation from July 2011 as an independent body responsible for:

- + holding and managing environmental water entitlements and allocations
- + coordinating the delivery of Victorian-held entitlements with those held by the Australian Government to maximise ecological benefits
- + making adaptive, responsive and timely decisions about where and when environmental water is delivered
- + managing environmental water entitlements in a way that optimises the benefits, reducing the need for government investment in further water recovery
- + trading water where there is a benefit to the environment
- + drawing on the priorities identified by catchment management authorities in consultation with local communities to identify state-wide priorities.

The CEWH was established through the *Water Act 2007* (see Box 3.7). While the CEWH can operate across Australia, the focus of its activities has been in the Murray–Darling Basin. In the absence of the environmental watering plan that will form part of the Basin Plan, the CEWH manages environmental water in conjunction with other environmental water managers in the basin states to align with local environmental management objectives and coordinate the delivery of environmental water, including water held by other jurisdictions for environmental purposes (CEWH 2010a). While the CEWH provides annual reports on its watering activities, the relationship between those activities and the water plans in operation in the relevant region is not clear from the reports.

Once the environmental watering plan for the basin is in place, accountability and the clarity of links between environmental objectives and environmental watering activity in the Murray–Darling Basin should improve. The Water Act requires the MDBA to identify and account for held environmental water in the Murray–Darling Basin for each financial year. However, a large number of bodies are involved in managing environmental water at regional, state and federal levels, and their roles, powers and interrelationships are not defined in a coherent way.

Box 3.7: Managing the Commonwealth's environmental water holdings

The Commonwealth Environmental Water Holder (CEWH) is within the Department of Sustainability, Environment, Water, Population and Communities. The CEWH manages Commonwealth-owned water recovered through the Restoring the Balance in the Murray–Darling Basin and Sustainable Rural Water Use and Infrastructure programs (part of the *Water for the Future* initiative) to achieve environmental outcomes.

Water access entitlements are purchased on the water market or acquired through infrastructure upgrades. The criteria for purchases are:

- + the ability of entitlements to provide more water in a catchment where scientific evidence indicates that water needs to be recovered for the environment
- + the capacity to deliver the water for an environmental benefit
- + the costs involved in purchasing the entitlement (with reference to the prevailing market price).

Although the *Water Act 2007* allows the Commonwealth to purchase and hold water outside the Murray–Darling Basin, it has not yet done so. The CEWH therefore holds no water entitlements outside the Murray–Darling Basin.

Proposals for environmental watering are assessed against criteria outlined in the Framework for Determining Commonwealth Environmental Watering Actions:

- + the ecological significance of the asset
- + the expected ecological outcomes from the proposed watering action
- + the potential risks of the proposed watering action at the site and at connected locations
- + the long-term sustainability of the asset, including appropriate management arrangements
- + the cost-effectiveness and operational feasibility of the watering.

The Environmental Watering Plan for the Murray–Darling Basin, which is part of the Murray–Darling Basin Plan, will coordinate watering by the CEWH and all other environmental water holders and managers within the basin once the plan is released.

An expert committee (the Environmental Water Scientific Advisory Committee) advises the CEWH and the Australian Government on the use of held environmental water for environmental watering priorities, based on proposals put forward by basin states and other groups. The CEWH then makes a decision on the approval of a watering event, based on the water allocations available in the relevant water year.

The CEWH's water is delivered by state-based water managers through existing delivery mechanisms. Basin states and other relevant bodies are responsible for monitoring and reporting back to the CEWH. This includes reporting on the delivery of the watering event, as well as the short-term ecological response to it. The monitoring and reporting requirement varies depending on the type of watering event.

The CEWH provides details on the outcomes achieved by individual watering events in an annual report to the Water Minister; the report is tabled in parliament (CEWH 2010a, 2010b).

Outside the Murray–Darling Basin, there is limited clarity about the identity, role and resourcing of environmental water managers. While water plans in Western Australia, Queensland and Victoria set out responsibilities, tasks and timeframes for managing water, including environmental water, the resources required or committed to environmental water management are not set out. Plans assume that the necessary work will be done within relevant government departmental budgets.

Finding 3.8

The creation of the Commonwealth Environmental Water Holder and reforms at the state level, particularly in Victoria, are landmark developments in improving the resourcing and profile of environmental water managers. In many parts of Australia, the roles, responsibilities and accountability for environmental water management remain unclear.

3.6.2 Monitoring and reporting

Parties to the NWI committed to the adaptive management of surface water and groundwater systems to meet agreed outcomes. More specifically, they committed to monitoring the performance of water plans against objectives, outcomes and water management arrangements (NWI clause 40(i)). Monitoring and the evaluation and reporting of monitoring results are essential in determining whether stated environmental water provisions have been achieved.

Most water plans lack systematic protocols for monitoring, evaluation and reporting against their intended outcomes, especially their environmental outcomes. Failure to develop and implement a monitoring strategy aligned with the objectives of a plan makes it very difficult to determine whether the objectives are being achieved.

Monitoring

This assessment has found that monitoring activities are not necessarily linked to the intended outcomes of individual water plans. This can result in poorly targeted analysis and reporting and produce information that cannot be used to assess the success of a water plan and the achievement of environmental objectives. In addition, the available resources are often insufficient for adequate monitoring.

Building an adequate time series of monitoring data is also important to the capacity of water managers to adapt environmental water management to respond to changes in conditions. Incorporating adaptability into water plans and being able to adjust them in response to new information is a key step for achieving long-term sustainable water management.

Some newer plans include mechanisms to incorporate improved knowledge or new data from monitoring (as opposed to waiting for the plan review cycle). For example, the Gingin Plan, Gnangara Plan and South West plans in Western Australia and the Katherine Water Allocation Plan in the Northern Territory have built-in triggers for changing the plans' strategies based on monitoring. In addition, several plans, including the draft Western Region Sustainable Water Strategy in Victoria, foreshadow potential changes when the plan is next reviewed and knowledge has improved.

Most plans assessed for this report rely on general state programs for monitoring water extraction, flows, water levels, water quality and ecosystem condition (see Table 3.8). The Western Australian and Northern Territory plans spell out additional resource and ecosystem monitoring tailored to the requirements of the plan.



Figure: Maules Creek 3D geological model looking east, sliced along the Namoi River. Green indicates bedrock, yellow zones are predominantly clay, and blue zones are high water yielding sands and gravels.

Table 3.8: Examples of monitoring and reporting on plan performance

Jurisdiction	Monitoring and reporting arrangements for water planning
NSW	The NSW Office of Water undertake monitoring and reporting of general water sharing plan performance, including achievement of environmental and other public benefit outcomes. Detailed progress reports have been developed for only a small number of plan areas to date. A state-wide monitoring and evaluation framework is currently being developed, as is a framework for the setting of more specific ecological objectives in plans, but this is not presently integrated within each plan. In addition, there is some reporting in annual reports on the progress of plan implementation.
WA	The South West plan describes a resource monitoring program consisting of the monitoring of groundwater levels and quality across the aquifer systems, and the monitoring of vegetation condition in key groundwater-dependent wetlands and terrestrial systems. The Gingin plan describes a resource monitoring program consisting of the ongoing monitoring of river flows and levels at three points.
	Performance indicators for the plans are linked to specified resource monitoring parameters and triggers, as well as other measures such as the use of water entitlements.
	Annual reports are to be prepared and published for each plan, setting out monitoring and performance data and the status of plan implementation.
SA	Monitoring arrangements are set out in the reviewed plans. For example, the Barossa plan monitoring is linked to a regional monitoring, evaluation and reporting framework. Results of monitoring will be reported at least every three years. These arrangements relate to monitoring of the resource generally, and defined, measurable performance indicators for the objectives of the plans are absent.
Tas.	Monitoring of plans is based on monitoring what the agency does under existing state programs (generally streamflow and groundwater level monitoring).
	Streamflow monitoring is the key monitoring component for assessing the performance of a plan.
	Other specific performance indicators for plan objectives are not defined. However, annual reports on the effectiveness of the plans in meeting their objectives are to be prepared.
NT	Monitoring and reporting requirements are detailed in an appendix to the plan.
Qld	Monitoring of the achievement of plan objectives in water resource plans and resource operations plans is required by the state's Water Act. Monitoring of environmental health is generally the responsibility of the Department of Environment and Resource Management, while water service providers monitor and report on extractions, water quality and groundwater levels if appropriate. Metering is required for all volumetric allocations and is slowly being introduced where it is not already in place; the department is responsible for monitoring in unsupplemented areas.
	The status of plans is reported annually.
Vic.	Monitoring of resource condition is undertaken outside the water strategy framework for streamflow and groundwater management plans, water supply and demand strategies, regional catchment strategies and river health strategies.

Environmental water needs projects undertaken by the Commission have highlighted the lack of a strategic approach to data collection and of a commitment to long-term monitoring and evaluation. Those shortcomings reduce the capacity for evidence-based decision making.

Groundwater monitoring, in particular, is generally more expensive and less extensive than monitoring in surface systems. There is also evidence that infrastructure in many parts of Australia is ageing and there are no clear investment plans to manage a deteriorating network. Our capacity to understand the impact of management decisions is reduced as a consequence.

The COAG Draft NWI Policy Guidelines for Water Planning and Management promote the use of appropriate monitoring, noting that the level of monitoring should be risk based (that is, proportionate to the nature of the water resource and the consequences of its use). In high-use areas or where there are significant environmental assets, extensive bore networks, gauging stations and regular monitoring are required; in lower use areas, fewer bores and stations and less monitoring will be required, but the requirement should be reviewed regularly.

Reporting

Most jurisdictions report annually on the performance of water management, to varying levels of detail, at a drainage basin or plan area scale. The reports are usually issued 6–18 months after the end of the water year.

The annual water reports prepared by jurisdictions rarely explicitly state the level of compliance with planned environmental water commitments and the reports are not typically publicly available (NWC 2010f).

Queensland publishes annual reports on plan implementation and performance, including against environmental provisions, and Western Australia is about to begin doing the same. South Australia states that such reports are to be published every three years, and Victoria publishes such reports on an ad hoc basis. New South Wales has some general reporting on plan implementation in departmental annual reports.

The timeframes involved in detecting ecological responses and changes in condition are often longer than a year, so reports that focus only on the activities in a water year make assessments of performance against water plan objectives difficult (NWC 2010f).

The *Commonwealth environmental water 2009–10 outcomes report* (CEWH 2010a) is a public report on the results of recent watering events undertaken in conjunction with local water managers. The report describes direct impacts on the health of water-dependent ecosystems from environmental watering events. See Box 3.8 for an example. Because of the drought, the main aim of 2009–10 watering was to avoid critical losses of threatened species, avoid irretrievable damage or catastrophic events, and maintain key refuges to allow recolonisation when conditions improved.

The report notes that, while the full results of Commonwealth environmental watering will take some years to emerge, early monitoring indicates that environmental water has produced benefits, such as improved canopy cover and health in river red gums, as well as drought refuges for rare and endangered flora and fauna. However, the reporting does not draw a clear link between environmental watering outcomes and the environmental objectives contained in relevant state water plans.

In 2010, the Commission released the *Australian environmental water management report 2010* (NWC 2010f), a comprehensive and authoritative statement of the environmental water management arrangements in Australia at 30 June 2010. The report documents the often complex mechanisms involved in managing environmental water. By providing a baseline of current jurisdictional arrangements for monitoring and reporting on environmental water management, it is a first step in supporting more transparent and accountable environmental outcomes.

The Commission is completing two follow-up reports (due later this year) to promote improved practices and improved environmental water reporting. *The Australian environmental water management report 2011: Stage 2 report* will identify the characteristics of successful environmental water management and related criteria, and the *Australian environmental water management report 2011: Stage 3 report* will investigate and report the extent to which each NWI party is meeting criteria outlined in the Stage 2 report.

See Appendix B (clauses 39–40) for further detail on how NWI parties report on the achievement of environmental and other public benefit outcomes.

Finding 3.9

Accountability for environmental outcomes remains weak. In particular, monitoring capacity is often inadequate and there is a lack of transparent reporting of outcomes.

Box 3.8: Reporting on outcomes of watering events at Hattah Lakes, Victoria

Hattah Lakes is a complex of 20 freshwater lakes about 50 kilometres south-east of Mildura, Victoria. The site is recognised nationally in *A directory of important wetlands in Australia*, and 12 of the lakes are recognised internationally under the Ramsar Convention. Hattah Lakes provides important feeding, nesting and breeding habitat for more than 50 waterbird species, including the freckled duck (*Stictonetta naevosa*), Pacific black duck (*Anas superciliosa*), grey teal (*Anas gracilis*) and Australian pelican (*Pelecanus conspicillatus*). The river red gum forests fringing the wetlands also provide habitat for the threatened regent parrot (*Polytelis anthopeplus*).

To make water delivery to Hattah Lakes more efficient, works funded through The Living Murray Environmental Works and Measures Program are being constructed. The work will include lowering the inlet to Chalka Creek to allow more frequent flows from the River Murray into the lakes, and a permanent pump station to deliver water at a low cost to the lakes during long periods of low river flow. Regulators and levees will also be built to hold water at higher levels in the lakes.

Watering actions in 2009–10 at Hattah Lakes were based on proposals put forward by the Victorian Department of Sustainability and Environment. A total of 12.9 GL of environmental water was delivered to Hattah Lakes, of which the Commonwealth contributed 7.06 GL, The Living Murray program contributed 2.34 GL and the Victorian Government contributed 3.1 GL. Public donations through the Australian Conservation Foundation contributed 0.4 GL. Four of the 13 lakes inundated in 2009–10 had not received water for 14 years.

The delivery of environmental water and ecological monitoring at Hattah Lakes were managed by the Victorian Department of Sustainability and Environment, the Mallee Catchment Management Authority and Parks Victoria.

The key aims of environmental watering at Hattah Lakes in 2009–10 were to provide drought refuge for a range of water-dependent species, such as waterbirds and frogs, and to prevent further decline in stressed river red gum forests. An additional aim was to build on the ecological benefits achieved from previous Commonwealth environmental watering actions in 2008–09, which delivered 4.9 GL to four lakes and included 2.12 GL of Commonwealth environmental water. That water supported river red gum forests that fringe the lakes and provided effective drought refuge for waterbirds. Aquatic vegetation responded strongly, supporting increased macroinvertebrate and fish communities.

River red gum health continued to improve following the 2009–10 watering. By December 2009, the inundated area at the site was 586 hectares. The extent of inundation was increased during 2010 to approximately 1089 hectares. This led to a greater inundation of stressed river red gum forests and other wetland vegetation. The trees fringing the watered lakes have exhibited vigorous foliage growth and increased canopy cover. Monitoring conducted by the Mallee Catchment Management Authority has shown that aquatic vegetation is also responding well, supporting an increase in aquatic insects and frogs.

Waterbirds have flocked to the lakes in their thousands since the water was delivered. Waterbird surveys by The Living Murray program at the site have observed more than 3200 birds, including state-listed threatened species such as the Australasian shoveler (*Anas rhynchotis*), the blue-billed duck (*Oxyura australis*) and the musk duck (*Biziura lobata*). Waterbird diversity and abundance at Hattah Lakes peaked following the delivery of environmental water. A survey of frog calls identified five frog species: the Peron's tree frog (*Litoria peronil*), eastern banjo frog (*Limnodynastes dumerilii*), plains froglet (*Crinia parinsignifera*), spotted marsh frog (*Limnodynastes tasmaniensis*) and common spadefoot toad (*Neobatrachus sudelli*).

In addition to the ecological benefits of the watering actions, the regeneration of the wetlands is likely to provide social and economic benefits for the broader regional community, such as improved water quality and increased tourism and recreation opportunities.

Hattah Lakes, like many wetlands in the Murray–Darling Basin, has suffered from many years of drought, river regulation and overextraction. Environmental watering by the Commonwealth and others is helping to ensure that the environmental values of this important site are maintained.

The Commonwealth delivered a further 9.34 GL of environmental water to Hattah Lakes in early 2010–11 to continue to support the site.

Source: CEWH (2010a) updated.

Summary of findings

Finding 3.1

Since 2004, there has been a material improvement in knowledge and understanding of Australia's water resources. There remains a significant gap in our knowledge of ecosystem responses to changes in flow. This knowledge is critical to the capacity of environmental water managers to effectively plan, monitor and review environmental watering.

Finding 3.2

Over recent years, considerable effort has been made to increase our knowledge of groundwater systems from what was a low base. Continued investment in groundwater science and knowledge to improve management practices remains a priority.

Finding 3.3

While all jurisdictions have developed policies for managing connected surface water and groundwater systems, the implementation of effective conjunctive management remains limited and the understanding of connectivity in individual systems is still inadequate in many areas.

Finding 3.4

The specification of objectives in water planning is continuing to improve. Some recent water plans articulate clear environmental water objectives that are measurable and connected to other provisions in the plans. Nationally, there continue to be inadequacies in the transparency of plan objectives.

Finding 3.5

While there has been improvement in recent water plans, jurisdictions remain reluctant to explicitly identify overallocated and overused systems and to fully implement measures to move them to sustainable levels of extraction. The development of the Murray–Darling Basin Plan is a historic opportunity to address overallocation at a whole-of-basin scale.

Finding 3.6

There has been a substantial increase in the level of water recovery for environmental purposes, most significantly through the Commonwealth's buyback.

Irrigation infrastructure investment is unlikely to be the most economically efficient mechanism for water recovery. While there may be benefits unrelated to water recovery from such investments, a rigorous economic assessment of the full benefits and costs (including external benefits and costs) should be undertaken to demonstrate to taxpayers that those investments are worthwhile.

Finding 3.7

NWI statutory reforms for water planning and entitlements have improved the security of environmental water. However, some plans were unable to respond effectively to the recent drought. These weaknesses need to be addressed if NWI parties are to implement fully their commitment to providing equal security for environmental and irrigation entitlements.

Finding 3.8

The creation of the Commonwealth Environmental Water Holder and reforms at the state level, particularly in Victoria, are landmark developments in improving the resourcing and profile of environmental water managers. In many parts of Australia, the roles, responsibilities and accountability for environmental water management remain unclear.

Finding 3.9

Accountability for environmental outcomes remains weak. In particular, monitoring capacity is often inadequate and there is a lack of transparent reporting of outcomes.



4 Communities

NWI elements discussed in this chapter



4 Communities

Summary of impacts

NWI-consistent water access entitlements, unbundled from land titles, have created a recognised and valuable business asset. Those reforms have increased access to business finance, made investment in water-efficiency measures more cost-effective, and had flow-on benefits for rural communities.

Reforms delivered under the NWI have helped make irrigation communities more resilient in dealing with changes in water availability and economic circumstances. There is evidence that, during the recent drought in south-east Australia, irrigation communities remained significantly more viable than they would have been without the reforms.

The NWI provided communities with a clear blueprint for reform to which all governments were committed. NWI principles had, and continue to command, a high degree of stakeholder support from a wide range of perspectives. However, delays in delivering on NWI commitments, inconsistent implementation and poorly managed community engagement processes have weakened community confidence in water governance systems.

The urban water sector is now more sophisticated in its approach to supply and demand management, and there are examples of urban utilities engaging in innovative approaches to integrated water management. These developments have highlighted the need for clear objectives to be set for the urban water sector and for the roles and responsibilities of different water agencies to be better delineated.

Major capital investments have improved the security of water supply in Australia's urban centres through the augmentation and increasing diversity of available supply options, including increased access to less rainfall-dependent water sources. However, there is evidence that ad hoc government interventions and policy constraints have undermined community confidence that they are receiving value for money services.

Australians continue to have access to high quality and safe drinking water supplies in the vast majority of communities. Jurisdictions are moving towards best-practice risk-based systems of regulation. The growth of more diverse water supply sources and scientific developments demand more adaptive and collaborative approaches to water quality regulation.

Communities are affected by the decisions of water planners, by regulatory processes, through water markets, and through the actions of water service providers and water entitlement holders.

NWI reforms to the management and use of water in Australia were intended to balance economic, environmental and other interests, to provide greater certainty about access to water, and to achieve social and economic outcomes that would benefit all communities.

Water reform actions are likely to have their greatest impact in communities whose water resources are overallocated or overused and communities that are heavily dependent on water as an economic input. For all communities, the impacts of water reform will be felt alongside, and interact with, other short-term changes (such as changes in water availability and commodity prices) and long-term changes (such as sociodemographic and climatic changes). For communities less dependent on water as an economic input, the effects of NWI reforms have been minimal.

4.1 Rural communities

As part of the 2011 biennial assessment, the Commission assessed the impact of the implementation of the NWI on rural communities, including their:

- + confidence in water rights
- + engagement in water planning and implementation
- + capacity to adapt to changes in water availability.

4.1.1 Confidence in water rights

The NWI entitlement framework, along with participatory planning processes, was intended to provide sufficient confidence in water management to enable irrigation-dependent communities to make the longer term business, social and family decisions required to sustain and build local and regional economies. Water planning and entitlement reform was intended to underpin efficient water use and investment decisions, and to ensure that water rights could be used as collateral to access business finance.

NWI parties agreed to establish water access entitlements and water plans that are based in statute and have agreed characteristics. Those reforms have enhanced the security and commercial certainty of entitlements, and stakeholder confidence in water plans. In turn, this has led to multiple positive impacts on rural communities.

Our review has found evidence that entitlement reforms have delivered benefits to individuals and businesses, and indirectly to their communities. For example, in a study conducted for this assessment, Marsden Jacob Associates modelled water exchange and survey data from the Goulburn–Murray Irrigation District and Murrumbidgee Irrigation Area. The study found that there has been an appreciable increase in the volumes and prices of water traded on the allocation and entitlement markets. Marsden Jacob Associates concluded that the creation of NWI-compliant entitlements is likely to have increased the value of water property rights and reduced the transaction costs of making water trades, and thus delivered benefits both to individual entitlement holders and to their communities.

The study also noted that the creation of NWI-compliant entitlements enabled increased farm investment by creating a new asset class that can be used as collateral for investment loans, and encouraged investment that reduces water input by increasing the value of water. That finding is supported by several case studies we undertook as part of our 2010 assessment of the impacts of water trading, which show that more secure water assets, and the ability to sell water separately from land, have enabled entitlement holders to retire debt and to refinance or restructure business enterprises (NWC 2010g).

In particular, our assessment found that water trading provided important economic benefits to local and regional communities, and that sales of water injected cash into many local economies. Water trading helped New South Wales rice-growing communities and some Victorian dairying communities to respond to drought and commodity price declines. It also enabled the development of new horticultural enterprises and facilitated significant expansion in economic activity around Robinvale in Victoria's Sunraysia region.

However, water trading is only one of many factors affecting regional communities. Our report on the impacts of water trading found that changes in broad economic and social indicators, such as population and employment in agriculture, were similar across regions, which suggests that other factors such as drought and demographic changes are more influential (NWC 2010g).

Finding 4.1

Rural communities have benefited from water access entitlements and trade reforms under the NWI, which have created a recognised and valuable business asset. This has increased irrigators' (and other entitlement holders') options for managing their businesses through short-term and longer term structural change.

4.1.2 Community engagement in water planning

Successful water plans foster community support and trust through consultative and transparent plan development and transparent and accountable implementation. NWI-consistent water plans should generate confidence in communities through transparent decision making on water allocations among competing users and through transparent mechanisms for accountable water plan implementation.

Several studies and assessments testify to the importance to communities of inclusiveness in consultations (for example, Tan et al. 2010). Other studies indicate that a lack of inclusiveness in consultations can pose a threat to the acceptance and success of a plan. For example, if significant stakeholders are not involved in planning, or feel that their values and requirements were not considered, they are not likely to align their activities to achieve the objectives of the plan. Furthermore, they may seek to have their values and requirements considered after the plan is completed, which can threaten its integrity. In some cases, individuals or groups of individuals have lobbied separately or together for a water plan to be reviewed or even rejected (Hamstead, Baldwin and O'Keefe 2008).

Where there is strong competition for water resources, water plans necessarily involve difficult decisions about the balance of competing water uses. In such communities, it is critical that community groups and individuals are given appropriate opportunities to identify their economic, social and environmental values related to water, to deliberate and debate the trade-offs inherent in allocating water to sustain those values, and to agree to the implementation activities required to achieve the objectives of the plan.

The Commission's review of recently completed plans found that since 2004 all jurisdictions have improved their consultation processes. All jurisdictions had generally used consultation to:

- + gather information on the values that communities and individuals place on the water resource, and the risks to those values
- + gather information on the impacts of proposed management changes
- + allow stakeholders to provide input to decision making.

All jurisdictions have set in legislation or policy minimum requirements for notifying stakeholders that a plan is being developed or reviewed, publicly exhibiting a draft plan, and calling for and responding to submissions on a draft plan. In practice, state and territory agencies usually take steps beyond the minimum requirements, for example by:

- + engaging the community in gathering information on values
- + establishing stakeholder advisory committees to provide input
- + holding public information meetings
- + conducting targeted consultations.

Water plans are rarely developed with robust socioeconomic analysis of impacts on communities as an input to decisions about trade-offs. Public consultation continues to be used as a proxy for social and economic impact assessments of options in most plans. The validity of that approach depends on the quality and breadth of engagement. Depending on the water literacy of the community, certain interests risk being neglected during planning.

In another study commissioned for this assessment, Marsden Jacob Associates noted that while most jurisdictions had in place a process for establishing the need for socioeconomic analysis, few jurisdictions are undertaking detailed socioeconomic assessments of specific water plans. It appears that jurisdictions decide to commission socioeconomic analyses only when they consider the expected gains in policy input to outweigh the costs of the work. While that is understandable given the budget constraints under which governments are operating, it is likely that they are underestimating the policy gains that could be made. In general, such assessments have only been conducted when governments have been put under public pressure. The quality of available socioeconomic assessments is also highly variable.

Furthermore, for most plans there is limited transparency about the process used to make trade-off decisions and the outcomes of that process. This makes it difficult for communities to understand how their views have been reflected in decisions.

Consultation is particularly critical in setting pathways for returning overallocated surface water and groundwater systems to environmentally sustainable levels of extraction, in periodic reviews of water plans, and in making other decisions that may affect the security of water access entitlements and allocations. An irrigator survey conducted in the Namoi region highlighted how challenging it can be to build community ownership of a water plan that addresses overallocation. The survey concluded that most irrigators affected by the plan found the development of the plan to be unfair, confusing and frustrating. In particular, respondents felt marginalised in consultations and frustrated by delays in the finalisation of the plan (Kuehne, Bjornlund and Cheers 2008).

Recent experience in the Murray–Darling Basin, where the *Guide to the proposed Basin Plan* was poorly received by affected communities, showed both that planners have not established a good model for community engagement in water planning when a reduction in extraction is envisaged, and that there are particular challenges associated with whole-of-basin planning because of the diversity of affected communities (see Box 4.1). This problem was exacerbated in the Murray–Darling Basin because of a community view that social and economic outcomes were not adequately taken into account.

Box 4.1: Community engagement in the development of the Murray–Darling Basin Plan

The Commission recognises that the development and implementation of a single plan that covers the entire Murray–Darling Basin will be a major step forward for water management in Australia and is integral to realising the full benefits of water reform. It is critical that all parties engage constructively so that ultimately a Basin Plan is implemented and there is clarity for all parties about the rules into the future. Developing a whole-of-basin plan is a difficult and complex task, and the development of the Murray–Darling Basin Plan is one of the largest and most challenging water planning exercises in the world.

However, the consultation and draft guide development processes had a detrimental effect on community confidence and brought into the spotlight the fragility of community support for the reform agenda.

This is highlighted in an extract from a submission from the Western Division Councils of New South Wales in response to the *Guide to the proposed Basin Plan:*

Following the release of the Guide in early October there has been a great deal of anxiety and concern from residents within our region who were already trying to recover from a record breaking 10 year drought.

The emotional state of residents and family stresses has increased as they face more uncertainty of their future on the land and in small businesses.

An immediate paralysis, to develop or implement future business plans, has set in for any businesses within the Basin, who are directly or indirectly involved in water management.

Banks and other financial lenders have also had to adopt a more cautious risk assessment when offering finance ... (Western Division Councils of New South Wales 2010)

The Commission also notes that, while the socioeconomic impacts of proposed water reform measures in the Murray–Darling Basin are still poorly understood, a considerable amount of work is currently being done to address that problem. We consider that this work is critical both for developing the Basin Plan and for gaining community understanding and acceptance of the plan. It may also provide a useful benchmark for the use of socioeconomic analysis in other water plans.

Finding 4.2

Effective community engagement is critical to building trust and confidence in water planning and management. While there have been some examples of good practice, recent experience with the proposed Murray–Darling Basin Plan highlights the fragility of that trust.

The failure of many water plans to explicitly take both socioeconomic and environmental values into account undermines stakeholder confidence in the appropriateness of planning decisions.

4.1.3 Community involvement in implementation

Community support for water management arrangements depends not just on effective engagement during the development of a water plan, but on transparent ongoing consultation with the community about subsequent implementation decisions and on clear reporting of outcomes. The absence of transparency is likely to undermine support for and confidence in the planned activities.

Consultations we have conducted revealed concerns that communities are not being consulted effectively as part of plan implementation. People often expressed a lack of confidence in the capacity of government agencies to fully deliver the work projected in water plans because of a failure to clarify who is responsible for implementation, or to explicitly identify resourcing.

4.1.4 Capacity to adapt to changes in water availability

Since the commencement of the NWI, the development of water markets has multiplied the options available to irrigators and other rural water users to manage their water assets and businesses flexibly. This has improved the adaptive capacity of many rural communities.

Water markets are most developed in the connected southern Murray–Darling Basin water systems. Our 2010 report, *The impacts of water trading in the southern Murray–Darling Basin*, found that water trading contributed to the ability of many southern Murray–Darling Basin communities to maintain financial viability during unprecedented reductions in water availability due to drought (NWC 2010g). As a result, many communities are in a much better position today as a result of water reforms than they might otherwise have been.

Water market reforms have been accompanied by some community concern about the possible adverse economic and social impacts of water trading. Those fears are usually linked to concerns that outward trade reduces local water use, irrigated agricultural production and economic activity in associated industries.

At an individual decision-maker level, trade is providing flexibility for water users and giving them the adaptive capacity to deal with variability in water availability and changes in commodity prices. Since 2004, many Australian rural and regional communities (and to a lesser extent urban communities) have increased their use of water trading to resist the shock of drought and to manage their water assets adaptively.

Our report on the impacts of water trading in the southern Murray–Darling Basin found that in most cases the benefits to individuals from water trading have translated into benefits for their industries, regions and communities (NWC 2010g). In particular, intraregional trading has provided unequivocal economic benefits to regions.

Without water trading, additional water sources would not have been available for irrigators to maintain long-lived horticultural assets during the drought. If those assets had been lost, the irrigators and their communities would have faced a long period of rebuilding to recover their agricultural productive capacity.

In Western Australia, Water Corporation entered into a water transfer arrangement with Harvey Water and received a one-off trade of 21.6 GL and an annual trade of 17.1 GL, with multiple positive outcomes. Funding from this trade was put towards Harvey Water replacing its open channel irrigation delivery infrastructure with a fully integrated piped system, resulting in an estimated 30% water saving. The water saved was traded to the Water Corporation for public water supply.

Communities in urban and regional areas, including Adelaide, Bendigo and Ballarat, also benefited from the purchase of entitlements and allocations by water authorities. Purchases bolstered supply security during critical periods and alleviated severe water restrictions, but also facilitated more cost-effective supply augmentations compared to infrastructure investments, minimising increases in water tariffs. For example, work by Hyder Consulting for this assessment found that in 2008–09 the median price high-reliability water entitlements in the Victorian Goulburn system where Coliban Water traded was \$2110/ML. This compares with other supply augmentation measures available to Coliban Water and Central Highlands Water, which have been estimated to cost \$3000–5000/ML.

For entitlement holders, trading from rural to urban areas in the temporary water market expands trading opportunities and income streams. Increases in the volume and number of rural–urban water trades across Australia since the commencement of the NWI have been enabled partly by widening trade possibilities arising from infrastructure investments and growing confidence among rural entitlement holders that such trade respects their water property rights.

Estimates of regional water use with and without water trading demonstrate that trading has influenced water use at the regional and local levels (see Table 4.1). However, in most cases, changes in regional water use due to trading were less than 10% of total water use—reductions in water use due to drought were much larger. From 2007–08, there were reallocations of more than 10% of water from the Victorian Goulburn, New South Wales Murray and Murrumbidgee regions to the Victorian Sunraysia region (the Murray below Barmah) and South Australia. Analysis of irrigation districts in Victoria showed that changes in water use due to trading were small in most areas.

Table 4.1: Agricultural value, water use and trading, 2000–01 and 2005–06

Region		2000–01	2005–06
NSW Lower Darling	Agriculture—total value (\$m)	216	219
	Water use (GL)	68	98
	Change in water use due to trading (GL)	+20	0
	Intraregional allocation trading (GL)	n.a.	21.8
NSW Murrumbidgee	Agriculture-total value (\$m)	961	931
	Water use (GL)	2 719	2 138
	Change in water use due to trading (GL)	-30	-6
	Intraregional allocation trading (GL)	152.9	102.7
NSW Murray	Agriculture-total value (\$m)	838	879
	Water use (GL)	2 378	2 034
	Change in water use due to trading (GL)	0	+3
	Intraregional allocation trading (GL)	107.8	154.4
SA Murray	Agriculture-total value (\$m)	1 203	1 222
	Water use (GL)	880	869
	Change in water use due to trading (GL)	+13	-4
	Intraregional allocation trading (GL)	0.7	49.1
Vic. Goulburn	Agriculture-total value (\$m)	958	1 068
	Water use (GL)	795	796
	Change in water use due to trading (GL)	3	-22
	Intraregional allocation trading (GL)	142	164
Vic. Loddon and Campaspe	Agriculture-total value (\$m)	157	131
	Water use (GL)	558	589
	Change in water use due to trading (GL)	-4	+38
	Intraregional allocation trading (GL)	4	5
Vic. Murray above Barmah	Agriculture-total value (\$m)	573	629
	Water use (GL) (Murray above/below Barmah)	2 008	1 526
	Change in water use due to trading (GL)	-1.6	+3.8
	Intraregional allocation trading (GL)	6	20
Vic. Murray below Barmah	Agriculture-total value (\$m)	1 116	1 040
	Water use (GL) (Murray above/below Barmah)	2 008	1 526
	Change in water use due to trading (GL)	-2	6
	Intraregional allocation trading (GL)	21	69

Source: NWC (2010g).

Even where regional water use fell, analyses of production and water use data demonstrate that reduced regional water use did not lead to a proportional reduction in the value of agricultural production—because water moved to higher value uses. Farmers could exploit dryland farming opportunities, sell water and purchase fodder rather than growing it, and increase their on-farm water-use efficiency. It has been observed throughout the southern Murray–Darling Basin that, during times of reduced allocation, water trading allows some (high-value) industries to maintain production while other (low-value) industries reduce production (NWC 2010g).

Comparisons of trade patterns and key socioeconomic indicators revealed no discernible link between patterns of water trading into or out of a region and changes in population, employment in agriculture, levels of unemployment or weekly household income. Instead, trends in those indicators were similar across regions regardless of their water trading history or their economic dependence on irrigated agriculture. For example, employment in agriculture fell in all regions during the drought, regardless of whether they were net purchasers or sellers of water. The SA Murray region showed the sharpest decline in the southern Murray–Darling Basin in employment in agriculture between 2001 and 2006, despite being a net importer of water during that time. This suggests that other factors had a greater impact than water trading in driving social and economic change at the regional level between 1996 and 2006 (NWC 2010g).

At a more finely disaggregated local level, there is some evidence to suggest that water trading accelerated existing processes of social and economic change in some areas. For example, over the period reviewed for the *Impacts of water trading* report:

- + The Robinvale area in Victoria experienced significant inward trade through the growth of new horticultural developments on greenfield sites outside the public irrigation districts. The associated influx of workers has put pressure on services such as housing, despite increasing economic activity.
- + Pyramid Hill in the Victorian Goulburn region consistently sold water each year. This may have hastened reductions in irrigated agricultural output, farm rationalisation and the subsequent observed reductions in population and services.
- Drought, combined with allocation trade out of the New South Wales Murray and Murrumbidgee regions, has reduced rice production.
 This has affected production and employment in associated industries, and the population has declined in some communities.
 For example, the rice mills in Deniliquin and Coleambally were mothballed in 2007, leading to over 100 job losses. However, the data on regional water use with and without trade suggests that drought (not trade) has been the biggest contributor to reduced water availability and therefore reduced rice production.

The experience in the southern Murray–Darling Basin, the region with Australia's largest and most developed water markets, illustrates clearly how the ability to trade water has assisted many communities to manage their water resources adaptively and become more resilient to change. During the drought, the ability to sell water separately from land provided a financial injection into many local economies and created opportunities to diversify business enterprises. For example, a case study of New South Wales rice-growing areas (discussed in Box 2.3 in Chapter 2) indicates that water trading has cushioned the impact of drought and commodity price declines by enabling entitlement holders to diversify their income streams.

Impacts of water recovery programs

A number of governments across Australia are investing in water recovery mechanisms. The Australian Government uses the *Water for the Future* program to recover water for the environment. Most of the funding is allocated to buybacks from willing sellers and to investments in infrastructure.

Modelling for this assessment by Marsden Jacob Associates found that buybacks and infrastructure investments have had a stimulatory impact on regional communities but that it has been minor relative to total regional economic production. To date, most investment has been in water purchases rather than infrastructure. In buybacks, farmers are fully compensated for selling their water entitlements, effectively meaning that the buyback simply substitutes one form of capital asset for another of a similar value. The stimulatory impacts of infrastructure investments are lower than might be expected because most investment inputs are not locally sourced.

An analysis of irrigator surveys by Marsden Jacob Associates concluded that environmental water recovery, whether through direct buybacks or infrastructure investments, has increased the range of autonomous adaptation opportunities available to entitlement holders, along with the number of avenues available to them to manage farm debt, risk, production and investment decisions. They also indentified that in some regions, such as the Murray Irrigation Area, the low allocations to general security water entitlements have meant that there has been effectively no demand for the entitlements in water markets. Thus, water sales to the Commonwealth have been the only avenue available to those irrigators to sell water entitlements in order to achieve farming objectives.

In regions such as the New South Wales Murray, where significant outward water entitlement sales have occurred, there is evidence of declining rural and regional populations, particularly of 25–40-year-olds, and declining numbers of businesses that rely on discretionary spending (such as cafes, restaurants and retail businesses). However, those trends appear to be unrelated to environmental water recovery programs because they are also evident in other rural economies not dependent on irrigated agriculture. Long periods of low rainfall and the continuation of longstanding sociodemographic trends may be as much a factor in the declines as outward water sales to the Commonwealth. Firm conclusions about the impact of environmental water recovery on regional irrigation systems and towns will only become clear as conditions for irrigated agriculture improve as a result of recent rain. The Commission will produce a new edition of its *Impacts of water trading* report for release in 2012.

Finding 4.3

Investment in environmental water recovery, whether through buybacks or infrastructure investment, injects money into rural communities and has increased the options for individual entitlement holders to manage farm debt, risk, production and investment decisions. However, early indications are that the overall economic impacts of water recovery programs have been minor, relative to other factors.

Structural adjustment

Structural adjustment is the continuing process of change in the size, composition and characteristics of industries and the communities in which they operate, including changes in the characteristics of the workforce and the size and mix of activities within regions. The changes occur in response to a range of market, technological and environmental factors, as well as in response to government policies.

Across much of Australia, and in particular in the Murray–Darling Basin, reductions in water availability, combined with many other factors such as commodity prices, exchange rates and social trends, contribute to ongoing structural adjustment in the irrigation sector and irrigation-dependent communities. The NWI acknowledges that water reform may also have structural impacts, and commits the parties to managing them by providing accurate and timely information and, where appropriate, targeted policy responses that arise as a consequence of implementing the NWI (objective 23(ix) and clauses 93–97).

In 2009, the Commission found that there was inadequate understanding of the processes and causes of structural adjustment, as well as a shortage of data to enable effective monitoring of it. We also noted that, while there is a wide variety of national, state and region-specific structural adjustment measures in place across rural Australia, there is a risk that they will be uncoordinated, ineffective or counterproductive, particularly where they attempt to artificially constrain adjustment.

There has been little progress in improving our understanding of the socioeconomic impacts of water reform since the 2009 biennial assessment. Few water plans include robust analysis of community impacts. The socioeconomic analysis that was used to develop the *Guide to the proposed Basin Plan* has been widely recognised as being one of the weakest elements of the information base. To overcome that weakness, the MDBA has commissioned more than a dozen new economic modelling and socioeconomic studies, and has sought further advice from industry, government and community stakeholders. However, there remains a need for better data on, and analysis of, the socioeconomic impacts of changes in water availability.

As we have noted elsewhere in this report, secure entitlements, clear planning objectives and water trading are important mechanisms to provide individuals and communities with the capacity to make their own choices about their future.

The upgrade of irrigation infrastructure can also have short-term benefits in the form of investment flows to communities, and if well designed can improve the efficiency and long-term viability of irrigation regions. Where such projects have multiple objectives, such as water saving, regional development or structural adjustment assistance, the expected benefits of those objectives should be clearly identified to ensure their economic efficiency. If they are poorly designed, or are not appropriately linked to broader regional policies, they may have perverse outcomes for communities through the long-term costs they impose.

Several contributors to this review, including the Local Government Association, called for improved structural adjustment assistance related to water planning and reform (LGA NSW and SA NSW 2010). The Queensland Farmers' Federation suggested that there is a need to improve the scope to investigate adjustment measures in water planning (QFF 2010).

Governments should consider the adjustment implications of their policies and programs, with the aim of ensuring that distortions are minimised wherever possible. Importantly, adjustment is a necessary feature of the economy, and water reform initiatives should facilitate it, not seek to hinder it. Where there is concern about the impact of the scale and speed of adjustment on communities, the merits and design of intervention measures should be rigorously assessed to ensure that they do not impede reform or cause undesirable outcomes in other policy areas.

See Appendix B (clause 95) for further detail on how NWI parties have addressed their commitments on community partnerships and adjustment.

4.2 Metropolitan and regional urban communities

Australia's urban water sector has undergone significant institutional and pricing reforms over the past two decades—first under COAG's 1994 Water Reform Framework and then under the NWI (COAG 1994, 2004). The NWI committed the parties to providing urban communities with healthy, safe and reliable drinking water supplies, to implementing pricing and institutional reforms, to taking demand management actions and to promoting innovation and capacity building to create water-sensitive cities by encouraging reuse and recycling of wastewater where they are cost-effective and by facilitating trade between rural and urban areas. The Commission has noted in the past that the actions required under the NWI in urban water reform are relatively limited in scope and were overtaken by the challenges of the recent drought.

We have assessed:

- + actions to improve the security of urban and regional water supplies
- + NWI measures to help the community to be more efficient in its water use
- + the impact of water pricing reforms on communities
- + public health, urban amenity and urban waterway health.

4.2.1 Urban water supply

Since the commencement of the NWI, most jurisdictions have initiated policies and made large investments to increase the security of urban water supplies by diversifying and augmenting metropolitan and (to a lesser extent) regional urban water supplies.

During the 2000s, most of urban Australia experienced severe and prolonged drought, resulting in dramatic decreases in runoff in the nation's main urban catchments. Low inflows over many years meant that storage levels in urban water systems dropped significantly.

In some cases, falls in storage levels were more rapid. South-eastern Queensland's storage levels dropped from 100% in 2001 to less than 17% in 2007. In Melbourne, the volume of water in storage fell by 20% of total capacity in 2006, and to below 30% of total capacity at its lowest point. In the most extreme example, rainfall patterns in Perth demonstrate a marked and ongoing reduction that began in the 1970s (NWC 2011b).

Responses to the drought varied across Australia, but generally focused on water conservation campaigns, demand-management programs and major supply augmentations, particularly desalination plants and other sources that diversified supplies. The recent report card of the Water Services Association of Australia identified that the industry was overseeing projects with a value greater than \$14 billion during 2009–10 (WSAA 2010).

The drought has fundamentally changed the way that the urban water sector and communities think about the security of supplies. It has underscored the risks in planning, managing and investing on the basis of long-term averages when supply security depends on actual rainfall that is extremely variable year on year and over multi-year periods.

Several jurisdictions have built or are building desalination plants to augment traditional water supplies in large cities (Table 4.2). The plants have the capacity to produce large volumes of potable water and the potential to largely secure some cities' water supplies at times of low inflow to storages.

City/region	Location	Estimated cost of construction ^a (\$m)	Capacity (GL/year)	Ability to increase capacity (GL/year)
Sydney	Kurnell, 2010	1 890	90	180
Melbourne	Wonthaggi, 2011	3 500	150	Up to 200
South-east Queensland	Tugun, 2009	1 200	49	
Perth	Kwinana, 2006	387	45	
	Binningup, 2011	955	50	100
Adelaide	Port Stanvac, 2011	1 830	100	

Table 4.2: Large desalination plants

a Costs were incurred in different years, making them not directly comparable.

Source: PC (2011).

Since the commencement of the NWI, most jurisdictions have also increased the amount of water they recycle to augment supply. The total volume of recycled water supplied in Australia has increased by 34% since 2005–06 (Table 4.3). The increase is expected to continue, as additional recycled water projects are underway in most jurisdictions.

Jurisdiction	2005–06	2006–07	2007–08	2008–09	2009–10	Change since 2005–06
ACT	2 141	2 104	3 789	4 207	4 249	98%
NSW	36 495	44 892	48 455	51 364	62 391	66%
NT	1 601	1 285	1 268	1 645	1 233	-23%
Qld	12 697	15 982	16 031	26 177	41 594	14%
SA	17 336	25 047	25 868	25 858	24 883	41%
Vic.	80 696	96 744	95 968	100 488	98 394	22%
WA	9 026	10 282	11 395	11 778	12 060	29%
Total	159 992	196 336	202 774	221 517	244 804	34%

Table 4.3: Total recycled water supplied (ML)

Note: In order to allow valid comparisons, figures are included only for those utilities that could report audited volumes in all the relevant years. Source: NWC (2011i).

Recycled water is used for a variety of purposes, including for irrigated agriculture, commercial, municipal and industrial purposes (including watering community sportsgrounds and parks), residential uses (typically through third pipe systems for non-drinking purposes) and for environmental flows. Figure 4.1 shows that urban water use comprises 27% of the total volume of recycled water use (25% commercial, municipal and industrial, and 2% residential). Over the recent drought period, recycled water sources enabled many urban communities to maintain social infrastructure and assets that would otherwise have been degraded while water restrictions applied.





Source: NWC (2011i).

All NWI parties are revising their policies and planning frameworks to foster diversity and growth in the alternative water supply industry. For example, in 2008 the New South Wales Government released regulations that established Australia's first third-party access and licensing system under the state's *Water Industry Competition Act 2006*. The system enables the private sector to enter the water supply industry to provide reticulated drinking water, recycled water and wastewater services while ensuring water quality and the protection of public health and the environment. The licensing regime is administered by IPART. By the end of September 2010, six network operator licences and five retail supplier licences had been granted, of which seven relate to recycled water schemes in Sydney (New South Wales Government 2011).

Some jurisdictions are also investing in alternative water supplies to help communities maintain public spaces, such as sporting fields, and other social infrastructure that has recreational, amenity or aesthetic values.

There are also examples of supply diversification and augmentation in regional cities. For example, Lake Wendouree in Ballarat, Victoria, is now replenished with recycled water at times of low water availability to support recreational and aesthetic values. Supplies to some smaller cities in New South Wales are augmented through local town sewerage recycling and stormwater harvesting. In many cases, alternative water supply options have contributed to the maintenance or enhancement of community wellbeing and local economic development in the face of severe drought.

A number of communities are implementing or trialling managed aquifer recharge. Projects are underway in South Australia, Western Australia, Victoria and Queensland to test its feasibility and demonstrate its capacity as a viable water supply management option.

Box 4.2: Australian Government funding for water supply diversification

Under the *Water for the Future* initiative, the Australian Government has committed over \$1.5 billion to assist communities in all states and territories to diversify their water supplies. Most of the funding is supporting wastewater recycling, stormwater harvesting, water meters, grey water systems, water tanks, the refurbishment of pipelines and other water-saving initiatives.

Communities have mainly received funding through competitive grants. Many of the projects funded provide water to irrigate parks and sportsgrounds so that they will be accessible and safe during the dry summer months and the next drought.

In a few cases, alternative options are being used to boost regional cities' potable supplies. In Orange, New South Wales, stormwater harvesting projects capture stormwater during high flows in local creeks. The stormwater is transferred to a holding dam, then pumped to batch ponds where it is held pending the results of water-quality testing, before being transferred to the town water supply dams. This initiative has the capacity to deliver around 1200 ML per year, which is almost 20% of Orange's unrestricted demand. Stormwater harvesting is also being used to provide additional water supplies for mining and other developments in the central west of New South Wales, contributing to local economic development (New South Wales Government 2011).

Some alternative water supply sources and management technologies, such as managed aquifer recharge and stormwater capture, raise new issues for the regulation of water property rights in the urban water context. There are only isolated examples of reforms designed to address this issue (see Box 4.3). The full economically efficient development of these alternative water sources will depend in part on the clarification of property and access issues.

See Appendix B (clause 92) for further information.

Box 4.3: Managed aquifer recharge on the Swan coastal plain in Western Australia

Most stormwater on the Swan coastal plain enters the superficial aquifer as recharge. The development of detention basins and water-sensitive urban design initiatives are having the effect of increasing recharge compared to natural conditions. The increase is considered in determining the aquifer water balance and allocation limits. Extraction of recharged water is managed through the normal licensing process.

With increasing interest in managed aquifer recharge, the Department of Water is providing entitlement licences to operators of recharge schemes. The licences include conditions that allow operators to take a proportion of the water they cause to be recharged into the aquifer. Drafting instructions have been prepared for state legislation that would allow managed aquifer recharge to be included in the entitlements regime.

4.2.2 Lessons from the drought

Despite the duration and severity of the recent drought, the responses by governments and the water industry ensured that no city ran out of water. Recent investments have helped to secure supply, at least in the short to medium term. However, as we observed in our *Urban water in Australia: future directions* report, the measures adopted came at a cost to the community. Government decisions about major infrastructure investment were not always well communicated in explaining the costs and benefits of the full range of options considered. The Commission is concerned that institutional arrangements and policy settings in the urban water sector are not well suited to dealing with the challenge of investing efficiently to ensure security of supply under major climatic uncertainty. (NWC 2011b).

Institutional arrangements for planning and investment

The long duration of the drought led many governments to make interventions that were ad hoc, not transparent, and lacking in community and customer engagement. Decisions made were also outside the purview of independent economic regulators, which limited the regulators' ability to ensure that investments were prudent and efficient. Government intervention suggests that there is no effective framework for managing security-of-supply risk and that measurable objectives that would provide a signal for risk-based investments are lacking.

The absence of transparency in those decisions, particularly those taken outside NWI-consistent planning frameworks, has given rise to community disquiet over several other recent water management decisions. Large-scale augmentation decisions taken in Victoria (concerning the Wonthaggi desalination plant) and south-east Queensland (about elements of the water grid) have been particularly contentious because of a perceived lack of transparency in decision making.

In addition, by blurring institutional roles and responsibilities, government intervention in such decisions can distort or reduce incentives for water businesses to plan and invest efficiently, creating uncertainty and undermining the confidence of private sector investors. For urban communities, this has limited the potential for new and innovative options to diversify water supply.

Costs of water restrictions

Governments initially responded to the drought by focusing on water conservation campaigns and demand-management programs, combined with increasingly severe and prolonged water restrictions. Mandatory water restrictions on outdoor use impose costs on customers, water businesses and communities. There have been many economic studies of the costs of water restrictions. The Productivity Commission estimated that restrictions during the drought were costing around \$1 billion annually across Australia (PC 2008).

The burden of restrictions falls heavily on households. The community suffers loss of amenity and recreational opportunity through damage to public parks, gardens and sportsgrounds unless alternative water supplies are available. The business sector is adversely affected by restrictions, particularly the nursery and garden industry and the pool and spa industry. There are also costs in administering restrictions regimes. For example, it has been estimated that the cost of administering restrictions in Sydney (net of revenue collected in fines) was around \$10 million for Level 3 restrictions (CIE 2010).

Ongoing water restrictions have also prompted many households to invest in rainwater collection tanks and private bores, although some may have had other reasons for investing in rainwater tanks (ABS 2007). The cost-effectiveness of rainwater tanks and bores is poor in many areas. They are often more expensive than reticulated supply, and they are often not reliable sources of supply. In the case of bores, there may be impacts on third parties and the environment from increased groundwater use (for example in Perth, where there are many private bores).

The cost of investments

Pricing reforms have occurred over a long period, most recently through the NWI Pricing Principles (NWC 2011e). Reforms towards consumption-based and full cost-recovery tariffs have until recently had a relatively modest impact on household water bills. However, major capital investments in recent years in response to the drought have led to customers' water bills increasing significantly (Figure 4.2).





Source: (NWC 2011c).

For example, over the period from 2008–09 to 2011–12, household bills are going to rise by around 8% per year in real terms in Sydney and by up to 13% per year in Melbourne. In Melbourne, this means that average water bills are expected to double over the current five-year regulatory period. In Queensland, the state government has introduced regulatory changes designed to lessen the impact of significant cost increases over the next five years.

Recent price determinations reveal that price increases will continue in the coming five years (Table 4.4).

Utility	Period of increase	Real average annual increase (%)
Sydney Water (NSW)	2008–09 to 2011–12	7.7
Gosford (NSW)	2009–10 to 2012–13	3.5
Wyong (NSW)	2009–10 to 2012–13	2.7
Hunter Water (NSW)	2009–10 to 2012–13	6.9
ACTEW Water ACTEW Sewerage (ACT)	2009–10 to 2012–13	1.0 4.8
City West Water (Vic.)	2009–10 to 2012–13	12.2
South East Water (Vic.)	2009–10 to 2012–13	14.0
Yarra Valley Water (Vic.)	2009–10 to 2012–13	14.7
Barwon Water (Vic.)	2008–09 to 2012–13	9.5
Central Highlands Water (Vic.)	2008–09 to 2012–13	10.1
Coliban Water (Vic.)	2008–09 to 2012–13	12.8
East Gippsland Water (Vic.)	2008–09 to 2012–13	6.8
Gippsland Water (Vic.)	2008–09 to 2012–13	14.9
Goulburn Valley Water (Vic.)	2008–09 to 2012–13	7.7
GWMWater (Vic.)	2008–09 to 2012–13	6.6
Lower Murray Water (Vic.)	2008–09 to 2012–13	4.3
North East Water (Vic.)	2008–09 to 2012–13	9.4
South Gippsland Water (Vic.)	2008–09 to 2012–13	4.9
Wannon Water (Vic.)	2008–09 to 2012–13	6.6
Western Water (Vic.)	2008–09 to 2012–13	8.8
Westernport Water (Vic.)	2008–09 to 2012–13	4.9

Sources: NWC (2011i), WSAA (2010).

These cost increases do not take into account the significant increase in direct government funding of water supply augmentations and demand-management programs. The Australian Government's National Urban Water and Desalination Plan provided funding for desalination, water recycling and stormwater harvesting projects to improve water supply security in cities and towns. As part of the plan, the government has committed to funding \$328 million of the \$1.8 billion Port Stanvac Desalination Plant in South Australia (DSEWPaC 2011i).
Box 4.4: Consumer protection frameworks

The introduction of independent economic regulation has often coincided with the development of stronger customer protection frameworks. For example, the Energy and Water Ombudsman (Victoria) is a voluntary industry scheme for dispute resolution approved by the Essential Services Commission (ESC 2006). Since 2005, customer protection codes in Victoria have required all urban water businesses to have policies in place to assist domestic customers facing hardship.

At a minimum, the hardship policies must exempt those customers from supply restrictions, legal action and additional debt recovery costs while customers make payments to the water business according to an agreed flexible payment plan or other payment schedule.

Social and hardship policies vary across regions. For example, the Public Interest Advocacy Centre (PIAC) notes that:

Apart from Sydney Water and Hunter Water, there are 106 local water utilities responsible for providing water supply and sewerage services to New South Wales nonmetropolitan urban communities. These utilities service 1.8 million people in New South Wales. A number of programs are available to customers of Sydney Water and Hunter Water that are not extended to customers of water utilities owned and operated by local councils.

PIAC supports the development of a state-based framework to address hardship issues in a consistent and comprehensive manner across New South Wales ... the lack of a consistent approach to hardship across the 106 local water utilities in New South Wales results in an inequity and inconsistency in the availability of hardship programs for disadvantaged consumers across the state (PIAC 2010).

In Tasmania, the Office of the Tasmanian Economic Regulator (OTTER) recently reported that 'before 2009–10, Tasmanian councils did not apply restrictions on water or sewerage services for non-payment of bills because water and sewerage services were billed through rates notices. Unpaid rates were recoverable through property sales in line with the provisions of the *Local Government Act 1993'*. Under the Water and Sewerage Industry (Customer Service Standards) Regulations 2009, however, corporations can now restrict water supply to residential customers for non-payment in certain circumstances but they must comply with the Customer Service Code issued by the Regulator (OTTER 2011).

Stakeholders often cite the customer protection frameworks in Victoria and metropolitan New South Wales as best practice. The Consumer Utilities Advocacy Centre (CUAC) has noted that:

Victoria's urban water sector now includes examples of best-practice service delivery. Victorian water consumers, particularly within metropolitan Melbourne, currently enjoy good water-service delivery as well as relatively strong consumer protections. This is the result of many years of work by government, regulators, water businesses and consumer representatives. (CUAC 2010)

Policy bans

Policy barriers restrict the choice of supply-side options and so potentially mean that the community does not have access to the most cost-effective supply security. Bans in place in parts of Australia include restrictions on rural–urban water trading, intercatchment transfers, new dams and indirect potable reuse.

One of the most significant constraints is the impediment to trades or transfers of water between catchments, which means that urban water authorities forgo the opportunity to secure relatively low-cost water or security of supply. A recent example is the decision by the Victorian Government to shut down the recently completed Sugarloaf Pipeline and to transfer water to Melbourne only in emergency circumstances. The pipeline cost approximately \$1 billion, funded by Melbourne water customers. Limiting its use in this way effectively means that other more costly options may be needed to maintain the pre-existing level of security of supply for Melbourne. It also limits access to important water markets by entitlement holders in rural areas.

Another option that has been ruled out by a number of state governments is the reuse of water for potable purposes. Indirect potable reuse is technically possible for a range of locations and can be financially competitive compared to other supply options, particularly where there are no significant alternatives. Despite the potential advantages of recycling water, the Commission acknowledges that there is real community anxiety about it. Nevertheless, we are concerned that indirect potable reuse has become overpoliticised, and that the full cost of other solutions has not been made transparent (NWC 2011b).

Finding 4.4

Since 2004, there has been considerable diversification and augmentation of water supplies to large cities and to a lesser extent smaller regional centres and towns. While this has given those communities greater supply security, the planning and investment decisions supporting diversification and augmentation have not always been well communicated, raising doubts about whether they are the most economically efficient and environmentally sustainable options.

4.2.3 More efficient water use

Since the commencement of the NWI, national urban water consumption per household has generally declined (Table 4.5). Nationally, the average annual volume of residential water supplied per property fell from 228 kilolitres in 2003–04 to 192 kilolitres in 2009–10. The decline is the result of a number of factors, including water restrictions, community education campaigns and an enduring community commitment to wise water use.

Utility	2005–06	2006–07	2007–08	2008–09	2009–10
Water Corporation (Perth)	268	281	268	277	276
Sydney Water	203	199	182	198	205
ACTEW	261	240	195	201	199
SA Water (Adelaide)	233	235	194	190	191
Hunter Water	205	195	177	180	184
Gold Coast	200	183	149	166	182
Barwon Water	216	169	156	156	150
Yarra Valley Water	198	178	157	151	144
Brisbane	185	153	128	133	143
South East Water	187	167	152	143	141
City West Water	183	163	149	146	140

Table 4.5: Average annual residential water supplied, major capital city utilities, 2005–06 to 2009–10 (kL/prop	erty)
for utilities with 100 000+ connected properties	

Source: NWC (2011i).

Under the NWI, the jurisdictions agreed to a range of reforms to better manage demand for water in urban areas (NWI clause 91). Key actions to improve the standards of household water-using appliances and the information available to consumers to make choices about those products occurred under the Water Efficiency Labelling and Standards (WELS) Scheme and the Smart Water Mark program for household gardens.

There is evidence that households' adoption of water-efficient appliances has increased since the introduction of the WELS Scheme. In 2008, a review of the scheme's cost-effectiveness by the Institute for Sustainable Futures identified national water savings of 10 GL per year since the scheme's introduction, of which around 25% came from more efficient showerheads and 22% from more efficient toilets (ISF 2008).

A more recent review of the WELS Scheme (Guest 2010) concluded that:

- + the scheme's objective of conserving water by reducing consumption through greater use of water-efficient products is appropriate, given the increasing scarcity of water
- + its use of the market by providing information to assist consumer decisions about the purchase of water-using products and by setting standards is efficient and effective
- + the national scope of the scheme is appropriate and efficient, as the market for water-using products is national
- + without the WELS Scheme, something similar would be required to perform its functions.

The review recommended several changes to the scheme to improve its governance, compliance and administration and the level and source of funding. The recommendations have been either agreed or noted for further consideration by signatories to the NWI.

The impact of the Smart Water Mark program in encouraging the adoption of water-efficient appliances and fittings for outdoor discretionary use is more difficult to measure. This is partly because there have been temporary restrictions on outdoor watering in many cities and towns over the period since the program's introduction. By March 2011, more than 210 products and 19 services had been awarded the Smart Approved WaterMark.

Finding 4.5

NWI demand-management initiatives to implement the Water Efficiency Labelling and Standards Scheme and the Smart Water Mark have increased consumer awareness of water-efficient products and led to greater consumer choice.



4.2.4 Public health

The NWI sought to ensure safe drinking water supplies for the community. The Commission's recent review of urban water management found that regulatory arrangements governing urban water quality to protect public health and safety and the environment have served Australia well, and that our nation's drinking water is generally safe and of a high quality. In general, Australia's performance in providing safe drinking water is high (Table 4.6). Our *National performance report 2009–10: urban water utilities* shows that large water utilities' performance against Australia's 2004 drinking water guidelines was excellent for the three years from 2007–08 (NWC 2011i).

Smaller utilities also performed well. Only three utilities, Tasmania's Ben Lomond Water, Southern Water and Cradle Mountain Water, reported less than 99% compliance with microbial limits (94%, 97% and 97% respectively).

Utility	2005–06	2006–07	2007–08	2008–09	2009–10
Sydney Water	100.0	100.0	100.0	100.0	100.0
Water Corporation (Perth)	100.0	100.0	100.0	100.0	100.0
Yarra Valley Water	100.0	99.7	100.0	100.0	100.0
South East Water	100.0	100.0	100.0	100.0	100.0
SA Water (Adelaide)	100.0	100.0	100.0	100.0	100.0
Brisbane	100.0	100.0	100.0	100.0	100.0
City West Water	100.0	100.0	100.0	100.0	100.0
Gold Coast	100.0	100.0	100.0	100.0	100.0
Hunter Water	99.6	99.8	100.0	100.0	100.0
ACTEW	100.0	100.0	100.0	100.0	100.0
Barwon Water	99.8	100.0	100.0	100.0	100.0

Table 4.6: Percentage of population for which microbiological compliance was achieved, utilities with 100 000+ conne	ected
properties, 2005–06 to 2009–10	

Source: NWC (2011i).

It is clear that risks to the quality of water supplies in almost all areas of Australia have been very effectively managed. Australia's water supply sources are continuing to diversify, and the technology and science for treating water from new sources are also evolving. This means that water quality risk management is becoming more complex, and current arrangements need to respond to this dynamic environment.

Recent work published by the Commission has revealed complex and unclear regulatory structures, a diversity of guidelines and uncertainty about their appropriate application (PWC 2011). While national efforts are underway to ensure that water quality regulation remains fully effective, many of those initiatives are short-term, one-off ventures, and some are heavily reliant on volunteer input. New cross-jurisdictional arrangements should be developed to facilitate more consistent and coordinated regulation of water quality.

Finding 4.6

Regulatory arrangements governing urban water quality to protect public health and safety and the environment have served Australia well. However, the diversification of urban water sources and continuing technological and scientific advances are placing increased stress on existing regulatory structures. There is a need for governments to consider new cross-jurisdictional arrangements to facilitate more consistent, coordinated and timely regulation into the future.

4.2.5 Regional urban water providers

There are different institutional arrangements across the country for delivering water services in regional areas. In South Australia, Western Australia and the Northern Territory, regions are usually served by a single organisation operating across the jurisdiction. By contrast, in New South Wales and in Queensland (outside the south-east), regions are usually served by local governments or organisations owned by local government. Tasmania and Victoria have regional water corporations.

Many regional providers are facing challenges in managing and replacing ageing water infrastructure. The Local Government Association of Queensland (LCAQ) recently noted that 'these challenges and policy drivers will continue to impact the industry through the next decade and many councils are not well positioned to find solutions individually under current arrangements for managing water services' (LGAQ 2010).

In 2008 an independent inquiry into regional provision of water services in New South Wales, conducted by the Hon Ian Armstrong and Dr Colin Gellatly, found evidence of both good and poor performance by local utilities against environmental, economic and public health indicators (Armstrong and Gellatly 2008). The inquiry concluded potential factors that could be contributing to the unsatisfactory performance of some local water utilities included:

- + difficulties in attracting and retaining skilled staff
- + a lack of effective regulatory incentives and sanctions
- + an absence of functional separation between water services and broader council functions
- + a lack of a commercial focus.

The report recommended the aggregation of local water utilities into regional groups and strengthened regulation and pricing arrangements, complemented by a strengthened reporting and monitoring framework and the designation of a regulator with adequate enforcement powers. To date, New South Wales has not responded to the issues raised by this inquiry, however in their submission to this assessment, New South Wales held the view that its current arrangements were effective for providing safe and reliable water supply to regional communities.

In recent years, a number of other reports have also raised concerns about the standard of urban water services provided in rural and regional areas, particularly in relation to water supply planning, public health and safety risks (ATSE 2007). The Productivity Commission has noted challenges faced by regional providers, including financial viability, water quality regulation compliance and skills shortages (PC 2011).

In Tasmania, in order to address such challenges, three regional water utilities have been established to supply water services formerly managed by local councils. In New South Wales, some water providers have taken initiatives to address scale challenges. For example, Centroc Water Utilities Alliance and Lower Macquarie Water Utilities Alliance seek to improve regional sustainability and promote regional cooperation in matters such as skills, water resource sharing, mentoring and sharing better practice strategies.

The performance of regional providers varies and the Commission considers that options for reform to address the challenges faced by small water suppliers should be considered. In response to concerns raised by the Commission and Commonwealth agencies, the Queensland Government is supporting the LGAQ and the Queensland Water Directorate to carry out a two year review of the provision of safe and reliable regional water services by local governments. This review will look at ways to ensure water service providers have the capacity to respond to changing economic conditions and regulatory frameworks, and the capacity to provide ongoing training and development for staff. Communities in regional Australia need to have the confidence that their water providers have the necessary organisational, financial, technical and management capacity to meet the interests of customers and protect public health and the environment (NWC 2011b).

Finding 4.7

Regional urban water service provision varies across Australia. Many small regional utilities face particular difficulties in meeting economic, environmental and public health objectives.

4.2.6 Urban waterway health

Urbanisation places pressure on wastewater and stormwater systems and can increase pollutant loads entering our natural waterways. While many factors contribute to urban waterway health, the urban water sector's main impacts arise from sewage spills and the management of stormwater. Sewage spills pose public health and environmental risks.

Utilities have generally improved their performance in managing discharges from sewage treatment facilities. The combination of higher treatment standards and recycling targets has also led to improvements in the quality of discharged wastewater. In collaboration with communities, catchment managers and local governments, utilities are also increasingly using recycling of stormwater and wastewater as an alternative to traditional asset management and pollution prevention approaches.

Since the commencement of the NWI, a number of programs have led to improved urban waterway health in some jurisdictions:

- + In Queensland, the South East Queensland Healthy Waterways report card has shown a continued improvement in water quality in the Eastern Banks catchment of Moreton Bay from 2001 to 2010. This has been achieved through coordinated investment to improve wastewater discharge and stormwater quality. Moreton Bay is a heavily used recreational area, and the health of the bay is important to communities in Brisbane and south-east Queensland.
- In Victoria, 10-year resource condition targets have been developed to measure changes in water quality in rivers and creeks. Since 2004, progress towards these long-term targets has been evident in Port Phillip Bay. The progress stems from improvements in water quality in the upper Yarra River, which were achieved through coordinated investment and implementation under the Heritage River Management Plan. Water quality indicators are all in accordance with the National Water Quality Management Strategy Guidelines for nearly 100% of the time.

However, threats to water quality in cities and towns will increase with population growth. Diffuse sources of pollution pose a significant threat, and are often linked to poor land-use and development controls, poor management of businesses, ageing stormwater and wastewater infrastructure, and illegal sewer connections to stormwater drains. This pollution can result in algal blooms, fish kills, swimming and boating bans, and economic losses.

Information extracted from national, state and local government state-of-the-environment reports and waterway health management strategies for urban centres gives a national snapshot of urban waterway health:

- + Urban waterways generally fail to meet ecosystem health guidelines, but improvements are occurring as a result of coordinated catchment actions.
- + Urban waterways generally fail to meet human recreation guidelines during and following rainfall, and closing waterway recreation areas at those times is standard government practice.
- + Continued high loads of nutrients, organics and sediments entering urban waterways through stormwater are resulting in a decrease of ecosystem functioning and a loss of community values.
- + Increasing flow during rainstorms due to catchment development is increasing downstream flood and pollution impacts.
- + Dioxin levels in some fish and other seafood have at times been high enough to cause the suspension of all commercial fishing in some estuaries.
- + Improvements to the quality of discharge water from treatment plants are being reported after considerable investment in plant upgrades.

Finding 4.8

Population growth is posing new risks to urban waterway health in some areas, particularly from diffuse sources of pollution. Actions in addition to those agreed under the NWI may be necessary to address those risks effectively.

4.2.7 Urban amenity and liveable cities

The NWI (clause 92) calls for the parties to innovate and build capacity to create water-sensitive Australian cities. Such efforts have the potential to benefit communities by improving the environment, enhancing amenity and improving water-use efficiency.

At the national level, actions have included the development and agreement by all governments to national water quality guidelines for the harvesting and use of urban stormwater and managed aquifer recharge. These guidelines are an essential building block to support the further safe use of alternative water sources in urban areas. Jurisdictions have also developed a national guide for evaluating options for water-sensitive urban design.



Beyond the commitments set out in the NWI, state and territory governments, the urban water industry and local governments have undertaken a range of investments and actions to support water-sensitive cities and broader 'liveable cities' objectives. However, the institutional settings for delivering those objectives and how their costs are met are not always clear.

Government efforts have included significant funding for science, research and innovation. Government-supported research hubs in Victoria, Queensland and South Australia focus on stormwater, alternative water sources, technologies and water quality safety. The Australian Government has provided research and development funding, including through the Australian Water Recycling Centre of Excellence, which supports important aspects of integrated water management.

A number of governments have moved to better align planning and development requirements with an integrated approach to the management of the urban water cycle (see Box 4.5 and Box 4.6). Western Australia has sought to apply the broader planning and environmental objectives set out in the NWI, and instituted regulatory arrangements to align land-use planning and development processes with integrated water management objectives (WAPC 2008). For example, that framework is providing the basis for water planning and research activity in the Mandurah growth region to precede land-use and planning approvals and development consent processes. Resource opportunities, constraints and incompatible land uses are being identified and taken into account in land-use decisions.

Under its *Water for Good* strategy, the South Australian Government is implementing planning objectives for water-sensitive urban design, while Queensland has implemented new stormwater management arrangements as part of its planning and development requirements (DFW 2010).

The number and scope of on-ground integrated water management projects across Australia continues to grow with funding support from national, state and local governments and in some cases from the water utility sector. The projects are diverse and have a broad range of objectives. In some cases, large consumers have embraced decentralised approaches as a way of meeting their water needs better (for example, the Victorian Racing Club).

As experience with such projects grows across the country, evidence for the relative economic efficiency and environmental performance of various technologies and approaches is developing. It will be strengthened through state-based and national research projects that are underway. It will be important that this information is managed and used effectively to ensure efficient investment decisions.

A number of urban water utilities are engaged in the development of water-sensitive cities, and some have provided the resources and technical capacity to drive innovative projects. Examples of strong organisational leadership and partnering at a development scale are Yarra Valley Water's involvement with the Kalkallo development in Victoria, Gold Coast Water's support for the Coomera Pimpama development and SA Water's role in the Mawson Lakes development. In some areas, water utilities are adopting new planning processes as a way of addressing integrated water management objectives for their communities.

Box 4.6: Integrated water management strategy—south-east Melbourne

South East Water, the government-owned retailer servicing south-east Melbourne, is leading the development of an integrated water management regional strategy in partnership with Melbourne Water and Southern Rural Water. The strategy is for the Bunyip catchment, which has an area of some 3600 square kilometres and a population of 1.4 million people and includes 15 local government areas.

The aim is to develop an integrated water management strategy that meets the needs of all water users across the whole water cycle for the south-eastern region of Melbourne and which:

- + provides greater customer choice
- + optimises resource infrastructure decisions and use
- + improves the health of waterways and water environments (including groundwater)
- + creates community value.

The regional strategy is intended to operate within the broader context of the Victorian Government's Central Region Sustainable Water Strategy and city-wide supply-demand, sewerage and waterway health strategies.

For the urban water sector, water planning at the regional catchment scale, in collaboration with all parties with a stake in the urban water cycle, is innovative and marks a change from historical roles and processes.

South East Water sees this collaborative process as providing a way to clarify roles and responsibilities in the urban water cycle between levels of government, between the public and private sectors, and between bulk and retail utilities—but in a way that delivers additional value to all parties.

The Victorian Government has recently released its *Living Melbourne, Living Victoria* roadmap, which aims to establish Melbourne as a world leader in integrated water management and sustainability. South East Water is now considering the implications for implementation planning for the regional integrated water management strategy.

The Water Services Association of Australia has taken a strong role in considering the implications and policy objectives of integrated water management, broader urban liveability objectives and the Australian urban water sector. In 2010, the association released *Cities for the future*, a report setting out views on the policy challenges and issues facing the urban water industry as it adopts a 'proactive and collaborative role' in delivering sustainable cities.

The Commission supports the efforts of the urban water sector to integrate a liveable cities agenda into the sector's planning and business models. In many ways, urban water utilities are operating ahead of current policy frameworks. Institutional arrangements, however, are generally not clear about the role of the sector in:

- + making decisions about and delivering broader public and environmental amenity services
- + agreeing on objectives and determining how to make trade-offs between costs and benefits that are inherently difficult to measure
- + determining who should pay for particular outcomes.

Confusion about roles is impeding progress across the board and creating coordination problems.

Finding 4.9

Initiatives by governments and urban utilities are making a positive contribution to the liveability of Australia's cities. There is a need for more robust evaluation of the full benefits and costs of those initiatives and greater clarity about the roles and responsibilities of service providers, including who pays for actions that have a broad community benefit.

Summary of findings

Finding 4.1

Rural communities have benefited from water access entitlements and trade reforms under the NWI, which have created a recognised and valuable business asset. This has increased irrigators' (and other entitlement holders') options for managing their businesses through short-term and longer term structural change.

Finding 4.2

Effective community engagement is critical to building trust and confidence in water planning and management. While there have been some examples of good practice, recent experience with the proposed Murray–Darling Basin Plan highlights the fragility of that trust.

The failure of many water plans to explicitly take both socioeconomic and environmental values into account undermines stakeholder confidence in the appropriateness of planning decisions.

Finding 4.3

Investment in environmental water recovery, whether through buybacks or infrastructure investment, injects money into rural communities and has increased the options for individual entitlement holders to manage farm debt, risk, production and investment decisions. However, early indications are that the overall economic impacts of water recovery programs have been minor, relative to other factors.

Finding 4.4

Since 2004, there has been considerable diversification and augmentation of water supplies to large cities and to a lesser extent smaller regional centres and towns. While this has given those communities greater supply security, the planning and investment decisions supporting diversification and augmentation have not always been well communicated, raising doubts about whether they are the most economically efficient and environmentally sustainable options.

Finding 4.5

NWI demand-management initiatives to implement the Water Efficiency Labelling and Standards Scheme and the Smart Water Mark have increased consumer awareness of water-efficient products and led to greater consumer choice.

Finding 4.6

Regulatory arrangements governing urban water quality to protect public health and safety and the environment have served Australia well. However, the diversification of urban water sources and continuing technological and scientific advances are placing increased stress on existing regulatory structures. There is a need for governments to consider new cross-jurisdictional arrangements to facilitate more consistent, coordinated and timely regulation into the future.

Finding 4.7

Regional urban water service provision varies across Australia. Many small regional utilities face particular difficulties in meeting economic, environmental and public health objectives.

Finding 4.8

Population growth is posing new risks to urban waterway health in some areas, particularly from diffuse sources of pollution. Actions in addition to those agreed under the NWI may be necessary to address those risks effectively.

Finding 4.9

Initiatives by governments and urban utilities are making a positive contribution to the liveability of Australia's cities. There is a need for more robust evaluation of the full benefits and costs of those initiatives and greater clarity about the roles and responsibilities of service providers, including who pays for actions that have a broad community benefit.

References

Executive overview

SKM (Sinclair Knight Merz) 2007, *High Conservation Value Aquatic Ecosystems Project—identifying, categorising and managing HCVAE*, Sinclair Knight Merz, Melbourne, *www.environment.gov.au/water/publications/environmental/ecosystems/pubs/hcvae.pdf*.

Chapter 1

ACT Government 2011, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

AWA (Australian Water Association) 2010a, National Water Skills Strategy Business Plan: an action plan for meeting the Australian water sector's workforce capacity needs, AWA, Melbourne, www.awa.asn.au/uploadedFiles/National%20Water%20Skills%20Business%20Plan%20-%20Final.pdf.

Belzile JA 2011, *Lessons from Oz to the Okanagan: water policy and structural reform in a changing climate*, draft master's thesis, University of British Columbia, Institute of Resources, Environment and Sustainability, British Columbia.

BoM (Bureau of Meteorology) 2011, Water information, BoM, www.bom.gov.au/water/about/waterRole/index.shtml (accessed 13 June 2011).

COAG (Council of Australian Governments) 1994, COAG Water Reform Framework, Marine and Water Division of Environment Australia and COAG, Canberra.

COAG (Council of Australian Governments) 2011, National Water Initiative policy guidelines for water planning and management, COAG Reform Council, Canberra.

DEWHA (Department of Environment, Water, Heritage and the Arts) 2009, National Water Skills Strategy, DEWHA, Canberra, www.environment.gov.au/water/publications/action/pubs/national-water-skills-strategy.pdf.

DLWBC–DPI (Department of Land, Water, Biodiversity Conservation, Department of Primary Industries) 2009, Managing the water resource impacts of plantation forests: a statewide policy framework, DLWBC and DPI, Adelaide, www.waterforgood.sa.gov.au/wp-content/uploads/2010/11/wr_policy_framework.pdf.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2010a, *National Water Initiative Pricing Principles*, prepared by the Steering Group on Water Charges, DSEWPaC, Canberra, *www.environment.gov.au/water/publications/action/pubs/nwi-pricing-principles.pdf*.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2010b, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011b, Policy and reform in the area of urban water: National Urban Water Planning Principles, DSEWPaC, Canberra, 23 October 2009, www.environment.gov.au/water/policy-programs/urban-reform/nuw-planning-principles.html (accessed 21 April 2011).

FPWEC (First Peoples' Water Engagement Council) 2011, National Water Initiative: 2011 biennial assessment of progress in implementation submission on discussion paper, National Water Commission, Canberra.

Hamstead M 2010, Alignment of water planning and catchment planning, Waterlines report no. 36, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/Waterlines_36_Alignment.pdf.

Hamstead M, Baldwin C and O'Keefe V 2008, *Water allocation planning in Australia: current practices and lessons learned*, Waterlines report no. 6, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/Waterlines_no_6.pdf*.

ICE WaRM (International Centre of Excellence in Water Resources Management) 2008, *National Water Skills Audit*, Department of Environment, Water, Heritage and the Arts for the Council of Australian Governments, Canberra, *www.awa.asn.au/uploadedFiles/Content/Programs_and_Networks/ Industry_Programs_docs/National_Water_Skills_Strategy_Business_Plan/National%20Water%20Skills%20Audit_low%20res%20(2).pdf.*

ICRC (Independent Competition and Regulatory Commission) 2010, Draft report: Enlarged Cotter Dam Water Security Project, report 6/2010, ICRC, Canberra.

Industry Commission 1992, Water resources and waste water disposal, Australian Government Publishing Service, Canberra.

IPART (Independent Pricing and Regulatory Tribunal) 2011, Fact sheet: IPART's approach to the determination, IPART, Sydney, www.ipart.nsw.gov.au/ files/Fact%20Sheet%20-%20Review%20of%20Prices%20for%20the%20Water%20Administration%20Ministerial%20Corporation%20-%20How%20 IPART%20has%20made%20its%20Determination%20-%20February%202011%20-%20Website%20Document.PDF.

Jackson S and Robinson C 2009, 'Indigenous participation in water planning and management', in Stone P (ed.), *Northern Australia Land and Water Science Review 2009*, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra, 1–29.

Minerals Council of Australia 2010, National Water Initiative: 2011 biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra

NFF (National Farmers' Federation) 2011, National Water Initiative: biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/National_Farmers_federation.pdf.

NOW (NSW Office of Water) 2009, Scientific and technical operating procedures: NSW Interim Water Meter Standards, no. a0048, NOW, Sydney.

NSW Government 2011, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

NT Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

NWC (National Water Commission) 2009a, Australian water reform 2009: second biennial assessment of progress in implementation of the National Water Initiative, NWC, Canberra, www.nwc.gov.au/resources/documents/2009_BA_complete_report.pdf.

NWC (National Water Commission) 2011a, The coal seam gas and water challenge: National Water Commission position, NWC, Canberra.

NWC (National Water Commission) 2011c, National hydrologic modelling strategy: Source Rivers progress, NWC, Canberra, December 2010, www.nwc.gov.au/www/html/2943-source-rivers.asp?intSiteID=1 (accessed 14 June 2011).

NWC (National Water Commission) 2011h, Strengthening Australia's water markets, NWC, Canberra, www.nwc.gov.au/resources/documents/StrengtheningAustraliasWaterMarketsReport.pdf.

NWC and AWA (National Water Commission and Australian Water Association) 2011, *Community of practice for environmental water managers*, NWC and AWA, Canberra, *www.cop4ewm.com.au/* (accessed 14 June 2011).

Queensland Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

SA Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

SKM, CSIRO and BRS (Sinclair Knight Merz, Commonwealth Scientific and Industrial Research Organisation and Bureau of Rural Sciences) 2010, Surface and/or groundwater interception activities: initial estimates, Waterlines report no. 30, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/Surface_and_or_groundwater_interception_activities_23June.pdf.

Sunwater Limited 2010, National Water Initiative: 2011 biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra.

Tasmanian Government 2011, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

Victorian Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

WA Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

Chapter 2

ABARES (Australian Bureau of Agricultural and Resource Economics) 2011, *Draft overview of recent changes in irrigated agriculture in the MDB 2006–07 to 2008–09*, report prepared for the National Water Commission, National Water Commission, Canberra.

ABS (Australian Bureau of Statistics) 2010a, Water Account Australia 2008–09, cat. no. 4610.0, ABS, Canberra.

ABS (Australian Bureau of Statistics) 2010b, *Experimental estimates of the gross value of irrigated agricultural production*, 2000–01– 2008–09, cat. no. 4610.0.55.008, ABS, Canberra.

ACCC (Australian Competition and Consumer Commission) 2010a, ACCC final advice on an amendment to the Water Charge (Termination Fees) Rules 2009, ACCC, Canberra, www.environment.gov.au/water/australia/water-act/pubs/accc-advice-minister-2009.pdf.

ACCC (Australian Competition and Consumer Commission) 2010b, Water Trading Rules: final advice, ACCC, Canberra, www.accc.gov.au/content/item. phtml?itemId=950331&nodeId=250865357ae6932908a436c8deb931e2&fn=Water%20trading%20rules%20-%20final%20advice.pdf.

ACCC (Australian Competition and Consumer Commission) 2011, ACCC water monitoring report 2009–10, ACCC, Canberra, www.accc.gov.au/ content/item.phtml?itemId=985068&nodeId=b3aab9af8477889c485730194d807291&fn=ACCC%20Water%20Report%202009-10%20-%20 high%20resolution%20version.pdf

Ashton D, Oliver M and Formosa T 2011, *Overview of recent changes in irrigated agriculture in the Murray–Darling Basin 2006–07 to 2008–09*, ABARES report prepared for the National Water Commission, National Water Commission, Canberra.

CIE (Centre for International Economics) 2010, Cost effectiveness analysis: 2010 Sydney Metropolitan Water Plan, NSW Office of Water, Sydney, www.waterforlife.nsw.gov.au/__data/assets/pdf_file/0005/16997/CIE_final_report_26_May_2010.pdf.

COAG (Council of Australian Governments) 1994, COAG Water Reform Framework, Marine and Water Division of Environment Australia and COAG, Canberra.

COAG Reform Council (Council of Australian Governments Reform Council) 2010, Report to the Council of Australian Governments: Water management partnerships: report on performance 2009, COAG Reform Council, Sydney.

DOW (Department of Water) 2009, Water resources management options: discussion paper, DOW, Perth.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2010a, National Water Initiative Pricing Principles, prepared by the Steering Group on Water Charges, DSEWPaC, Canberra, www.environment.gov.au/water/publications/action/pubs/nwi-pricing-principles.pdf.

ERA (Economic Regulation Authority) 2011, *Final report: inquiry into water resource management and planning charges*, ERA, Perth, *www.erawa.com. au/cproot/9476/2/20110329%20D62487%20Final%20Report%20-%20Inquiry%20into%20Water%20Resource%20Management%20and%20 Planning%20Charges.PDF.*

Frontier Economics 2011, Externality pricing in the Australian water sector, Waterlines report no. 43, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/43_Externalities.pdf.

ICRC (Independent Competition and Regulatory Commission) 2010, Draft report: Enlarged Cotter Dam Water Security Project, report 6 of 2010, ICRC, Canberra.

IPART (Independent Pricing and Regulatory Tribunal) 2011, *IPART Fact sheet: IPART's approach to the determination*, IPART, Sydney, *www.ipart.nsw.* gov.au/files/Fact%20Sheet%20-%20Review%20of%20Prices%20for%20the%20Water%20Administration%20Ministerial%20Corporation%20-%20 How%20IPART%20has%20made%20its%20Determination%20-%20February%202011%20-%20Website%20Document.PDF.

KPMG 2008, The potential for water trading in Western Australia: a report prepared for the Department of Water, Department of Water, Perth.

NFF (National Farmers' Federation) 2011, National Water Initiative: biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/National_Farmers_federation.pdf.

NWC (National Water Commission) 2008, Australian water markets report 2007–2008, NWC, Canberra, www.nwc.gov.au/resources/documents/AWMR2007-08COMPLETE.pdf.

NWC (National Water Commission) 2009a, Australian water reform 2009: second biennial assessment of progress in implementation of the National Water Initiative, NWC, Canberra, www.nwc.gov.au/resources/documents/2009_BA_complete_report.pdf.

NWC (National Water Commission) 2009b, Australian water markets report 2008–2009, NWC, Canberra, www.nwc.gov.au/resources/documents/AWMR_08-09_Full_report.pdf (accessed 16 July 2010).

NWC (National Water Commission) 2010b, National performance report 2008–2009: urban water utilities, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_2008-09_Urban_Part_A2.pdf; www.nwc.gov.au/resources/documents/National_Performance_Report_ URBAN_2008-09_-_PART_B_-_WEB_FINAL3.pdf.

NWC (National Water Commission) 2010d, National performance report 2008–2009: rural water service providers, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_RuralReport_08-09.pdf.

NWC (National Water Commission) 2010e, Australian water markets report 2009–2010, NWC, Canberra, www.nwc.gov.au/resources/documents/AWMR_2009-103.pdf.

NWC (National Water Commission) 2010g, The impacts of water trading in the southern Murray–Darling Basin: an economic, social and environmental assessment, NWC, Canberra, www.nwc.gov.au/resources/documents/681-NWC_ImpactsofTrade_web.pdf.

NWC (National Water Commission) 2011d, National performance report 2009–2010: rural water service providers, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_rural2.pdf.

NWC (National Water Commission) 2011e, Review of pricing reform in the Australian water sector, NWC, Canberra, www.nwc.gov.au/resources/documents/review_of_pricing_reform.pdf.

NWC (National Water Commission) 2011g, Australian water markets: trends and drivers 2007–08 to 2009–10, NWC, Canberra, www.nwc.gov.au/resources/documents/AWMR-companion-09-10_FA-1.pdf.

NWC (National Water Commission) 2011h, Strengthening Australia's water markets, NWC, Canberra, www.nwc.gov.au/resources/documents/StrengtheningAustraliasWaterMarketsReport.pdf.

NWC (National Water Commission) 2011i, National performance report 2009–2010: urban water utilities, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_urban.pdf; www.nwc.gov.au/resources/documents/Urban_NPR_2009-10_Part_B.pdf.

NWC and AWA (National Water Commission and Australian Water Association) 2011, *Community of practice for environmental water managers*, NWC and AWA, Canberra, *www.cop4ewm.com.au/* (accessed 14 June 2011).

OTTER (Office of the Tasmanian Economic Regulator) 2011, Tasmanian water and sewerage state of the industry report 2009–10, OTTER, Hobart, www.gpoc.tas.gov.au/domino/otter.nsf/LookupFiles/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415.pdf PC (Productivity Commission) 2008, Towards urban water reform: a discussion paper, research paper, Productivity Commission, Melbourne, www.pc.gov.au/__data/assets/pdf_file/0003/78150/urbanwaterreform.pdf.

Victorian Auditor-General 2010, Restricting environmental flows during water shortages, Victorian Auditor-General's Office, Melbourne, http://download.audit.vic.gov.au/files/20100710_Water_report.pdf.

Young MD, Shi T and McIntyre W 2006, Informing reform: scoping the affects, effects and effectiveness of high level water policy reforms on irrigation investment and practice in four irrigation areas, technical report no. 02/06, Cooperative Research Centre for Irrigation Futures, Canberra, www.irrigationfutures.org.au/imagesDB/news/CRCIF-TR-0206-col.pdf.

Chapter 3

AWA (Australian Water Association) 2010b, National Water Initiative: 2011 biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra.

CEWH (Commonwealth Environmental Water Holder) 2010a, Commonwealth environmental water: 2009–10 outcomes report, CEWH, Canberra, www.environment.gov.au/water/publications/action/pubs/cewh-outcomes-report-09-10.pdf.

CEWH (Commonwealth Environmental Water Holder) 2010b, *Commonwealth environmental water: 2008–09 outcomes report*, CEWH, Canberra, *www.environment.gov.au/water/publications/action/pubs/cewh-outcomes-report-08-09.pdf.*

Christie H 2007, 'Real-life management of an environmental water reserve: a Wimmera perspective', 5th Australian Stream Management Conference: Australian rivers—making a difference, Albury, NSW.

CIE (Centre for International Economics) 2010, Cost effectiveness analysis: 2010 Sydney Metropolitan Water Plan, NSW Office of Water, Sydney, www.waterforlife.nsw.gov.au/__data/assets/pdf_file/0005/16997/CIE_final_report_26_May_2010.pdf.

COAG (Council of Australian Governments) 1994, COAG Water Reform Framework, Marine and Water Division of Environment Australia and COAG, Canberra.

COAG (Council of Australian Governments) 2004, Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia, and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory, Commonwealth of Australia, Canberra.

Colloff MJ, Overton IC, Cuddy SM, Doody TM, Henderson B and Capon SJ 2010, *Improving environmental water planning and policy outcomes:* ecological responses to flow regimes in the Murray–Darling Basin, Waterlines report no. 34, National Water Commission, Canberra.

CSIRO (Commonwealth Scientific and Industrial Research Organisation) 2011a, *Sustainable Yields projects*, Water for a Health Country Flagship, CSIRO, Canberra, *www.csiro.au/partnerships/SYP.html* (accessed 14 June 2011).

CSIRO (Commonwealth Scientific and Industrial Research Organisation) 2011b, Water for a Healthy Country Flagship, CSIRO, Canberra, www.csiro.au/org/WfHC--ci_pageNo-1.html (accessed 13 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011a, *New South Wales wetland recovery plan: Macquarie Marshes and Gwydir Wetlands*, NSW, 15 December 2009, DSEWPaC, Canberra, *www.environment.gov.au/water/policy-programs/water-smart/projects/nsw06.html* (accessed 10 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011c, *Water for the Future*, DSEWPaC, Canberra, *www.environment.gov.au/water/australia/index.html* (accessed 13 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011d, Northern Australia Water Futures Assessment, DSEWPaC, Canberra, 19 January 2011, www.environment.gov.au/water/policy-programs/northern-australia/index.html (accessed 14 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011e, *Sustainable rural water use and infrastructure*, DSEWPaC, Canberra, 23 May 2011, *www.environment.gov.au/water/policy-programs/srwui/index.html* (accessed 23 May 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011f, National Water Security Plan for Cities and Towns, DSEWPaC, Canberra, 16 December 2010, www.environment.gov.au/water/policy-programs/cities-towns/index.html (accessed 22 April 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011g, *Restoring the Balance in the Murray–Darling Basin*, DSEWPaC, Canberra, *www.environment.gov.au/water/policy-programs/entitlement-purchasing/index.html* (accessed 10 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011h, *Progress of water* recovery under the Restoring the Balance in the Murray–Darling Basin program, DSEWPaC, Canberra, 31 May 2011, www.environment.gov.au/water/policy-programs/entitlement-purchasing/2008-09.html (accessed 10 June 2011).

Hamstead M, Baldwin C and O'Keefe V 2008, *Water allocation planning in Australia: current practices and lessons learned*, Waterlines report no. 6, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/Waterlines_no_6.pdf*.

MDBA (Murray–Darling Basin Authority) 2011a, The Living Murray: environmental water recovery progress report, 27 May 2011, MDBA, Canberra.

MDBA (Murray–Darling Basin Authority) 2011b, 'MDBA Chair Mr Craig Knowles' speech to the Sustaining Rural Communities Conference (Narrabri)', media release, 6 April 2011.

MDBA (Murray–Darling Basin Authority) 2011c, The Living Murray, MDBA, Canberra, http://mdba.gov.au/programs/tlm (accessed 10 June 2011).

MDBA (Murray–Darling Basin Authority) 2011d, *Environmental works and measures*, MDBA, Canberra, *http://mdba.gov.au/programs/tlm/programs_to_deliver/works_measures* (accessed 10 June 2011).

NOW (NSW Office of Water) 2011, Environmental flow response and socio-economic monitoring: Border Rivers progress report 2009, NOW, Sydney.

NWC (National Water Commission) 2007a, Australian water resources 2005: a baseline assessment of water resources for the National Water Initiative: Key findings of the Level 2 assessment: Summary results, NWC, Canberra, http://water.gov.au/publications/AWR2005_Level_2_Report_May07.pdf.

NWC (National Water Commission) 2009a, Australian water reform 2009: second biennial assessment of progress in implementation of the National Water Initiative, NWC, Canberra, www.nwc.gov.au/resources/documents/2009_BA_complete_report.pdf.

NWC (National Water Commission) 2010a, National Water Commission position: sustainable levels of extraction, NWC, Canberra, www.nwc.gov.au/resources/documents/National_Water_Commission_SLE_11_5.pdf.

NWC (National Water Commission) 2010f, Australian environmental water management report 2010, NWC, Canberra, www.nwc.gov.au/resources/documents/803-NWC_AustEnvironmentalWaterManagementReport_web.pdf.

NWC (National Water Commission) 2010g, The impacts of water trading in the southern Murray–Darling Basin: an economic, social and environmental assessment, NWC, Canberra, www.nwc.gov.au/resources/documents/681-NWC_ImpactsofTrade_web.pdf.

NWC (National Water Commission) 2011f, Investigating low flows for improved water planning and management, NWC, Canberra, 16 May 2011, www.nwc.gov.au/www/html/2439-investigating-low-flows-for-improved-water-planning-and-management-.asp?intSiteID=1 (accessed 14 June 2011).

NWC (National Water Commission) 2011i, National performance report 2009–2010: urban water utilities, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_urban.pdf; www.nwc.gov.au/resources/documents/Urban_NPR_2009-10_Part_B.pdf.

NWC (National Water Commission) 2011j, National coordination of the framework for the assessment of river and wetland health (FARWH) trials, NWC, Canberra, 3 February 2011, www.nwc.gov.au/www/html/462-national-coord-of-farwh-trials.asp?intSiteID=1 (accessed 14 June 2011).

NWC (National Water Commission) 2011k, National Groundwater Action Plan, NWC, Canberra, www.nwc.gov.au/www/html/350-groundwater-action-plan.asp?intSiteID=1 (accessed 14 March 2011).

NWC and AWA (National Water Commission and Australian Water Association) 2011, *Community of practice for environmental water managers*, NWC and AWA, Canberra, *www.cop4ewm.com.au/* (accessed 14 June 2011).

NWC, Griffith University, CSIRO and TRaCK (National Water Commission, Griffith University, Commonwealth Scientific and Industrial Research Organisation and Tropical Rivers and Coastal Knowledge) 2011, *Water planning tools: water planning portal, http://waterplanning.org.au/* (accessed 14 June 2011).

SA Government 2010, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

SKM (Sinclair Knight Merz) 2007, High Conservation Value Aquatic Ecosystems Project—identifying, categorising and managing HCVAE, Sinclair Knight Merz, Melbourne, www.environment.gov.au/water/publications/environmental/ecosystems/pubs/hcvae.pdf.

SKM (Sinclair Knight Merz) 2011, *Evolving issues and practices in groundwater-dependent ecosystem management*, Waterlines report no. 46, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/46_GDE.pdf*.

TRaCK 2011, Welcome to TRaCK, National Water Commission and the Department of Sustainability, Environment, Water, Population and Communities, Canberra, www.track.gov.au/ (accessed 14 June 2011).

Victorian Auditor-General 2010, Restricting environmental flows during water shortages, Victorian Auditor-General's Office, Melbourne, http://download.audit.vic.gov.au/files/20100710_Water_report.pdf.

WSAA (Water Services Association of Australia) 2010, WSAA report card 2009-2010: performance of the Australian urban water industry and projections for the future, WSAA, Melbourne, www.wsaa.asn.au/About/News/Documents/20101108%20WSAA%20Report%20Card%202009-2010%20FINAL.pdf.

Chapter 4

ABS (Australian Bureau of Statistics) 2007, Environmental issues: people's views and practices, March 2007, cat. no. 4602.0, ABS, Canberra.

AECOM 2011, Review of Regional Water Quality and Security, Infrastructure Australia, Canberra, www.infrastructureaustralia.gov.au/publications/files/Review_of_RegionalWaterQuality_and_Security_Volume2_251010.pdf.

Armstrong I and Gellatly C 2008, *Report of the independent inquiry into secure and sustainable urban water supply and sewerage services for non-metropolitan NSW*, Department of Water and Energy, New South Wales Government, Sydney.

ATSE (Australian Academy of Technological Sciences and Engineering) 2007, Urban water: review of water supply planning for Australia's non-metropolitan urban water utilities, ATSE, Sydney.

CIE (Centre for International Economics) 2010, Cost effectiveness analysis: 2010 Sydney Metropolitan Water Plan, NSW Office of Water, Sydney, www.waterforlife.nsw.gov.au/__data/assets/pdf_file/0005/16997/CIE_final_report_26_May_2010.pdf.

COAG (Council of Australian Governments) 1994, COAG Water Reform Framework, Marine and Water Division of Environment Australia and COAG, Canberra.

COAG (Council of Australian Governments) 2004, Intergovernmental Agreement on a National Water Initiative between the Commonwealth of Australia, and the Governments of New South Wales, Victoria, Queensland, South Australia, the Australian Capital Territory and the Northern Territory, Commonwealth of Australia, Canberra.

CUAC (Consumer Utilities Advocacy Centre) 2010, Australia's urban water sector—submission on Productivity Commission issues paper, vol. 46, Productivity Commission, Melbourne.

DFW (Department for Water) 2010, Water for Good: a plan to ensure our water future to 2050, DFW, Adelaide, www.waterforgood.sa.gov.au/wp-content/uploads/2009/06/complete-water-for-good-plan.pdf.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011f, *National Water Security Plan for Cities and Towns*, DSEWPaC, Canberra, 16 December 2010, *www.environment.gov.au/water/policy-programs/cities-towns/index.html* (accessed 22 April 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011i, *National Urban Water and Desalination Plan*, DSEWPaC, Canberra, 10 May 2011, *www.environment.gov.au/water/policy-programs/urban-water-desalination/index.html* (accessed 22 April 2011).

ESC (Essential Services Commission) 2006, Water performance report: performance of urban water and sewerage businesses, July 2004 – June 2005, ESC, Melbourne, www.esc.vic.gov.au/NR/rdonlyres/4101FCBC-21A9-4C4C-9FEC-88CDCF81889F/0/WaterPerformanceReport_0405.pdf.

Guest C 2010, Independent Review of the Water Efficiency Labelling and Standards Scheme (WELS), Department of Sustainability, Environment, Water, Population and Communities, Canberra, www.environment.gov.au/water/wels-review/index.html (accessed 27 January 2011).

Hamstead M, Baldwin C and O'Keefe V 2008, *Water allocation planning in Australia: current practices and lessons learned*, Waterlines report no. 6, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/Waterlines_no_6.pdf*.

ISF (Institute for Sustainable Futures) 2008, Cost effectiveness of the Water Efficiency Labelling Scheme (WELS), ISF, Melbourne.

Kuehne G, Bjornlund H and Cheers B 2008, 'Identifying common traits among Australian irrigators using cluster analysis', *Water Science & Technology*, 58(3):587–95.

LGA NSW and SA NSW 2010, *National Water Initiative*: 2011 biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra, www.nwc.gov.au/resources/documents/Local_Government_Association_of_NSW_Submission.pdf.

LGAQ 2010, Australia's urban water sector—submission on Productivity Commission issues paper, vol. 20, Productivity Commission, Melbourne, www.pc.gov.au/__data/assets/pdf_file/0007/103579/sub020.pdf.

Mallawaarachchi T and Foster A 2009, *Dealing with irrigation drought: the role of water trading in adapting to water shortages in 2007–08 in the southern Murray–Darling Basin*, ABARE research report, no. 09.6, Department of the Environment, Water, Heritage and the Arts, Canberra.

MDBA (Murray–Darling Basin Authority) 2011b, 'MDBA Chair Mr Craig Knowles' speech to the Sustaining Rural Communities Conference (Narrabri)', media release, 6 April 2011.

NSW Government 2011, unpublished submission to the National Water Commission to inform the 2011 biennial assessment of the National Water Initiative.

NWC (National Water Commission) 2007a, Australian water resources 2005: a baseline assessment of water resources for the National Water Initiative: Key findings of the Level 2 assessment: Summary results, NWC, Canberra, http://water.gov.au/publications/AWR2005_Level_2_Report_May07.pdf.

NWC (National Water Commission) 2007b, National Water Initiative urban reform action (paragraph 92iv), Institutional and regulatory models for integrated urban water cycle management, issues and scoping paper, NWC, Canberra, www.nwc.gov.au/resources/documents/Institutional-reg-models-integrated-urban-water-cycle-management-PUB-0307.pdf.

NWC (National Water Commission) 2010g, The impacts of water trading in the southern Murray–Darling Basin: an economic, social and environmental assessment, NWC, Canberra, www.nwc.gov.au/resources/documents/681-NWC_ImpactsofTrade_web.pdf.

NWC (National Water Commission) 2011b, Urban water in Australia: future directions, NWC, Canberra, www.nwc.gov.au/resources/documents/Future_directions.pdf.

NWC (National Water Commission) 2011e, Review of pricing reform in the Australian water sector, NWC, Canberra, www.nwc.gov.au/resources/documents/review_of_pricing_reform.pdf.

NWC (National Water Commission) 2011i, National performance report 2009–2010: urban water utilities, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_urban.pdf; www.nwc.gov.au/resources/documents/Urban_NPR_2009-10_Part_B.pdf.

OTTER (Office of the Tasmanian Economic Regulator) 2011, *Tasmanian water and sewerage state of the industry report 2009–10*, OTTER, Hobart, *www.gpoc.tas.gov.au/domino/otter.nsf/LookupFiles/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Mater_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Mater_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Mater_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Mater_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Report_2009_1194. pdf/\$file/11949_Tasmanian_Report_2009_1194. pdf/\$*

PC (Productivity Commission) 2008, *Towards urban water reform: a discussion paper*, Productivity Commission, Melbourne, *www.pc.gov.au/___data/assets/pdf_file/0003/78150/urbanwaterreform.pdf*.

PC (Productivity Commission) 2011, Australia's urban water sector, Productivity Commission: draft report, April 2011, Productivity Commission, Melbourne, www.pc.gov.au/__data/assets/pdf_file/0006/107745/urban-water-draft.pdf.

PIAC (Public Interest Advocacy Centre) 2010, Australia's urban water sector—submission on Productivity Commission issues paper, vol. 61, Productivity Commission, Melbourne.

PWC (PricewaterhouseCoopers) 2011, *Review of urban water quality regulation in Australia*, Waterlines report no. 47, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/47_review_of_urban_water.pdf*.

QFF (Queensland Farmers' Federation) 2010, National Water Initiative: 2011 biennial assessment of progress in implementation—submission on discussion paper, National Water Commission, Canberra.

Tan P-L, Mooney C, White I, Hoverman S, Mackenzie J, Burry K, Baldwin C, Bowmer K, Jackson S, Ayre M and George D 2010, *Tools for water planning: lessons, gaps and adoption*, Waterlines report no. 34, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/Waterlines_no37_tools.pdf.*

WAPC (Western Australian Planning Commission) 2008, Better urban water management, WAPC, Perth.

Western Corridor Recycled Water 2011, *The Australian Water Recycling Centre of Excellence*, Australian Water Recycling Centre of Excellence, Brisbane, *www.australianwaterrecycling.com.au/coe/*.

Western Division Councils of NSW 2010, Submission to the Guide to the proposed Basin Plan, Murray–Darling Basin Authority, Canberra, www.mdba.gov.au/files/submissions/Western%20Division%20Councils%20of%20NSW.pdf.

WSAA (Water Services Association of Australia) 2010, WSAA report card 2009-2010: performance of the Australian urban water industry and projections for the future, WSAA, Melbourne, www.wsaa.asn.au/About/News/Documents/20101108%20WSAA%20Report%20Card%202009-2010%20FINAL.pdf.

Abbreviations and acronyms

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACCC	Australian Competition and Consumer Commission
ACT	Australian Capital Territory
ANAE	Australian National Aquatic Ecosystems (classification system)
CEWH	Commonwealth Environmental Water Holder
СМА	catchment management authority
CRC	cooperative research centre
CRP	Community Reference Panel
CSG	coal-seam gas
CSIR0	Commonwealth Scientific and Industrial Research Organisation
DERM	Department of Environment and Resource Management (Qld)
DOW	Department of Water (WA)
DPIPWE	Department of Primary Industries, Parks, Water and Environment (Tas.)
DSE	Department of Sustainability and Environment (Vic.)
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EPA	Environment/Environmental Protection Authority
ERA	Economic Regulation Authority (WA)
ERRR	economic real rate of return
ESC	Essential Services Commission (Vic.)
FARWH	Framework for the Assessment River and Wetland Health
FPWEC	First People's Water Engagement Council
GAP	National Groundwater Action Plan
GDE	groundwater-dependent ecosystem
GL	gigalitre
GVIAP	gross value of irrigated agricultural production
HEVAE	high ecological value aquatic ecosystem
110	irrigation infrastructure operator
ICRC	Independent Competition and Regulatory Commission (ACT)
IECA	Integrated Ecological Condition Assessment
IPART	Independent Pricing and Regulatory Tribunal (NSW)
MDB	Murray–Darling Basin

MDBA	Murray–Darling Basin Authority
ML	megalitre
NPAT	net profit after tax
NRM	natural resource management
NSW	New South Wales
NWMS	National Water Market System
OEH	Office of Environment and Heritage (NSW)
PAWC	Power and Water Corporation (NT)
PWA	prescribed wells area (SA)
PWC	prescribed water course (SA)
QCA	Queensland Competition Authority
RSMG	Risk and Sustainable Management Group (University of Qld)
SDL	sustainable diversion limit
SEQ	south-east Queensland
SWMA	surface water management area
SWS	sustainable water strategy (Vic.)
TRaCK	Tropical Rivers and Coastal Knowledge
WAC	water abstraction charge (ACT)
WAE	water access entitlement
WAL	water access licence
WAP	water allocation plan (SA, WA, NT)
WELS Scheme	Water Efficiency Labelling and Standards Scheme
WMA	water management area
WMP	water management plan (Tas.)
WSP	water sharing plan (NSW)
WSPA	water supply protection area (Vic.)

Glossary of terms

4% interim threshold limit on water trade: an annual limit to permanent trade out of an irrigation area of 4% of the total water entitlement of that area

Adaptive environmental water: licensed water that can be used for environmental purposes, obtained either through the buying of water licences or through other 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: established under the *Water Act 2007* to manage the water entitlements that the Australian Government acquires. Those entitlements are used to protect or restore environmental assets such as wetlands and streams, including those in the Murray–Darling Basin.

Community service obligation: the amount received or receivable from governments for specific agreed services to the community. A community service obligation 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: the amount of water that can be made available for consumptive use in a given water system under the rules of the relevant water plan.

Consumptive use: the use of water for private benefit consumptive purposes, including irrigation, industry, urban uses, stock and domestic use.

Environmental buyback programs: programs designed to purchase water entitlements, which would otherwise be used by irrigators, to ensure certain environmental flows.

Environmental and other public benefit outcomes: defined as part of the water planning process and specified in water plans. May include:

- + *environmental outcomes:* maintaining ecosystem function (such as through periodic inundation of floodplain wetlands), biodiversity, water quality, river health
- + *other public benefits:* mitigating pollution, public health (such as limiting noxious algal blooms), Indigenous values, cultural values, recreation, fisheries, tourism, navigation and amenity values.

Environmental water manager: 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 water manager varies 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 water 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: descriptions of flow regimes (for example, 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: 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: a side-effect of a decision by an individual (or business) that affects another party's wellbeing, but that is not taken into appropriate account by the decision maker.

Extraction rate: the rate, in terms of unit volume per unit time, at which water can be drawn from a surface or groundwater system.

Groundwater Action Plan: a comprehensive funding program initiated by the Commission in 2007 to invest in projects that enhance groundwater management and improve our knowledge and understanding of groundwater.

Lower-bound pricing: the price level at which, to be viable, a water business should recover at least its operational, maintenance and administrative costs, externalities, taxes or tax equivalents (not including income tax) and the interest cost on debt and dividends (if any), and make provision for future asset refurbishment or replacement. Dividends should be set at a level that reflects commercial realities and stimulates a competitive market.

Managed aquifer recharge: the returning of water to aquifers through managed percolation.

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: situations in which, with the 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.

Overuse: situations in which 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: a funding program administered by the Commission, which supports projects that improve Australia's national capacity to measure, monitor and manage water resources.

Ramsar Convention: an intergovernmental treaty signed at the Convention on Wetlands in Ramsar, Iran, in 1971. The convention provides a framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. There are currently 160 contracting parties to the convention; some 1933 wetland sites totalling 189 million hectares are included in the Ramsar List of Wetlands of International Importance.

Reliability class: reflects 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: 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.

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 volume 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 policies.

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.

Termination fee: 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 of water rights into distinct components, each of which confers specific rights on the holder, such as water take, water delivery, water use and works approval.

Upper-bound pricing: the price level at which, to avoid monopoly rents, a water business should not recover more than operational, maintenance and administrative costs, externalities, taxes or tax equivalents, the cost of asset consumption and the cost of capital (calculated using a weighted average cost of capital).

Water access entitlement: a perpetual or ongoing entitlement to exclusive access to a share of water from a specified consumptive pool as defined in the relevant water plan.

Water allocation: the specific volume of water allocated to a water access entitlement in a given season, defined according to rules established in the relevant water plan.

Water charge rules: rules made by the Minister for 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 regional natural resource management plans, developed in consultation with all relevant stakeholders on the basis of the best scientific and socioeconomic assessments, to provide secure ecological outcomes and resource security for water 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 (subcatchment, catchment, basin or drainage division, groundwater management unit, sub-aquifer, aquifer, groundwater basin, and so on).

Index

A

accountability, 55-6, 110-15 agriculture, 67-71, 125-7 appliances and products, water-efficiency of, 136 aquatic and water-dependent ecosystems see water-dependent ecosystems Australian Bureau of Agricultural and Resource Economics and Sciences, 69-70 Australian Competition and Consumer Commission, 38, 72, 76, 336 Australian Water Association, 54, 55 Australian water reform accountability and nationally compatible approaches, 55-6 overview, 3-4 progress, 22-3 reform machinery, 16-17 Water Act 2007 (Cwth), 21, 38, 47, 48, 49, 72, 88, 111-12, 150, 200 - 1see also National Water Initiative Australian Water Research and Development Coalition, 52 Australian Water Resources Information System, 49

B

best practice water pricing progress summaries, 203–5, 212–14, 225–9, 241–3, 253–5, 268–70, 281–4, 297–8, 310–12 *see also* water pricing bores, 40, 132 *see also* intercepted water Bureau of Meteorology, 15, 38, 48–9

C

catchment management, 37, 38 Centre for Australian Weather and Climate Research, 49 climate change adaptation and mitigation initiatives, 7, 8, 14 co-produced water regulation, 43-4 coal-seam gas extraction impacts on water resources, 14, 43-4 Commonwealth Environmental Water Holder, 38, 76, 107, 111-12 communities adaptive capacity, 125-8 drought responses and interventions, 129-35 efficient water use, 135-6 engagement in water planning, 10-11, 123-4 impacts of NWI reforms, 6, 121 irrigation communities, 6, 9, 86, 121, 125, 127 metropolitan and regional urban communities, 129-41 public health, 137 rural communities, 122-8 structural adjustment, 128, 195 communities of practice, 55 community engagement, 10-11, 123-4

community partnerships and adjustment progress summaries, 208–9, 217, 237–8, 246, 261, 276, 287, 304, 318–19 compliance and enforcement, 10, 51 conflicts of interest, 76 consultations for this review, 324–8 consumer protection frameworks, 134 cost recovery, 79–80, 81, 85, 88, 89 Council of Australian Governments, 4, 5, 7–8, 15, 16, 17, 22 CSIRO, 49, 52, 94, 95 cultural flows and purposes *see* Indigenous access to water

D

desalination plants, 129–30, 133, 189–90 dewatering (mining operations), 13–14, 42–3 Draft NWI Policy Guidelines for Water Planning and Management, 10, 30, 114 drought impacts government intervention in plans, 11, 37, 132 infrastructure investment, 85, 132 irrigation communities, 6, 9, 86, 121, 125, 127 rural water provider revenue, 80, 86 on urban communities, 129–35 urban sector water use, 81, 83 and water market reforms, 5, 11, 78, 81, 86, 89, 110 water trading and agricultural productivity, 67, 69, 71, 122, 125, 127 watering events, 115–16

E

economic modelling, 329-35 emerging water markets, 74, 76 enforcement see compliance and enforcement environmental sustainability, defined, 101 environmental water management accountability, 110-15 aquatic ecosystems, 116, 159-61 Commonwealth Environmental Water Holder, 38, 76, 107, 111–12 communities of practice, 55 environmental and public benefit outcomes, 151-65 impacts of NWI reforms, 6, 93 knowledge and capacity building, 94-7 monitoring and reporting, 9, 113-16, 157-8 Murray-Darling Basin, 38, 104-8, 111-12 objectives and regimes, 38, 100-1 overallocated and overused systems, 101-4 see also overallocation and overuse pricing environmental externalities, 88-9 progress summaries, 205, 214, 230-1, 243, 256-7, 270-1, 284, 299-300, 313-14 security of environmental water, 9, 108-10 water recovery programs, 6, 9, 105-8, 116, 127-8 eWater Cooperative Research Centre, 49, 94 extractive industries, 13-14, 41-4

F

farm dams, 40, 41 First Peoples' Water Engagement Council, 9, 45–6 floodplain harvesting of water, 40 forestry plantations, 40, 41 Framework for the Assessment River and Wetland Health, 97, 159 freshwater aquatic ecosystems, 13, 37

G

governance accountability, 55-6, 110-15 Commonwealth reforms (Water Act 2007), 21, 38, 47, 48, 49, 72, 88, 111-12, 150, 200-1 compliance and enforcement, 10, 51 conflicts of interest, 76 impacts of NWI reforms, 5, 27 Indigenous rights see Indigenous access to water interception and mining see extractive industries; intercepted water reform machinery, 16-17 risk assignment, 46-8 science and skills see water science; water skills statutory water plans, 30-8 summary of findings, 57 water access entitlements, 28-9 water accounting and information see water accounting; water data and information Great Artesian Basin, 40 groundwater Action Plan, 98, 99 extractive industries and, 41-4 information systems, 49, 99 interception of, 9, 39-41 management, 98-9, 108-10, 147-9 monitoring, 114 science and knowledge, 15, 54, 98 supplied to users, 189-90 trading, 73-4 see also water-dependent ecosystems groundwater-surface water connectivity, 10, 15, 98, 99-100, 196-9

Η

Hattah Lakes, Victoria, 116 high ecological value aquatic ecosystems, 161

L

Indigenous access to water, 9, 44–6, 154 information resources *see* water data and information infrastructure investment, 81–5, 121, 131–3 integrated management of water for environmental and other public benefit outcomes, 151–65, 205, 214, 230–1, 243, 256–7, 270–1, 284, 299–300, 313–14 *see also* environmental water management surface and groundwater resources, 196–9 *see also* groundwater–surface water connectivity integrated urban water management, 12, 140 *see also* urban water reform intercepted water, 9, 39–41 irrigated agricultural production, 67–71, 186–7 irrigation and other rural water, 80, 86, 185–8 *see also* rural water service providers

K

knowledge and capacity building, 94–7, 99 progress summaries, 209, 217, 238, 246, 262, 277, 288, 305, 319 *see also* water science

L

leadership, 7, 8 The Living Murray initiatives, 107, 109, 116 *see also* Murray–Darling Basin

Μ

metering, 10, 50-1 see also monitoring and reporting metropolitan and regional urban communities, 129-41 see also communities; urban water supply; water-sensitive urban design mining industry see extractive industries monitoring and reporting, 9, 49, 113–16, 157–8 see also metering; water data and information Murray-Darling Basin environmental water, 104-8, 111-12 see also environmental water management floodplain harvesting of water, 40 risk assignment provisions, 47-8 Sustainable Yields project, 94 water trade, 62-5, 67-73, 336-7 see also water markets and trading Murray–Darling Basin Authority, 38 Murray-Darling Basin Plan, 9, 38 community engagement, 10, 104, 124 environmental water holdings, 38, 76, 107, 111-12 planning processes, 104 water trading rules, 336-7 see also water markets and trading

Murray-Darling Basin Sustainable Yields project, 94

Ν

national assessment of water resources, 97, 159-60 see also governance; monitoring and reporting National Centre for Groundwater Research and Training, 54, 99 National Framework for Non-urban Water Metering, 50 National Framework for Water Compliance and Enforcement, 10, 51 National Urban Water and Desalination Plan, 133 National Water Account, 48, 185 National Water Commission function and outputs, 55-6 role and obligations, 21 National Water Initiative accountability and nationally compatible approaches, 55-6 background, 3-4 impact modelling, 329-35 impacts (summary), 4-6 implementation progress, 18 objectives, 3, 21, 22-3 performance indicators, 23 policy guidelines for water planning and management, 10, 30, 114 recommitment to, 7, 8, 16-17 reform machinery, 16-17 reporting obligations of parties, 16 risk assignment framework, 46-8, 180-4 National Water Market System, 48 National Water Planning Report Card, 23, 30, 36 National Water Skills Strategy, 15-16, 54-5 natural resource management coordination with water planning, 13, 37-9 Natural Resource Management Ministerial Council performance indicator report, 144-99 performance indicators, 23, 144-5 role, 21 non-urban water meters see metering Northern Australia Sustainable Yields project, 96 Northern Australia Water Futures Assessment, 96 northern Australia water resources, 45, 94, 96, 99-100

0

overallocation and overuse, 54, 101-4, 166-9

Ρ

performance indicators (NRMMC) *see under* Natural Resource Management Ministerial Council plantation forestry *see* forestry plantations policy bans, 72–3, 135 policy guidelines for water planning and management, 10, 30, 56, 114 water planning/NRM policy coordination, 13, 37–8 productivity, 67–73 Productivity Commission, 85, 132, 138 public health, 137 *see also* water quality

R

rainwater tanks, 81, 132 Raising National Water Standards Program, 45, 52 recycled water, 80, 82, 130-1, 135, 189-90 regional urban water services see under urban water supply reporting see monitoring and reporting research see CSIRO; water science Restoring the Balance in the Murray–Darling Basin Program, 105–7, 112 rice production, 71, 127 risk assignment, 46-8, 180-4 river systems modelling, 53, 94 RSMG model, 329-35 rural communities, 122-8 see also communities rural water service providers efficiency, 86 environmental management practices, 164-5 operating costs, 195 pricing, 80 rates of return, 84 regional urban water services, 131-3, 138 see also irrigation and other rural water

S

scientific information see water science security of entitlements see under water access entitlements and planning framework security of environmental water see under environmental water management security of supply see under urban water supply skills see water skills Smart Water Mark program, 136 socioeconomic analyses, 36-7 Source Integrated Modelling System, 53 Source Rivers (modelling package), 53, 94 stakeholder consultations for this review, 324-8 standards meters and metering, 50-1 service standards for processing water trades, 75 water accounting and measurement, 49, 185 Standing Council on Environment and Water, 21 statutory water plans see water planning and management stormwater reuse, 80, 82, 139, 140, 189-90 structural adjustment, 128, 195 surface water and extractive industries, 41-3 interception of, 9, 39-41 resource planning see water access entitlements and planning framework; water planning and management supplied to users, 189-90 see also water storage and supply surface water and groundwater connectivity, 10, 15, 98, 99-100, 196-9 Sustainable Rural Water Use and Infrastructure Program, 105, 112

sustainable water management see water planning and management

T

Tropical Rivers and Coastal Knowledge (TRaCK) research hub, 94, 96

U

unaccounted water use, 39 urban amenity and liveable cities see water-sensitive urban design urban utilities see water service providers urban water reform, 6, 7, 11-12 progress summaries, 207-8, 216, 235-6, 245, 259-60, 274-5, 286-7, 303, 316-17 urban water supply consumer protection frameworks, 134 drought impacts, 129-33 efficient delivery, 82-3 efficient use, 135-7 household/residential water consumption, 81, 135-6, 189 infrastructure see infrastructure investment pricing, 79-80 recycled water, 80, 82, 130-1, 135 regional urban water services, 131-3, 138 security of supply, 121, 125, 129, 131-2, 135 urban water cycle management, 140 utilities/providers see water service providers water quality, 6, 12-13, 137 see also water-sensitive urban design urban waterway health, 139

V

Victorian Environmental Water Holder, 111

W

wastewater treatment and disposal, 12, 82, 135, 139 see also recycled water; stormwater reuse water access entitlements and planning framework confidence in water rights, 122 extractive industries access to water, 13-14, 41-4 governance, 28-9 progress summaries, 200-1, 210-11, 218-23, 239-40, 247-51, 263-6, 278-80, 289-94, 306-9 security of entitlements, 28, 50, 51, 145-6 see also water markets and trading; water planning and management water accounting, 48-9, 185 intercepted water, 9, 41 progress summaries, 206-7, 215, 231-4, 244, 257-8, 272-3, 285-6, 301-2, 314-16 unaccounted water use, 39 see also monitoring and reporting; water use Water Accounting Standards Board, 49 Water Act 2007 (Cwth), 21, 38, 47, 48, 49, 72, 88, 111-12, 150, 200-1 water allocation trade see water markets and trading Water Amendment Act 2008, 38 water data and information, 15, 48-9, 94-9 see also water science

water-dependent ecosystems, 94-7, 116, 159-61 see also environmental water management Water Efficiency Labelling and Standards (WELS) Scheme, 136 Water for the Future initiative, 21, 85, 105, 112, 127 Water Information Research and Development Alliance, 49 water infrastructure see infrastructure investment water interception see intercepted water water markets and trading administrative processes and transaction costs, 75-6 allocation announcements, 74-5 barriers to trade, 72-3, 135, 176 benefits, 125 community adaptation to water availability, 125-8 conflicts of interest, 76 costs of water trades, 176-80 efficiency, 62-77, 173-5 groundwater trading, 73-4 see also groundwater market activity, 170-2 Murray-Darling Basin trade, 62-5, 67-73, 336-7 price information disclosure, 74 pricing and institutional reforms, 77-89 progress summaries, 201-3, 211-12, 223-5, 241, 252, 266-7, 280-1, 295-6, 309-10 reform impacts (NWI reforms), 5, 61, 125-7 reform opportunities (further reform), 9, 72-7 role of ACCC, 38, 72, 76, 336 water meters see metering water planning and management, 6-10 community engagement, 10-11, 123-4 cost recovery, 88, 89 decision making and government intervention, 37 environmental water see environmental water management extractive industries access to water, 13-14, 41-4 impacts of NWI reforms, 6, 93 Indigenous interests and engagement, 9, 44-6, 154 knowledge and information see knowledge and capacity building; monitoring and reporting; water data and information; water science NRM policy coordination and, 13, 37-8 plans and performance, 147-9 principles and policy guidelines, 10, 30, 56, 114 resourcing, 17 statutory water plans, 30-8 suspension of water plans, 37 see also water access entitlements and planning framework water pricing consumption-based pricing, 81-2 efficient water use and, 5, 9, 81-7 independent economic regulators, 78, 79 price information disclosure, 74 progress summaries, 203-5, 212-14, 225-9, 241-3, 253-5, 268-70, 281-4, 297-8, 310-12 reforms, 5, 9, 78-82, 87, 89, 191-3 rural water, 80 urban water, 79-80 see also water markets and trading

water quality, 6, 12-13, 137 see also waterway health water recovery programs, 6, 9, 105-8, 116, 127-8 see also Commonwealth Environmental Water Holder water reform see Australian water reform: National Water Initiative water resource accounting see water accounting water resource condition assessment programs, 159-60 water rights see water access entitlements and planning framework water science, 7, 15-16, 36-7, 49, 52-5, 94-8, 141 water-sensitive urban design, 11, 12, 129, 131, 140-1 see also urban water reform; urban water supply water service providers efficiency, 82-4 environmental performance, 162-5 NPAT & rates of return, 83-4, 191-3 operating costs, 194-5 performance reports, 56 Water Services Association of Australia, 56 water skills, 15-16, 54-5 water storage and supply consumer protection, 134 efficiency, 190-1 infrastructure investment, 81-5, 121, 131-3 policy barriers, 135 publicly owned, 49 rainwater tanks, 81, 132 recycled water, 80, 82, 130-1, 135, 189-90 type (source) of water supplied, 189-90 in urban areas see urban water supply utilities/providers see water service providers water losses in distribution systems, 190-1 water quality, 6, 12-13, 137 water use agricultural value, water use and trading, 125-7 community adaptation to water availability, 125-8 consumption-based pricing, 81-2 consumption (household/residential), 81, 135-6, 189 consumptive purposes, 40, 150 efficiency, 5, 9-10, 81-7, 135-7 interception activities and purposes, 39-41 irrigation purposes see irrigation and other rural water metering see metering stock and domestic bore use, 40 unaccounted water use, 39 see also overallocation and overuse; recycled water; stormwater reuse water utilities see water service providers waterway health, 3, 4, 97, 104, 139 see also water-dependent ecosystems





Appendices

Appendix A: NRMMC performance indicator report 2011

2011 update of performance

In the National Water Initiative (NWI) Agreement, the signatories agreed that the Natural Resource Management Ministerial Council (NRMMC) would be responsible for developing a comprehensive national set of performance indicators for the initiative. The purpose was to assist the National Water Commission with the 2011 review of the impact of the NWI.

The NWI Agreement states that the NRMMC will:

in consultation with the National Water Commission (NWC), develop by mid-2005, a comprehensive national set of performance indicators for this Agreement. The indicators should, where possible, draw on existing indicators and include initialisation of water access entitlements, environmental water, water use efficiency, water pricing and water trading. (clause 104ii)

The National Water Commission Act 2004 (Cwth) states that the Commission will:

in 2010–11, ... review the NWI comprehensively, including assessing ... the NWI against performance indicators that are developed by the Natural Resource Management Ministerial Council in consultation with the NWC. (Part 2, section 7(2))

A total of 28 performance indicators were developed to address the 10 NWI objectives listed in clause 23 of the NWI Agreement. See Box A1 for a summary of the events that led to the first performance indicator report, which used 2004–05 data.

To help prepare for the 2011 biennial assessment, the 2009 biennial assessment commented on six of the 28 indicators (indicators 3.2, 3.3, 4.1, 4.2, 8.8 and 10.1) and concluded that many of the indicators were unsuitable for monitoring performance against the NWI.

For example, Recommendation 8.11 stated that:

The Commission recommends that the NRMMC 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.

Some NWI parties echoed our concerns about the appropriateness of the indicators in their submissions to the 2011 biennial assessment. While several of the indicators have been used for this assessment, such as financial performance of water service providers (indicators 8.7, 8.8), we have again identified a number of challenges in reporting against the 2004–05 indicators:

- + Some data and information sources are no longer available. Several of the performance indicators reported on for 2005 relied on data from reports that are no longer produced in the same form (for example, indicators 2.1 and 2.2).
- The Australian water sector has changed since the indicators were developed. Consistency of reporting is made difficult by the evolution of water-related terminology, emerging issues and changes to catchment management boundaries (for example, indicator 3.2).
- + The data requirements of most of the performance indicators are ambiguous and open to interpretation. Where indicators were subsequently reported on (such as in the 2009 biennial assessment they were often presented in a different format (for example, qualitative rather than quantitative), limiting the comparability of time-series data.
- + The indicators are not adequately linked by logic to the NWI actions, objectives and intended outcomes. Appropriate indicators should provide an accurate and succinct measure of a government's performance against specific actions and its effectiveness in achieving set objectives and outcomes. The level of detail presented in the 2004–05 report resulted in an ambiguous story, requiring in-depth analysis to understand the performance message (for example, indicator 3.4).

This appendix reports performance for all NWI parties using available data and, where practical, shows progress by comparison with the 2004–05 performance indicator report. Descriptions for each of the indicators have been sourced from the 2004–05 report.

Overall, about half of the 28 performance indicators are comparable with previous assessments in their existing format. The other half are reported differently from the 2004–05 report, or provide only a qualitative assessment.

This appendix does not provide an in-depth analysis of the progress of water reform. Commentary on the implications of the results is in the body of the 2011 biennial assessment.

Box A.1: Chronology of the development of NRMMC performance indicators

The NWI Working Group developed a draft set of NRMMC performance indicators and hosted a workshop of stakeholders on 18 August 2005 to test the indicators for practicality and completeness.

At its meeting on 30 August 2005, the Commission endorsed the performance indicators as a broad framework for measuring the achievement of NWI outcomes.

The NRMMC endorsed the performance indicators at its meeting on 27 October 2005 (Resolution 9.3). The NRMMC also agreed that a task group would be formed to refine the indicators and oversee data collection.

The NWI Performance Indicators Working Group subsequently refined the indicators, and the NWI Committee agreed to the revised indicators on 1 August 2007. The committee also endorsed the first performance indicators report, which used data for 2004–05 and the revised list of indicators.

On 18 April 2008, the NRMMC endorsed the revised set of performance indicators for use in the 2011 biennial assessment.

NWI Objective 1: Clear and nationally compatible characteristics for secure water access entitlements

Performance indicator 1.1

The number of decisions by governments that revoke or change the security of statutory water access entitlements and the reasons for these decisions.

Description of indicator

A key objective of the NWI is to improve security for water users through statutory provisions for water entitlements underpinned by comprehensive water planning. This indicator measures decisions that potentially undermine that security.

Source of data

Jurisdictions.

Table A.1: Government decisions that revoke or change the security of statutory water access entitlements and the reasons for these decisions, 2005 and 2011

Jurisdiction	Number of decisions current 2005	Number of decisions current 2011	Comments
ACT	0	0	_
NSW	0	5	NSW reported that five plans in NSW were suspended due to severe water shortages. Four were to recommence on 1 July 2011 (Macquarie, Lachlan, Murrumbidgee, Murray–Lower Darling), while the Wybong Creek plan is under review and may be amended.
NT	0	0	_
Qld	0	0	-
SA	0	0	_
Tas.	0	0	-
Vic.	0	4	Victoria reported that, due to prolonged dry conditions in 2009–10, the Minister for Water qualified rights to surface water in the Murray, Broken, Goulburn, Campaspe, Loddon, Bullarook, Maribyrnong, Melbourne, Werribee and Ballarat water supply systems, and to groundwater in the Deutgam and Campaspe water supply protection areas, along with a number of smaller unregulated water supply systems, to enable the supply of water for essential human, stock and domestic and industrial needs. At the end of October 2010, modified qualifications remained in the Campaspe and Loddon water supply systems and the Campaspe and Deutgam groundwater supply protection areas.
WA	0	0	

NWI Objective 2: Transparent, statutory-based water planning

Performance indicator 2.1

The proportion of *surface water* systems and proportion of diversions [of inflow and storage volume] either:

- + covered by a water plan
- + not covered by a water plan, but identified as requiring one
- + not covered by a water plan and not yet assessed in terms of requirement
- + not covered by a water plan but identified as not requiring one.

Performance indicator 2.2

The proportion of groundwater systems and proportion of groundwater extraction [of aquifer recharge and storage volume] either:

- + covered by a water plan
- + not covered by a water plan, but identified as requiring one
- + not covered by a water plan and not yet assessed in terms of requirement
- + not covered by a water plan but identified as not requiring one.

Description of indicators

The success of the NWI will be shown in trends towards surface water and groundwater systems being either covered by water plans or assessed as not requiring water plans. This indicator directly assesses that trend.

Context for this report

Population of this indicator with 2004–45 data relied heavily on *Australian Water Resources 2005 (AWR 2005)*, which divided Australian water resources into spatially defined surface water and groundwater water management areas, as previously defined in the *Australian water resources assessment 2000.*

In most cases, water planning by jurisdictions does not follow the spatial boundaries used in *AWR 2005*, and the collection and collation of data for the 2004–05 performance indicator report was a considerable time and resource burden for state and territory water agencies. In 2010, performance indicator data was still not collated cohesively or used for any other reporting, and to collect it in that format would have again placed a considerable burden on jurisdictions.

The National Water Planning Report Card, due for completion in late 2011, is collecting information that will address the intent of this performance indicator, although not necessarily with the same structure.

A qualitative assessment based on material provided by jurisdictions has been used to indicate progress in water planning.

Source of data

Jurisdictions.

Domments		95% of water extracted is currently covered by WSPs. n 2004–05, the proportion was approximately 80%. VSW has adjusted the numbers and types of plans hat were to be developed over the years. For example, the individual Border Rivers surface water and groundwater areas were combined to allow for ntegrated management of those water resources.	Based on available information, Victoria has seven GWMPs, six operational SFMPs and one draft SF/GWMP (Upper Ovens). Those plans cover approximately 10% of the surface area of the state.	n 2004–05, approximately 60% of the state was covered by WRPs. n 2011, over 90% is covered. This figure does not nclude systems covered by wild rivers legislation.	WA reported that more than 80% of consumptive water is covered by WAPs; the remaining 20% is covered by licences. Since WA signed the NWI in 2006, 19 new WAPs have been developed. Of those, 14 have been finalised and five are nearing completion and being used to guide allocations for their areas.
Proposals for areas without plans		NSW has advised that it proposes to gradually cover the state on a priority basis to address the most stressed systems first. The schedule has not been finalised.	100% of the state will be covered by sustainable water strategies and regional river health strategies. SWSs address some NWI elements, but other elements are covered under different planning instruments, such as bulk entitlements, groundwater management plans (GWMPs), streamflow management plans (SFMPs) and regional river health strategies.	There are 10 declared Wild River areas in Queensland and there are limited other areas where the Queensland Government does not currently have intentions to develop a WPP or a Wild Rivers Declaration. These areas mostly consist of minor coastal catchments with limited consumptive water use. The exception is the water resource in the area around Weipa on Cape York, which is subject to the <i>Commonwealth Aluminium Corporation</i>	WA reported that it has developed new WAPs for WA reported that it has developed new WAPs for 75% of the medium and high water-use management areas around the state. For the remaining areas either new plans are in preparation, the pre-2006 plans are still valid, or use is low or highly localised and management through licences is considered adequate.
ber of plans completed	2011	62 (74%) (51 have commenced, 2 more are to commence on 1 July 2011, another 8 are to commence shortly, and 1 is on exhibition. Another 5 are being finalised to go on exhibition this year.	2 (50%) (2 are in draft)	22 (96%) (2 currently being revised) 18 (78%)	14 (45%) (plus 5 released for public comment)
Total numl d	2004-05	37	0	ى ـــ	ω
of plans I as require	2011	8	4	53 53	
Number identified	2004-05	33	4	23 23	5
Type of water plan		Water sharing plan (WSP)	Sustainable water strategy (SWS)	Water resource plan (WRP) Resource operations plan	Water allocation plan (WAP)
		M SN	Vic.	QIQ	WA

Table A.2: Ground and surface water resources covered by water plans, 2004–05 and 2011

	Type of water plan	Number o identified	of plans as required	Total numt	ber of plans completed	Proposals for areas without plans	Comments
		2004-05	2011	2004-05	2011		
SA	Water allocation plan (WAP)	23	23	16	20 (87%)	Prescribed water resources include all assessed at-risk or potentially at-risk water resources, covering most significant water resources in the state.	All of the plans active in 2005 (pre-NWI) have been, are being, or are scheduled to be reviewed and amended, bringing them into line with the NWI.
						The other water resources are managed under provisions of the South Australian <i>Matural Resources Management Act 2004</i> , regional	Therefore, comparisons of numbers of plans in 2005 and 2011 do not tell the full story of SA planning efforts since the signing of the NWI.
						natural resource management plans and the State Natural Resources Management Plan 2006.	For example, four of the WAPs in place in 2005 have been replaced by amended WAPs, and 11 of the WAPs in place now are being reviewed or amended.
							Three new plans are under development. A number of other plans are being combined to produce four plans where there were previously eight.
Tas.	Water management	12	12	4	6 (50%)	Tasmania reported that additional areas will be progressively covered by water plans. Those areas will	Four WMPs have been released as drafts, and a further two are currently being prepared.
	plan (WMP)					be determined on the basis of their need for a plan, the benefits of having a plan and the risk of not having a plan	No information is available on which areas plans are proposed for.
							Approximately 15% of Tasmania's surface area is covered by WMPs.
ACT	Water				1 (100%)	Not applicable	100% coverage of water resources identified in
	management						
NT	Water	2 plus 2	16	. 	3 (75%)	The NT reported that all water resources, whether	Four WAPs are in the draft/consultation stage, and
	allocation	existing			7 in preparation for completion	covered by a water plan or not, are managed in accordance with the NT Water Allocation Planning	advisory committees and preliminary consultations are
		to be			6 yet to commence but	Eramework (Schedule C of the NWI Implementation Plan)	underway on another two.
		reviewed			programmed for completion after 2013		

Table A.2 continued

NWI Objective 3: Statutory provision for environmental and other public benefit outcomes, and improved environmental management practices

Performance indicator 3.1

Proportion of water use for consumptive and non-consumptive purposes.

Description of indicator

This indicator identifies trends in the provision of water for the environment.

Context

As an interim step in the 2004–05 performance indicator report, this indicator was simplified to report the volume of water consumed as a proportion of the total inflows into the system; the remaining proportion of the inflows was considered to be used for 'non-consumptive' purposes.

The source of data for total inflows in 2004–05 was the Bureau of Rural Science's Water 2010 Project. The *Water Act 2007* (Cwth) transferred responsibility for the calculation of inflows for each jurisdiction from the Bureau of Rural Sciences to the Bureau of Meteorology (BoM) as part of the National Water Account. The first full account has not yet been completed.

The indicator is not a reliable measure of the adequacy of environmental water provisions because:

- + presenting annual proportions of water overlooks seasonal variations in inflow between drought and flood years (for example, a flood year will show a low proportion of consumptive use but not necessarily illustrate a trend to increased environmental allocations)
- + calculations for the volume of *consumption* suit jurisdiction boundaries while *inflow* calculations do not, as catchment boundaries overlap administrative boundaries.

Consequently, data for this performance indicator is presented as consumption in volumetric terms rather than as a proportion of inflows. Even so, it should be recognised that drought has had a significant impact by reducing water consumption over the period reported.

Source of data

Australian Bureau of Statistics (ABS), Water account 2004–05, Water account 2008–09.





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).

Description of indicator

This indicator shows whether environmental and other public benefit objectives in water plans are being implemented. Rather than reporting on individual objectives (which vary between water plans), the indicator looks at whether jurisdictions have implemented actions and timelines that are intended to achieve the objectives, monitored the outcomes of those actions, and used adaptive management to make improvements to plans where necessary.

Context

The 2004–05 performance indicator report noted that it is very difficult to determine whether jurisdictions are implementing actions set out in water management plans to achieve environmental and other public benefit outcomes, and suggested that this component of the indicator be readdressed in the future.

The indicator appears to restrict future assessments to reviews of those water plans that were in force in 2004–05. Water planning cycles have led to the revision of water plans and the amalgamation of some plan areas, so the intended outcomes of many plans have changed significantly since then.

Source of data

The National Water Planning Report Card, due for completion in late 2011, is collecting information that will address the intent of this performance indicator.

In the interim, progress for this indicator is based on an assessment of recently completed plans (see Table A.3).

The assessment considered 13 criteria for each plan:

- + assessment of needs and values
- + consultation in plan development
- + consultation with Indigenous people in plan development
- + cultural flows
- + objectives and program logic
- + trade-offs
- + responsibilities for implementation
- + monitoring and reporting
- + responses to monitoring and new knowledge
- + urban water
- + unlicensed interception
- + mining, petroleum and gas
- + surface water groundwater connectivity.

To assess achievements specifically against environmental and other public benefit outcomes, findings for six of the criteria are presented in Table A.4:

- + assessment of needs and values
- + cultural flows
- + objectives and program logic
- + trade-offs
- + monitoring and reporting
- + responses to monitoring and new knowledge.

In some cases, the findings have been amended to reflect additional information from jurisdictions.
Table A.3: Water plans reviewed for performance indicator 3.2

Jurisdiction	Plans covered in the independent review
NSW	Water Sharing Plan for the Peel Valley Regulated, Unregulated, Alluvium and Fractured Rock Water Sources 2010 (the Peel Plan)
	Water Sharing Plan for the NSW Border Rivers Regulated River Water Source 2009 (the Border Rivers Plan).
WA	Draft Gingin Surface Water Allocation Plan, draft of final plan (final plan released in April 2011) (the Gingin Plan)
	South West Groundwater Areas Allocation Plan, May 2009
SA	Barossa Prescribed Water Resources Area Water Allocation Plan 2009 (the Barossa WAP)
	Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area 2010 (the Marne Saunders WAP)
Tas.	The Ansons River Catchment Water Management Plan, July 2010 (the Ansons River Plan)
	The Draft Sassafras Wesley Vale Water Management Plan, November 2009
NT	<i>Water Allocation Plan for the Tindall Limestone Aquifer, Katherine, 2009–2019.</i> The NT reported that this plan is representative of the approach now taken in the development of all plans.
Qld	Water Resource (Gulf) Plan 2007 (the Gulf Plan)
	Gulf Resource Operations Plan 2010
	Water Resources (Logan) Plan 2007 (the Logan Plan).
	Amendment to the Logan Basin Water Resource Plan to include Southern Moreton Bay Islands
	Logan Basin Resource Operations Plan 2009
Vic.	Northern Region Sustainable Water Strategy, 2009
	Draft Western Region Sustainable Water Strategy, 2010

Table A.4: Extent to which actions have been implemented to achieve environmental and other public benefit outcomes defined in water plans

Criteria: Assessment of needs and values

New South Wales

Water user needs and values assessments were undertaken by agency staff using available databases of information and studies. The Border Rivers Plan identified an extensive list of important water-dependent ecosystems. The Peel Plan identified in-stream ecological values and classified subcatchments according to their in-stream value and community dependence on water extraction. It also identified several important groundwater-dependent ecosystems (GDEs). Current water entitlements and use were documented in both plans, as were estimated requirements for non-licensed domestic and stock rights. Some general information was provided on the value generated from irrigated agriculture.

Western Australia

Studies to identify water-dependent environmental and social values and water requirements were done for both plans. All the studies were done by independent experts using a combination of desktop and field data and community input, and are published on the internet. The level of investment and rigour was far greater in the South West plan, reflecting the much larger area, larger stakeholder base, competition for water and risks. Current water entitlements were documented in both plans, as were estimated requirements for water under non-licensed domestic and stock rights. Estimates of future demands for water for consumptive use were outlined qualitatively in terms of drivers (e.g. trends in agriculture, land subdivision) and projected quantitatively in relation to urban water needs.

South Australia

In the Marne Saunders Plan, the department and board made significant investments in developing capacity and knowledge to comprehensively assess water-dependent ecosystems and their needs. In the Barossa Plan, the Gawler River was divided into a number of zones and environmental flow bands were identified; however, the resources and effort applied were much less than for the Marne Saunders system. Current entitlements and use were identified in the Marne Saunders Plan. Difficulties in accurately determining historical water use in the Barossa mean that not all use is quantified, but a mechanism for the conversion of area-based licences and metering of use is in place. Some general information about the value of irrigated agriculture is included in the plans.

Tasmania

Water user needs and values assessments were undertaken by agency staff using available information and studies. A survey of water users was also undertaken for the Draft Sassafras Wesley Vale Plan. The Ansons River Plan did not detail environmental water needs because of the low level of development. The draft Sassafras Wesley Vale Plan identified areas of key conservation value. Current entitlements and use were documented in both plans, as were estimated requirements for water for non-licensed domestic and stock use. Some general information about the value of agriculture was provided in the Draft Sassafras Wesley Vale Plan.

Northern Territory

Assessments of water user needs and values were undertaken by agency staff using available information and studies. Environmental water requirements were based on studies that identified the importance of base flows from the aquifer to the highly valued Daly River. Knowledge gaps, assumptions in the assessments of needs and values and approaches to meeting knowledge gaps in the future were identified. Current water entitlements and use were documented, as were estimated requirements for water for non-licensed domestic and stock use.

Queensland

In both plan areas, initial information reports and additional technical reports by experts identified current water entitlements and use and non-consumptive values. There was some opportunity for input through the Community Reference Panel (CRP) and in response to the publicly available overview and information reports. For the Gulf Plan, information was provided on extraction volumes of supplemented schemes, in-stream storages and entitlements, as well as the value generated from irrigated agriculture and estimated requirements for non-licensed domestic and stock use. Technical reports identified areas of high conservation value and those at highest risk. In the Logan Plan amendment, ongoing studies are clarifying characteristics of the groundwater and GDEs. For information about the future water consumption and needs for additional water, parties were referred to the SEQ Water Strategy, which in itself is not transparent and does not justify additional demand on the North Stradbroke Island aquifer in comparison with other sources.

Victoria

Water user needs and values assessments were undertaken by agency staff using available databases of information and studies. The Northern Region Sustainable Water Strategy (SWS) identified the environmental flows required to meet ecological objectives. Environmental values in the Western Region were identified for surface water and groundwater systems. Current water entitlements and use were documented in both plans, as were estimated requirements for water for non-licensed domestic and stock use.

Criteria: Cultural flows

New South Wales

No provisions were made in the plans for flows specifically for Indigenous cultural needs. However, NSW policy allows Aboriginal people to apply for water licences for Aboriginal cultural purposes without having to purchase them on the market.

Western Australia

While considerable effort went into identifying sites and values of importance to Aboriginal people, it do not lead to the identification of flow regime requirements additional to those already identified for environmental values. Both reviewed plans are groundwater plans, so water to protect cultural values is retained in situ as groundwater, not provided as a flow.

South Australia

No provision was made in the plans for flows specifically for Indigenous cultural needs. Use of water for Aboriginal cultural and spiritual needs is exempt from licensing in the Marne Saunders Prescribed Water Resources Area as long as that does not impede the flow of water.

Tasmania

No provisions were made in the plans for flows specifically for Indigenous cultural needs.

Northern Territory

Cultural flows are not specifically provided for; however, the plan assumes that 'provision of discharge for environmental protection will also maintain the condition of places that are valued by Indigenous people for cultural purposes'. Any information on specific requirements for cultural flows that becomes available will be considered as part of the plan review.

Queensland

Cultural flow is not mentioned in the Gulf plans; however, a specific allocation of 1000 ML in total was provided to help Indigenous communities achieve their economic and social aspirations, but only in the Cape York streams of the plan area, as required under the *Cape York Peninsula Heritage Act 2007*. The resource operations plan (ROP) requires consideration of the effect of granting new entitlements on Indigenous cultural values and the social and economic wellbeing of local Indigenous communities. However, no base values are documented, so it will be difficult to assess performance. In the Logan area, it is a high priority to protect groundwater and GDEs that are of significant cultural value to Aboriginal residents. A broader North Stradbroke Island Management Strategy, which is being finalised, will formalise native title and the role for Indigenous residents in management.

Victoria

No provisions are made in the plans specifically for Indigenous cultural needs, although the value of water for Indigenous cultural purposes is recognised.

Criteria: Objectives and program logic

New South Wales

Objectives in the plans are very generalised, reflecting principles stated in the legislation. The logic for how the very specific rules in the plan will contribute to the objectives is not transparent. Performance indicators are also very general.

Western Australia

The plans set out a hierarchy of objectives, strategies and performance indicators in tables and text, although many important strategies specified in the licensing policies section or other parts of the plans are not mentioned specifically (e.g. low-flow triggers and adaptive management in the Gingin Plan). Objectives are general and sometimes ambiguous. Practice in specifying objectives in WA plans varies substantially. Specific management targets are defined in tables of allocation limits and in the performance indicators. The relevance of some performance indicators to demonstrating achievement of objectives is not clear.

South Australia

The Barossa Plan has a large number of objectives that relate to specific management activities. How they all work together is not clear. The Marne Saunders Plan has fewer, more general objectives. In both cases, objectives are a mixture of high-level and low-level objectives, with unclear linkages. In both cases, the objectives are supported by 'principles' that are a combination of management targets and rules. The logic of the plans is not transparent, particularly in the Barossa Plan. There are more detailed links between specific water regime risks, management action and indicators in the Marne Saunders Plan. In many ways, that plan sets out the reasons for the rules and strategies in the plan, but it does not link them to plan objectives.

Tasmania

The objectives in the plans are based on standard operating templates that reflect the legislation, and are adapted as relevant to the needs of the plan area. Some state what the planning process does, rather than what it is intended to achieve. The logic of the Ansons River Plan is relatively transparent but not explicitly stated. As in the Draft Sassafras Wesley Vale Plan, the connection between objectives and the management regime is general rather than specific.

Northern Territory

The plan sets out the vision, outcomes, objectives, strategies and performance indicators with precision and clarity. In addition, the monitoring program is directly aligned with the performance indicators and related outcomes. The approach is exemplary.

Queensland

In the Gulf plans, the objectives are mostly appropriate, except that objectives for maintaining fishing in the Gulf are at a 'higher' level than the other objectives and rely on those other objectives being met. The logic and science for how the specific rules in the plan will contribute to the objectives is in the plan, but it is cumbersome to work through the WRP and ROP to understand how objectives are to be met and measured. The exception to otherwise adequate program logic is an obvious deficit in relation to Indigenous values. In the Logan area, provided the recently stated high priority for the protection of groundwater is carried forward, there are sufficient data and processes for good program logic. However, if the initial proposed objective to extract additional water for the mainland is reintroduced, it is likely to be unacceptable to the community because of environmental impacts and poor justification of additional needs in the SEQ Water Resource Strategy.

Victoria

Objectives in plans are generalised, reflecting legislation and policy. Several are related to the strategy development process rather than to what it is intended to achieve. The logic of how the actions and policies in the strategies will contribute to the objectives is not transparently stated.

Criteria: Trade-offs

New South Wales

Trade-offs between consumptive use benefits and in-stream environmental and other public benefits are transparent but not explicitly documented in the plans. For regulated rivers, the 'rules' discussion in the background documents summarises the trade-offs between achieving environmental outcomes and consumptive use. For unregulated rivers and the fractured rock aquifer in the Peel Valley, the macro approach was used to balance risk to in-stream/aquifer values against community dependence. The method, rankings and any exemptions to the indicative rules are also documented in the background documents.

Some community stakeholders stated that the main issues and potential impacts of the rules were not transparent in the draft or final plans.

Western Australia

The decision making logic and process and the trade-offs made are set out in some detail in separate allocation limits reports for each plan. Both plans aim for 100% reliability for current water users, although that is not stated as such in the objectives. While low risk to environmental water requirements is aimed for, a higher risk is accepted to support reliability. Undeveloped licences are actively recovered, and the issue of new licences is curtailed where necessary to minimise risks to environmental values and reliability for water users. Impacts, in terms of level of environmental risk accepted, levels of recovery targeted or limits to licences, are set out transparently in the allocation limits reports. Plan objectives, while being consistent with the adopted position, do not necessarily reflect it clearly. Assessment of impacts of options is based on well-documented studies and modelling in the South West Plan. The information shortfalls are stated expressly in the Gingin Plan allocation limits report: the holding/marginal recovery position adopted is based on a precautionary interpretation of available data. Community members commented that the department was genuine in considering submissions and other input. One community member commented that the value of food security was poorly represented, and also that the cumulative effects of a range of government regulations on growers, of which water planning is just one, are not addressed because of separation of processes.

South Australia

Trade-offs between consumptive use benefits and environmental and other public benefits are not clearly documented in the plans. The commentary and explanatory guides to the plans provide information about the issues of contention. The Marne Saunders Plan provides clear detail on the approach to determining allocation limits and extraction rules. In the Barossa Plan, it appears that environmental values may have been placed at higher risk because of the lack of information about use and the environment and the perception of the economic values that derive from its use locally.

Tasmania

Trade-offs between consumptive use benefits and in-stream environmental and other public benefits are not clearly documented in the plans. Tasmania does not prepare plans with an explicit view on describing trade-offs. Each plan describes the water regime that best meets the objectives of the plan, including the balance between consumptive and environmental water needs, and together with the supporting documentation that provides transparency. Socioeconomic impacts are not documented, and community stakeholders involved in the Draft Sassafras Wesley Vale Plan expressed some concern about community consultation on the plan.

Northern Territory

Documentation associated with the plan details the range of issues that were of contention in plan development, and the method by which they were resolved.

Queensland

In the Gulf plans, the draft plan and overview report provide a rationale for plan provisions but do not clearly identify trade-offs made between consumptive use benefits and in-stream environmental and other public benefits. Discussions about trade-offs are best documented in the CRP report, which is not made publicly available. Expectations of community stakeholders for additional water were not met, and they reported that they were not satisfied with the explanation. Decisions about trade-offs are informed by scientific studies and stakeholder input. At this point, the documentation of risks to ecosystem and other non-consumptive values is based on limited data due to the isolated nature of the area, low demand and therefore low priority for assessment. High-security water is granted for urban and mining uses—in such locations there is usually better data. In the remainder of the area, a precautionary approach has been taken due to climate and seasonal variability and data limitations. In the Logan area, priority is being given to protecting the sensitive groundwater system and GDEs of this sand dune island, in contrast to initial proposals to double the amount of extraction to provide water for the mainland. This decision has been informed by environmental studies and community input. Both agency staff and stakeholders indicated that engagement through the CRP has been invaluable for acquiring information, refining information products, and discussing trade-offs.

Criteria: Trade-offs

Victoria

The sustainable water strategies (SWSs) do not make determinations in relation to water sharing but rather develop policies and actions to manage the water resource within the entitlement framework. Adjustments to water sharing between the environment and consumptive use are to be achieved in most cases through investment or other means over time, guided by the SWS. However, there were trade-offs in the development of rules to manage the water resource for better reliability, especially in the Northern Region SWS. A transparent and robust process for selecting management options was used in both strategies. In particular, the role of the independent panel in reviewing public submissions and the strategy response to particular issues helps to build transparency about community values and trade-offs.

Criteria: Monitoring and reporting

New South Wales

Monitoring of the achievement of plan objectives is to be finalised once a state monitoring and reporting strategy is finalised. There is some reporting on progress in plan implementation in the department's annual report.

Western Australia

The South West Plan describes a resource monitoring program consisting of the monitoring of groundwater levels and quality across the aquifer systems, and the monitoring of vegetation condition in key groundwater-dependent wetlands and terrestrial systems. The Gingin Plan describes a resource monitoring program consisting of the ongoing monitoring of river flows and levels at three points. Performance indicators for the plans are linked to specified resource monitoring parameters and trigger levels, as well as other measures such as the use of water entitlements. Annual reports are to be prepared and published for each plan, setting out monitoring and performance data and the status of plan implementation.

South Australia

Monitoring arrangements are set out in both plans. The Barossa Plan monitoring is linked to a regional monitoring, evaluation and reporting framework. Results of monitoring of both plans will be reported at least every three years. These arrangements relate to monitoring of the resource generally, and there is an absence of defined, measurable performance indicators for the objectives of the plans.

Tasmania

Monitoring of both plans is based on monitoring that the agency does under existing state programs (generally streamflow and groundwater level monitoring). Streamflow monitoring is the key monitoring component in assessing the performance of a plan. Other specific performance indicators for plan objectives are not defined. However, annual reports on the effectiveness of the plans in meeting their objectives are to be prepared.

Northern Territory

Monitoring and reporting requirements are detailed in an appendix to the plan. An agency representative said that a program for ensuring appropriate and relevant monitoring has been developed by the relevant department.

Queensland

Monitoring of the achievement of plan objectives in both plan areas is required by the Act, the WRP and the ROP. Monitoring of environmental health is generally the responsibility of the Department of Environment and Resource Management (DERM), while water service providers monitor and report on extraction, water quality and groundwater levels if appropriate. Metering is required for all volumetric allocations and is slowly being introduced where it is not in place; DERM is responsible for monitoring in unsupplemented areas. Stakeholders were concerned that monitoring data provided by mining companies is not publicly available. While the status of plans is reported annually, the Gulf Plan has not been in place long enough for an annual report. The amendment to the Logan WRP has not been finalised.

Victoria

Monitoring of resource condition is undertaken outside the strategy framework for the relevant streamflow and groundwater management plans, water supply and demand strategies and regional catchment strategies and river health strategies. Monitoring of the implementation of actions is undertaken by the lead agency.

Criteria: Responses to monitoring and new knowledge

New South Wales

There are provisions in the plans to change rules in response to monitoring and new knowledge, including the ability to add GDEs to the schedule in the Peel Plan. In addition, amending provisions are included in the water sharing plans in cases where new infrastructure is required or to incorporate new knowledge. Amendments are based on the advice of an interagency regional panel. If either the installation of infrastructure or the acquisition of new information is not considered a priority for water sharing, then specific amending provisions are not included.

Western Australia

The South West Plan includes provision for a range of further investigations and foreshadows further refinements to the plan as a result of them, commencing with a plan review in 2011. Being non-statutory, the plan is in many respects non-prescriptive, in that it allows for changes to such things as trigger and response mechanisms at a local level to be continually refined and added to. The Gingin Plan specifically mentions monitoring of low flows and the proposed response of imposing low-flow access conditions on licences if necessary. It also mentions further studies to be done to further define low-flow requirements.

South Australia

The Barossa Plan's supporting documents indicate that triggers in response to monitoring will be established. However, it is reported that there is currently insufficient information on which to meaningfully base triggers. The Marne Saunders Plan includes triggers for additional monitoring.

Tasmania

No specific triggers for changes to the plans in response to monitoring and new information are identified.

Northern Territory

The plan includes provisions to change rules in several specific circumstances and in response to monitoring and new knowledge. Triggers are not explicitly linked to responding to monitoring or knowledge improvements related to the achievement of objectives.

Queensland

The Act and plans include provisions to change rules in response to monitoring and new knowledge, although that has so far not happened in these plan areas. In the highly variable systems of the Gulf, extraction is generally related to the volume of flow rather than a fixed allocation. Triggers related to flow are explicitly built into certain licences (e.g. upper Gilbert River). In the Logan amendment area, targets and thresholds will be established for groundwater levels. Stakeholders are concerned that the adaptive management approach may be too reactive and that permanent damage will already be done by the time monitoring reveals it.

Victoria

The strategies do not include provisions to change rules in response to monitoring and new knowledge. Those types of triggers are in the operational and assessment planning framework. The draft Western Region SWS indicates several areas for attention in relation to long-term resource assessment.

Performance indicator 3.3

Improved resource condition outcomes.

Description of indicator

This indicator measures environmental outcomes in the form of improved resource condition.

Context

At the commencement of the NWI, there was no national-level aquatic ecosystem resource condition program, database or framework for collating and reporting information from the various jurisdiction-based and disparate resource condition datasets.

The *AWR 2005* addressed this issue by using the only national aquatic ecosystem resource condition data that was available. That data included assessments of river condition compiled for the National Land and Water Resources Audit 2000, covering Australia's intensive land-use zones; Victorian Index of Stream Condition data, which was available for all Victorian streams between 1999 and 2004; and Tasmanian Conservation of Freshwater Ecosystem Values data, which was available for 2003–04. Those datasets were collated to present a national picture of aquatic ecosystem resource condition.

The *AWR 2005* also proposed a national-level reporting framework—the Framework for the Assessment of River and Wetland Health (FARWH) —that would use disparate but compatible data sources to present a consistent national picture of aquatic ecosystem resource condition.

The 2004–05 performance indicator report identified a range of technical challenges to arriving at an agreed set of definitions and methods to populate an indicator of this type.

In 2011, there is still no national-level dataset available to address this indicator. The Commission has funded the development of two national approaches that could contribute to reporting against this indicator in future: FARWH and a national inventory of water-stressed systems.

The Framework for the Assessment River and Wetland Health

The FARWH was developed as a major component of the *AWR 2005* after scoping identified difficulties in comparing river and wetland health within and between jurisdictions, and deficiencies in the level of information available at a national level.

The FARWH model was proposed to:

- + collect data from existing aquatic ecosystem monitoring programs and make it comparable within and across jurisdictions
- + provide a model for jurisdictions that did not have programs or the expertise to develop their capacity to make such assessments
- + help jurisdictions meet their commitment to undertake integrated management of water resources by developing good-quality and comprehensive monitoring programs.

The FARWH uses a conceptual model of river and wetland function based on six ecologically significant components that are appropriate for comprehensive assessments of river and wetland health: catchment disturbance; hydrological change; water quality and soils; physical form; fringing zone; and aquatic biota.

The FARWH does not replace existing river and wetland health assessment programs, or generate data, but provides an overarching framework designed to ensure that the outputs from previous and future monitoring and assessment in the states and territories are comparable and can be reported in a nationally consistent manner.

As part of the *AWR 2005*, the Commission tested the FARWH against the Victorian Index of Stream Condition and the Tasmanian Conservation of Freshwater Ecosystem Values programs. Over the past four years, we have funded four additional trials to test the alignment of the FARWH with existing jurisdictional programs and to design and implement new jurisdiction-based and FARWH-consistent river or wetland health assessments. The trials were conducted for rivers in Queensland, south-west Western Australia, northern Australia's wet/dry tropics and wetlands in New South Wales and are now complete.

A report (due for completion in mid-2011) will synthesise the results, key findings and recommendations of the FARWH trials and propose a refined FARWH model for future use in a national assessment.

Current river and wetland health programs in each jurisdiction are summarised in Table A.5.

Table A.5: Water resource condition assessment programs, by jurisdiction

Jurisdiction	Comments
ACT	In 2009–10, the Office of the Commissioner for Sustainability and the Environment reviewed state-of-the-environment (SoE) reporting in the ACT to assess and refine the territory's 2011 SoE reporting framework, which includes catchment and river health as one of its themes.
NSW	Monitoring and evaluation reporting programs include state-of-the-catchment reports and assessment programs for riverine and wetland themes. The 2010 reports document the condition of and pressures on 11 natural resource assets and two community targets at the regional scale.
	Programs in the riverine and wetlands themes measure resource condition for riverine and wetland assets. They are assessed at each reporting period; the next report will be in 2013. The reporting programs are designed to detect trends. The riverine theme has on-ground reporting programs for the Sustainable Rivers Audit and to report on trends, and the wetlands theme uses remotely derived data to report on trends.
NT	The Water for Life program aimed to capture information for comparison with baseline data gathered 10 years previously in the Australian River Assessment Program, AUSRIVAS.
	The Tropical Rapid Assessment of Riparian Condition technique has been developed to provide a multi-parameter riparian condition assessment and has been implemented in parts of the wet/dry tropics in the Northern Territory.
Qld	The Ecosystem Health Monitoring Program provides a regional assessment of the ambient ecosystem health (or 'pulse') for each of south-east Queensland's 19 major catchments, 18 river estuaries and Moreton Bay.
	The Stream and Estuary Assessment Program uses a pressure-stressor-response model to select indicators and design the monitoring regime to assess the condition of riverine ecosystems in nine Queensland biogeographic provinces.
SA	The Environmental Protection Authority releases an SoE report at least every five years. It aims to inform South Australians about the current state of their environment and provide an assessment of efforts to deal with significant environmental issues.
	The current state-wide river and wetland health assessment program assesses water quality and macroinvertebrates using the AUSRIVAS method. Regional programs and NRM bodies conduct comprehensive condition assessments that align with the FARWH themes.
Tas.	The Conservation of Freshwater Ecosystem Values (CFEV) assessment framework uses information collected as part of a state-wide audit designed to characterise freshwater ecosystems and to determine their condition. CFEV audits include rivers and wetlands as well as water bodies, estuaries, salt marshes, karst systems and groundwater-dependent ecosystems. CFEV provides a baseline for the development of the Tasmanian River Condition Index.
Vic.	The Victorian River Health Program Report Card 2002–2009 tracks progress against targets set in the Victorian River Health Strategy.
	The Victorian Government established the Index of Stream Condition (ISC) in the late 1990s. The ISC has five sub-indices to assess river health: hydrology, physical form, streamside zone, water quality and aquatic life. The ISC has been applied across Victoria in 1994 and 2004, and a third assessment is expected in late 2011.
	Other existing assessment programs that could support the application of the FARWH across the state include the Index of Wetland Condition and the Index of Estuary Condition.
WA	The River Health Assessment Scheme has been developed to provide multi-parameter river health assessments of the rivers and drains of the Swan–Canning catchment. Four years of data have been collected so far (2007–2010) from 12 of the 31 subcatchments in the system.
	Other than that, there is no state-wide program to provide up-to-date broadscale river health data in Western Australia. A number of datasets are available, including various GIS layers (land use, vegetation), water quality data stored in the Water Information database, wild rivers data and AUSRIVAS data.
MDB	The Sustainable Rivers Audit is designed to measure the health of MDB rivers at the basin scale. The FARWH builds on the methodology of the audit to ensure consistency in approach.

Performance indicator 3.4

Number and proportion of water systems for which:

- + high conservation value aquatic ecosystems have been identified
- + water plans or other instruments addressing high conservation value components have been completed
- + actions consistent with the plan have been undertaken.

Description of indicator

This indicator shows whether high ecological value aquatic ecosystems (HEVAEs) are being considered in water planning and whether actions to maintain conservation values are being undertaken.

Context

There has been substantial progress in the development of a national framework for the identification, classification and management of HEVAEs. The Australian Government is leading the development of the HEVAE framework and is working collaboratively with the jurisdictions through the multijurisdictional Aquatic Ecosystem Task Group.

The HEVAE framework aims to help the states and territories to meet their NWI commitments to identify and manage HEVAEs. It will help to meet the growing requirement at the national and regional levels for a nationally consistent approach to identifying and classifying aquatic ecosystems as connected functioning units, and is consistent with the systems approach adopted by the NWI. The HEVAE framework will include a set of tools that may be adapted to suit different jurisdictional needs in managing such systems.

The components of the framework include draft criteria to identify HEVAEs and draft delineation guidelines. Through the HEVAE development process, a separate draft Australian National Aquatic Ecosystems (ANAE) classification scheme has evolved. The framework and the classification scheme will bring national consistency to jurisdictions' classifications of HEVAEs.

Before the NWI, several jurisdictions had their own systems for identifying and managing high conservation value aquatic ecosystems. They are working to align their systems with the draft HEVAE Framework, but the resourcing implications of implementing the framework are still being considered.

Jurisdictions without such a system are using the elements of the draft HEVAE framework to identify assets for water planning and other purposes. As well as NWI compliance, the HEVAE framework and the ANAE classification scheme may be used for a range of other purposes. For example, they may contribute to the identification, classification and management of assets under the Ramsar Convention, the National Biodiversity Strategy and the National Reserve System, and for natural resource management investment.

An Integrated Ecological Condition Assessment (IECA) framework for HEVAEs is also being developed as part of the HEVAE framework. It will provide the capacity to assess and report at the individual aquatic ecosystem scale or on a number of connected aquatic ecosystem types at a range of scales. The IECA will allow comparative assessments and the integration of different indicators and ecosystems, and will be compatible with existing national and state river and wetland condition assessment frameworks. As the first steps in developing the IECA, jurisdictions are running a small number of proof-of-concept projects.

It is expected that the first components of the HEVAE framework (the draft criteria and the draft delineation guidelines) and draft ANAE classification scheme may be finalised and agreed through the Aquatic Ecosystem Task Group in early 2012.

Performance indicator 3.5

Environmental compliance by urban water service providers.

Description of indicator

This indicator measures improvements in the environmental management practices of urban water service providers.

Context

The 2004–05 performance indicator report used data on recycled water for this indicator. In the Commission's view, the data collation methodology was flawed. We noted at the time that net greenhouse gas emissions and sewer overflows were suitable alternative indicators once data became available, and those are reported below.

Greenhouse gas emissions

Comparing different utilities' net greenhouse gas emissions is a difficult exercise because of the number of variables that affect emissions, such as the source of water, gravity versus pumped networks, geographical conditions (which influence the need for pumping), the number of customers using large volumes of water, the proportion of industry in the customer base, the prevailing greenhouse policy in the jurisdiction, and the method of calculation.

Sewer overflows

An indicator based on sewer overflows was first introduced into national performance reporting in 2008–09. It includes only those sewer overflows that meet the criteria for reporting to the jurisdiction's environmental regulator (that is, overflows at the more 'extreme' end of the scale).

Different jurisdictions can have different licensing arrangements and varying reporting requirements, so numbers of sewer overflows reported to environmental regulators are sometimes not directly comparable between jurisdictions.

Source of data

NWC, National performance report: urban water utilities 2009–10, National performance report: rural water service providers 2009–10.



Figure A.2: Total net greenhouse gas emissions, urban water utilities, 2005–06 to 2009–10 (net tonnes CO₂-equivalent per 1000 properties)

Figure A.3: Sewer overflows reported to the environmental regulator, utilities with 100 000+ connected properties, 2008–09 and 2009–10 (per 100 km of main)



Performance indicator 3.6

Environmental compliance by rural water service providers.

Description of indicator

This indicator measures improvements in the environmental management practices of rural water delivery agencies.

Context

Greenhouse gas emissions

See comments under performance indicator 3.5.

Environmental management plans

Reporting from rural service providers for the Commission's *National performance report 2009–10: rural water service providers* confirms the existence or absence of environmental management plans. As noted in the report, 'In comparison to the urban sector, reporting on comparable indicators of environmental performance is more difficult for the rural water sector because of the diversity of services provided by rural [water service providers] and the manner in which they are delivered.'

Source of data

NWC, National performance report 2009–10: rural water service providers.



Figure A.4: Total net greenhouse gas emissions, rural water service providers, 2006-07 to 2009-10 (net tonnes CO_-equivalent)

CICL = Coleambally Irrigation Co-operative Limited; CIT = Central Irrigation Trust; FRW = Fitzroy River Water; G-MW = Goulburn–Murray Water; GWMW = Grampians Wimmera Mallee Water; HW = Harvey Water; LMW = Lower Murray Water; MI = Murrumbidgee Irrigation Limited; MIL = Murray Irrigation Limited; OI = Ord Irrigation Cooperative; SRW = Southern Rural Water; SunW = SunWater; SWC = State Water Corporation.

Note: Ord Irrigation Cooperative (OI) sources 100% of its electricity from hydropower. Blank (-) indicates not reported.

Rural water	Enviror plan or	nmental r system i	nanagem n place	ent	ls the e plan or	environme system	ental man certified?	agement	Comment (where provided)
service provider	2006 07	2007 08	2008 09	2009 10	2006 07	2007 08	2008 09	2009 10	
CICL	Yes	Yes	Yes	Yes	No	No	No	No	Was certified to ISO 9001 and ISO 14001 but certification has lapsed due to drought budget cuts.
MIL	Yes	Yes	Yes	Yes	No	No	No	No	Land and Water Management Plan Operating Licence
MI	Yes	Yes	Yes	Yes	No	No	No	No	
SWC	n.p.	Yes	Yes	Yes	n.p.	No	No	No	The environmental management plan is a requirement under State Water's operating licence. State Water's compliance is audited annually by IPART; the audit is not a formal approval or certification.
FRW	n.p.	n.p.	n.p.	No	n.p.	n.p.	n.p.	No	
SunW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
CIT	No	No	No	No	n.p.	n.p.	n.p.	n.p.	
G-MW	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
GWMW	Yes	Yes	Yes	Yes	No	No	No	Yes	IS014001 certified, 2009–10
LMW	n.p.	n.p.	Yes	Yes	n.p.	n.p.	No	No	
SRW	n.p.	No	No	Yes	n.p.	No	No	Yes	ISO 14000 certified, 2009–10
HW	No	No	No	No	No	No	No	No	
OI	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Included in this is the Water Use Improvement Plan, which forms the action plan for the water allocation licence. It is endorsed by the regulator (the Department of Water) and is used to assess performance against licence conditions.

Table A.6: Evidence of environmental management plan or system, 2006–07 to 2009–10

CICL = Coleambally Irrigation Co-operative Limited; CIT = Central Irrigation Trust; FRW = Fitzroy River Water; G-MW = Goulburn–Murray Water; GWMW = Grampians Wimmera Mallee Water; HW = Harvey Water; LMW = Lower Murray Water; MI = Murrumbidgee Irrigation Limited; MIL = Murray Irrigation Limited; OI = Ord Irrigation Cooperative; SRW = Southern Rural Water; SunW = SunWater; SWC = State Water Corporation.

n.p. = not provided.

NWI Objective 4: Complete the return of all currently overallocated or overused systems to environmentally sustainable levels of extraction

Performance indicator 4.1

The number and proportion of water systems for which a water plan has been completed that:

- a have not been assessed for overallocation
- b have been assessed for overallocation and are determined not to be overallocated
- c are assessed as being overallocated (and the level of overallocation) with a pathway in place to address the overallocation
- d are assessed as being overallocated (and the level of overallocation) with no pathway in place to address the overallocation.

Performance indicator 4.2

The number and proportion of water systems for which a water plan has been completed that:

- a have not been assessed for overuse
- b have been assessed for overuse and are determined not to be overused
- c are assessed as being overused (and the level of overuse) with a pathway in place to address the overuse
- d are assessed as being overused (and the level of overuse) with no pathway in place to address the overuse.

Description of indicator

This indicator shows whether states and territories are addressing overallocation and overuse, as required under the NWI. According to the 2004–05 performance indicator report, an overallocated catchment is one in which the sum of all water access entitlements is more than 100% of the sustainable yield, and an overused catchment is one in which the long-term average sum of all extractions and diversions is more than 100% of the sustainable yield.

Context

The 2004–05 performance indicator report noted that:

[T]he concept of overallocation, as addressed in indicator 4.1, is considered to be far less relevant to the environmentally sustainable management of water resources than overuse, as addressed in indicator 4.2. As noted in the context data provided for indicator 4.1, the water management within jurisdictions is often structured so that entitlements are issued with differing reliabilities, for example high or low security licences. Such a system may appear 'overallocated' on paper, however access to 100% of allocations is typically only allowed in wet years, and a much smaller percentage of allocations may be accessed in dryer years.

The AWR 2005 Level 2 summary report noted that:

This study concludes that there are concerns with the use of the term overallocation as defined in the NWI. It suggests that consideration be given to a new term, 'over-entitlement', that would be synonymous with the National Land and Water Audit's term 'over-development' ...

Data for environmentally sustainable levels of extraction and sustainable yields used in this study were provided by the states and territories. Given that they are implicit to the calculation of overallocation and overuse, there is concern that they are determined differently from jurisdiction to jurisdiction and that they may not reflect the effect of climate variability, climate change and land use trends during the past decade.

Source of data

This performance indicator presents data from two sources. The data for Table A.7 is based on independent research commissioned for the 2011 biennial assessment, as described below. The second set of data (Table A.8) is based on submissions from jurisdictions, and is presented in the same format as was used for the 2009 biennial assessment.

Note that the number of water systems parameter is shown in both tables. The proportion parameter is not shown, as the total number of water plans varies from year to year. The denominator in such a calculation varies over time, which makes the proportion parameter an unreliable measure of progress.

Table A.7

For the 2009 biennial assessment, the Commission reviewed all active water management plans across Australia to identify the extent to which:

- + overallocated and overused systems and systems approaching full allocation had been accurately and explicitly identified within the planning framework
- + 'firm pathways' had been established and implemented, under the NWI, to return all overallocated and/or overused systems to sustainable levels of extraction.

In that assessment, each water plan was assessed by the Commission to establish:

- + whether environmental assets had been identified within the plan
- + the extent and nature of the identification of environmental and other public benefit outcomes in the plan
- + whether the ecosystem services needed to achieve those outcomes had been identified in the plan
- + whether the plan showed that scientific studies had been used to determine the environmental water requirements to achieve the plan's outcomes
- + the extent to which overallocated and/or overused systems and systems approaching full allocation had been accurately and explicitly identified within the plan
- + where overallocation and/overuse had been identified, the extent to which jurisdictions had put in place through the planning process firm pathways and open processes for returning those systems to environmentally sustainable levels of extraction
- + the nature of those pathways and processes.

The review found that, through water planning, 104 systems were identified as overallocated and/or overused, fully allocated or approaching full allocation. Where a system had been found to be overallocated or overused, a range of measures were in place to address the overallocation or overuse, or at least to manage its impact. Note that most water plans cover more than one water source. For example, the Victorian Central Region Sustainable Water Strategy covers up to 37 surface water and groundwater systems.

For the 2011 biennial assessment, that framework was applied to all new water plans and to any that had been revised since 2009. Based on the water plans, this report updates the list of all currently overallocated and/or overused or fully allocated systems in Australia. Given that the 2004–05 report collected data in a different format, its tables are not reproduced here and 2009 data is presented for comparison purposes.

Jurisdiction	Status	2009	2011
ACT	Overallocated and/or overused	-	-
	Fully allocated	_	_
NSW	Overallocated and/or overused	7	8ª
	Fully allocated	28	34
NT	Overallocated and/or overused	-	-
	Fully allocated	-	1
Qld	Overallocated and/or overused	1	5
	Fully allocated	7	4
SA	Overallocated and/or overused	5	8
	Fully allocated	5	5
Tas.	Overallocated and/or overused	-	-
	Fully allocated	2	2
Vic.	Overallocated and/or overused	9	18
	Fully allocated	3	10
WA	Overallocated and/or overused	2	8
	Fully allocated	-	-
Total		71	104

Table A.7: Identified overallocated and/or overused or fully allocated systems or subsystems, 2009 and 2011

a NSW has implemented measures to reduce entitlements.

Note: This table includes only those water systems that were managed at the time in accordance with available water plans. A small number of those systems are not entirely overallocated or fully allocated, but include some overallocated or fully allocated subsystems.

Jurisdiction	Indicator	Number	r of water sy	stems for	which a wa	ter plan ha	s been com	npleted tha	÷	Comments
		a) have assesse overallo overuse	not been ed for Acation /	b) have l assessed determir be overa	been d, and ned not to illocated / d	c) have b assessed overused a pathwa	een l as ated / and have y in place	d) have t assessed overallod overused no pathw	oeen d as cated / 1, but have ay in place	
		2009	2011	2009	2011	2009	2011	2009	2011	
ACT	4.1 (overallocation)	0	0			0	0	0	0	The ACT has one water planning area, and the water plan for that area is
	4.2 (overuse)	1								complete. The ACT reported that it has no overallocated water systems.
NSW	4.1 (overallocation)	n.p.	0	n.p.	n.p.	n.p.	n.p.	n.p.	0	NSW reported that, in areas with water sharing plans, the extraction limits
	4.2 (overuse)	n.p.	0	n.p.	n.p.	n.p.	n.p.	n.p.	0	plus the environmental water rules are designed to ensure that systems are not overused. Allocations vary from year to year depending on the volume of water available for consumptive use.
NT	4.1 (overallocation)	0	0	2	က	0	0	0	0	The NT reported that there were no overallocated systems in any water plan
	4.2 (overuse)	0	0	2	n.p.	0	n.p.	0	0	at 30 September 2010.
QId	4.1 (overallocation)	n.p.	0	n.p.	20	n.p.	S	n.p.	0	Queensland reported an amendment of the Pioneer Water Resource Plan
	4.2 (overuse)	n.p.	0	n.p.	18	n.p.	IJ	n.p.	0	(WRP) to include groundwater, and confirmed the overallocation and overuse of groundwater in coastal sections of the Pioneer Valley aquifer system.
										Overuse of groundwater was identified in the Bundaberg Groundwater Management Area (Burnett WRP), and in Management Area A of the Atherton Sub-artesian Area (Barron WRP).
										Ongoing assessments indicate overallocation and overuse of groundwater in the Callide Valley subcatchment of the Fitzroy Basin (Fitzroy Basin WRP) and the Condamine River and Tributary Alluvium aquifer (Condamine and Balonne WRP).
SA	4.1 (overallocation)	0		10	12		c	ω	n	SA reported that if the majority of management areas within a water allocation plan are not overallocated and/or overused then the water allocation plan is not marked as such There may be localised 'hotsoric' where there is
	4.2 (overuse)	0	. 	12	17	. 		Q	. 	some overallocation and/or overuse, but the overall resource is not classified as such.

Table A.8: Overallocated and/or overused systems or subsystems reported by jurisdictions, 2009 and 2011

Jurisdiction	Indicator	Number	of water sy	stems for v	which a wat	er plan has	s been com	pleted that		Comments
		a) have r assessed overalloc overuse	not been d for cation /	b) have t assessed determin be overa overused	een 1, and ed not to llocated /	c) have be assessed overused a pathway	en as ated / and have / in place	d) have b assessed overalloc overused no pathwe	een as ated / , but have ay in place	
		2009	2011	2009	2011	2009	2011	2009	2011	
Tas.	4.1 (overallocation)	0	0	5	all	0	0	0	0	Tasmania reported that water management plans set environmentally
	4.2 (overuse)	0	0	2	all	ę	0	0	0	sustainable levels of extraction by providing water allocation limits and rules for accessing water on a daily basis. No Tasmanian water resources have been assessed as overallocated.
Vic.	4.1 (overallocation)	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	n.p.	Victoria reported that it does not explicitly identify water systems as being
	4.2 (overuse)	n.p.	n.p.	n.p.	Ч. П	n.p.	n.p.	.d.п	.d. П	overallocated or overused through its water planning process. As a result, it has not identified any additional water resources as being overallocated and/or overused and requiring pathways for water recovery. Water supply protection areas are declared when allocations approach the sustainable yield.
WA	4.1 (overallocation)	n.p.	0	7	13	œ	6	0	0	WA reported that, for all water allocation plans, if an area is overallocated
	4.2 (overuse)	n.p.	0	n.p.	13	n.p.	0	0	0	the plan contains recovery strategies to reduce the level of overallocation. All areas are overused as well as overallocated.
n.p. = not provided	J.									

Note: Only those water systems that were managed at the time in accordance with available water plans have been included. Some management areas are both overallocated and overused.

NWI Objective 5: 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

Performance indicator 5.1

Percentage (by volume and number) of entitlements/allocations traded permanently, traded temporarily or leased.

Description of indicator

This indicator assesses market activity and depth.

Context

In the 2009 biennial assessment (p. 133), the Commission raised concerns about the validity of this indicator as a measure of market activity and depth. Some of those concerns remain.

First, comparing trading intensities across valleys and jurisdictions is not necessarily informative, as different valleys contain different proportions of higher and lower reliability entitlements, and therefore have different volumes of water allocation available for trade. Regional variation in water availability also plays a significant role in determining trade intensity.

Second, it is difficult to report on the percentage of allocations traded by number or volume. Allocations are generally made to entitlement holders cumulatively throughout the water year, and are expressed as percentages of the nominal volume of the entitlement. As many as 24 separate allocation announcements are made throughout the year, depending on the jurisdiction. Water users are not limited to any particular number of allocation trades, and reporting the number of allocation trades relative to the number of allocation determinations or announcements is not informative about market activity or depth.

Reporting the percentage of allocation traded by volume is possible, but is also problematic due to the cumulative nature of allocations, and the difficulty of comparing allocation levels and trade intensities between valleys. However, it is possible to report the number and volume of allocation trades in a given year.

Source of data

2007-08, 2008-09 and 2009-10 data adapted from NWC, Australian water markets reports.

2004–05 data from the 2004–05 performance indicator report, which used ABS, *Water access entitlements, allocations and trading, Australia, 2004–05.*

Data on leased entitlements has not been included because it was not available for all states and territories.

Data was not available for the number of allocation trades in 2007–08.



Figure A.5: Entitlement trade intensity, by number, 2004–05 to 2009–10 (percentage of total entitlements on issue)





Note: Intensity is calculated based on the number or volume of entitlements traded in a year, divided by the number or volume of entitlements on issue in that year. Excludes area-based licences. Percentages have been rounded.



Figure A.7: Allocation trade intensity, by number, 2008–09 and 2009–10





Note: Based on Australian water markets report 2009-10 for 2009- data.

Performance indicator 5.2

Water trade approval times.

Description of indicator

This indicator measures administrative approval times for water trades to show the ease with which water can be traded. It is a measure of the efficiency of the trading system.

Context

Since 2007–08, COAG and the NRMMC have adopted service standards for processing times by state approval authorities for approvals or rejections of entitlement and allocation trades.

The Murray–Darling Basin states are required to report publicly on their performance against those service standards. The Commission independently verifies their achievement through the annual COAG Water Management Partnership Agreement Assessments, which assess the implementation of the 2008 Agreement on Murray–Darling Basin Reform.

During 2008–09, only the water allocation trade service standards were applicable, as they came into force for only the second half of the water year (from 1 January 2009). The 2009–10 water year was the first full year in which both water allocation and entitlement service standards applied.

Due to limitations in the data provided to the Bureau of Meteorology by jurisdictions, this report does not account for 'stop the clock' provisions used by jurisdictions to account for delays in processing caused by factors outside the control of approval authorities. As a result, the figures below may differ from those reported by approval authorities. For more information, see COAG Reform Council, *Water Management Partnerships: report on performance 2009, Australian water markets report 2009–10*, p. 240.

Source of data

NWC, Australian water markets report 2008–09, Australian water markets report 2009–10.

COAG service standards	Water allocation 2008–09	trades	Water allocation to 2009–10	rades	Water entitleme 2009–10	nt trades
	Intrastate 90% within 10 business days	Interstate 90% within 20 business days	Intrastate 90% within 5 days; 10 days for South Australia	Interstate 90% within 10 days; 20 days for South Australia	Approvals stage 90% within 20 business days	Registration stage 90% within 10 business days
Qld	97% within 5 days	n.a.	99% (supplemented) 87% (unsupplemented)	n.a.	Standard not applicable	95%
Vic.	97% within 10 days	97% within 20 days	92%	89% (NSW) 95% (SA)	92%	97%
SA (River Murray only)	97% within 10 days	90% within 20 days	75%	99%	94% unbundled	100% (bundled and unbundled)
NSW	99% within 10 days	98% within 10 days	93% within 5 days	86% (Qld and Vic.) 92% (SA)	81%	59%

Table A.9: Water trade approval times, MDB jurisdictions, 2008–09 and 2009–10

Note: SA and NSW figures include allowance for 'stop the clock' provisions.

Table A.10: Water trade approval times, non-MDB jurisdictions, 2009–10

Jurisdiction	Performance
NT	No trades recorded.
WA	100% of approvals for water licence trades in regulated systems and 24% of water licence transfers in unregulated systems were processed within 20 business days.
	All registrations for water licence transfers in regulated systems were processed within 10 business days (average: 2 business days).
	No data was available for registration processing times for water licence transfers in unregulated systems.
Tas.	39% of approvals for water licence trades were processed within 20 business days.
	98% of registrations for water licence trades were processed within 10 business days.
	There is a wide range in approval times in Tasmania, as trades include both licence transfers and limited period transfers (equivalent to leases). A licence transfer approval requires a complete review of the licence history, but the approval time is expected to decrease in future as more licences are reviewed and the original issue or conversion is validated.

Note: COAG service standards for trade processing times do not apply to the Northern Territory, Western Australia or Tasmania or any other area outside the MDB. Western Australia advised that the Department of Water is developing state-based service standards.

Performance indicator 5.3

Number and proportion of applications rejected by state and territory approval authorities, by reason for rejection.

Description of indicator

This indicator assesses the sophistication of the water market.

Context

The 2004–05 performance indicator report noted that time-series comparisons within jurisdictions may not be useful because variability influences the frequency of water trades, and that the indicator may not be suitable for comparing temporal trends across jurisdictions.

The reasons for rejections of trades have not been routinely collected by all jurisdictions because the reasons vary considerably and are often complex and technical. Common reasons include insufficient information, insufficient allocation, hydrological constraints, supply constraints, environmental impacts, administrative errors, cut-off dates for temporary trade, and previous breaches of licence conditions.

Jurisdictions also differ in their approaches to administering applications. State Water in New South Wales and a number of water authorities consulted by the Commission noted that they were unlikely to reject an application on the grounds that a form contained minor errors; however, Victoria's 2004–05 figures include applications that were quickly rectified, for example via a phone call. Victoria also notes that few applications are fully rejected.

Given the range of potential reasons, the data below does not list rejections by reason, although that data would be useful for analysis.

Source of data

Jurisdictions. Data for 2009–10 was received only from the ACT, Tasmania and the Northern Territory.

				2004–05			2009–10
	Type of trade	Total no.	Total no. rejected	% Rejected	Total no.	Total no. rejected	% Rejected
ACT	Allocation	0	0	n.a.	1	0	n.a.
	Entitlement	0	0	n.a.	0	n.a.	n.a.
NSW	Allocation	2 150	n.a.ª	n.a.	4 757	n.a.	n.a.
	Entitlement	n.a.	n.a.	n.a.	1 246	n.a.	n.a.
NT	Allocation	0	n.a.	n.a.	0	n.a.	n.a.
	Entitlement	0	n.a.	n.a.	0	n.a.	n.a.
Qld	Allocation	n.a.	0	n.a.	1 513	n.a.	n.p.
	Entitlement	n.a.	0	n.a.	538	n.a.	n.p.
SA	Allocation	505	9	1.8%	1 726	n.a.	n.p.
	Entitlement	364	4	1.1%	1 335	n.a.	n.p.
Tas.	Allocation	220	0	0.0%	12	0	0.0%
	Entitlement	70	0	0.0%	163	0	0.0%
Vic.	Allocation	11 500	2 200	5.3%	8 676	n.a.	n.p.
	Entitlement	950	50	19.1%	3 245	n.a.	n.p.
WA	Allocation	227	9	4.0%	188	n.a.	n.p.
	Entitlement	6	0	0.0%	149	n.a.	n.p.

Table A.11: Number and proportion of applications rejected by state and territory approval authorities, 2004–05 and 2009–10

n.a. = not applicable; n.p. = not provided or not available.

a NSW advised that this number would have been small.

Performance indicator 5.4

Cost of doing a trade of a water entitlement, including permanent and temporary trade.

Description of indicator

This indicator assesses jurisdictions' progress towards the removal of barriers to water trading, in line with the goals of the NWI.

Context

Water trades vary in complexity; the number and scale of fees depend on the type of trade, the processing involved and the approval authority or authorities. Fees also vary between approval authorities for similar trades and approval steps. Variations in fees are due to different levels of cost-reflectivity, differences in hydrological assessments required to process trades, administrative systems and trade processes, and the maturity of the market.

Reporting against this indicator focuses on transaction costs for the purchase of entitlements and allocations in regulated and unregulated surface water systems. Water trading transaction costs can include searches, transactions, registrations, solicitors' fees, brokerage, stamp duty and termination fees:

- + Search costs include fees payable to government departments or irrigation infrastructure operators to undertake due diligence on entitlement purchases (for example, information on fines or security interests).
- + Transaction costs include trade application fees to approval authorities, which generally cover administrative costs for processing and may include hydrological assessments required to process trades.
- + Registration costs include fees payable to government departments to update entitlement registries after a trade is completed.
- + Termination fees are charges by irrigation infrastructure operators when an entitlement holder transfers that entitlement to someone outside the operators' bulk licence.
- + Brokerage fees are charged by water brokers to facilitate trading between buyers and sellers.
- + Solicitors can manage the conveyancing for entitlement trading, including drawing up contracts and lodging documents.
- + Stamp duty can also apply to entitlement transactions.

Costs for brokerage, solicitors and conveyancing are not reported here, as those services are not regulated and, although widely used, are not required to enable trade.

It should be noted that the NWI requires jurisdictions to remove barriers to trade while at the same time moving towards the full recovery of planning and management costs. This indicator should be assessed in that context—that is, as a balance between the removal of barriers to trade and cost recovery for trade processing and administration.

Sources of data

Data has been collected from website searches and through requests for information from staff in water authorities and water management agencies. Information requests were restricted to administrative sources only, and that information was used to supplement gaps in the information available on websites.

The information available online varied between jurisdictions. Much of the information was difficult to source, and explanations and descriptions of charges provided online were inadequate. Some information was included only within forms and templates, without a concise listing of all applicable fees and charges.

	Trade type	2009				2011			
		Search	Transaction	Registration	Stamp duty	Search	Transaction	Registration	Stamp duty
ACT	Entitlement transfer	n.c.	\$132	n.c.	n.a.	n.c.	\$134.60	n.c.	n.a.
	Allocation transfer	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Entitlement lease	n.c.	\$132	n.c.	n.a.	n.c.	\$134.60	n.c.	n.a.
NSW	Entitlement transfer	\$10.75 to \$12.50	n.c. to \$407	\$88	\$10	\$11.30 to \$13	\$116.68 to \$484	\$93	\$10
	Allocation transfer	n.a.	\$50 + \$0.50/ML (State Water) \$25 to \$210 (private IIOs)	n.a.	n.a.	n.a.	\$50+ \$0.50/ML (State Water) \$27.5 to \$75 (private IIOs)	n.a.	n.a.
	Entitlement lease	\$10.75 to \$12.50	n.c.	\$88	n.a.	\$11.30 to \$13	n.c.	\$93	n.a.
NT	Entitlement transfer	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.
	Allocation transfer	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.
	Entitlement lease	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.	n.i.
QId	Entitlement transfer	\$26	n.c. (\$124.50 if changes in entitlement conditions)	\$121	Yes	\$13.5	\$290.70 (DERM) \$251 (SunWater)	\$128	Yes
	Allocation transfer	n.a.	n.c. (\$10 admin. charge if via post or fax)	n.a.	n.a.	n.a.	\$132.10 (DERM) \$251 (SunWater)	n.a.	n.a.
	Entitlement lease	\$26	n.c.	\$121	n.a.	\$13.5	\$418 (SunWater)	\$128	n.a.
SA	Entitlement transfer	n.c.	\$278 to \$335	n.c.	No	n.c.	\$292 to \$361	n.c.	No
	Allocation transfer	n.a.	n.a.	n.a.	n.a.	n.a.	\$212 to \$603	n.a.	n.a.
	Entitlement lease	n.c.	\$278 to \$335	n.c.	n.a.	n.c.	\$292 to \$361	n.c.	n.a.
Tas.	Entitlement transfer	\$19	\$32 to \$252	n.c.	No	\$22	\$36.99 to \$267.24	\$27.50	No
	Allocation transfer	n.a.	\$32 to \$252	n.a.	n.a.	n.a.	\$36.99 to \$267.24	\$27.50	n.a.
	Entitlement lease	\$19	\$126	n.c.	n.a.	\$22	\$36.99 to \$267.24	n.c.	n.a.

Table A.12: Administrative costs of water trades, 2009 and 2011

	Trade type	2009				2011			
		Search	Transaction	Registration	Stamp duty	Search	Transaction	Registration	Stamp duty
Vic.	Entitlement transfer	\$11 to \$22	\$129	66\$	No	\$12 to \$22.80	\$165.80	\$104	No
	Allocation transfer	n.a.	\$62	n.a.	n.a.	n.a.	\$73.80	n.a.	n.a.
	Entitlement lease	\$11 to \$22	\$129	\$99	n.a.	\$12 to \$22.80	\$165.80	\$104	n.a.
MA	Entitlement transfer	n.c. (\$15 Harvey Water)	\$15 (Harvey Water) \$200 (DoW)	n.c.	n.a.	n.c.	\$15 (Harvey Water) \$200 (DoW)	n.c.	No
	Allocation transfer	n.a.	n.a.	n.a.	n.a.	n.a.	\$50 (Harvey Water) \$200 (DoW)	n.c.	n.a.
	Entitlement lease	n.c. (\$15 Harvey Water)	n.c. (Harvey Water) \$200 (DoW)	n.c.	n.a.	n.c.	\$15 (Harvey Water) \$200 (DoW)	n.c.	n.a.
DFRM -	Denartment of Environment a	ind Besource Manademe	nt (Old): DoW – Denartment of Water (M/	∆)· IIO — irriaation in	fractructure onerato	hr. n a – not annlicahle. r	ר – החלאמת היו		

Water (WA); IIU : 20

Note: Does not include groundwater charges or termination fees for entitlement trades out of irrigation districts.

Table A.12 continued

Summary charts

The charts in this section show the cost ranges for trades, based on fees and charges in place in 2011. They are simplified representations of the information gathered by the Commission and are intended only to make it easy to compare possible costs across jurisdictions. Large discrepancies in charges between jurisdictions may reflect the fact that not all trades are the same and may also reflect additional costs for unusual or complex transactions.



Figure A.9: Minimum and maximum cost of entitlement trade, 2011 (\$)









NWI Objective 6: Clarity around the assignment of risk arising from future changes in the availability of water for the consumptive pool

Performance indicator 6.1

Application of risk management framework in jurisdictions and regular public reporting to aid risk management.

Description of indicator

A risk assignment framework, which allocates the risk arising from future changes to the consumptive pool, is set out in the NWI. This indicator shows the extent to which the framework is being applied and whether the reporting required under clause 40 (iii) of the NWI is being done.

Source of data

Jurisdictions.

Table A.13: Application of risk assignment provisions, 2005, 2009 and 2011

	2005 (2004–05 performance indicator report)	2009 (biennial assessment)	2011 (jurisdictions' submissions)
ACT	No information provided	Risk assignment is not addressed in the ACT Water Resources Act 2007.	The NWI risk assignment framework is not yet fully implemented, but is
		The ACT stated that it would adopt the NWI risk assignment framework in legislation later in 2009.	scheduled for implementation in 2011.
NT	No information provided	The NT <i>Water Act</i> does not clarify risk assignment. It simply provides for licences to be issued, except in exceptional circumstances, for a period of not more than 10 years (section 45(4)).	The NT <i>Water Act</i> is silent about risk assignment. Prima facie, all risks of reduced water availability are carried by water extraction licence holders, subject to successful appeal determined through
		Because licence terms are only 10 years, all risk falls to the consumptive user.	the Act against regulatory decisions to grant or amend licences.
		Risks are enunciated in individual water allocation plans.	Drafting instructions have been prepared for incorporation of the risk assignment framework described in NWI
		The NT advised that risk is associated	clauses 46–51 into the Water Act.
		primarily with climatic factors outside the control of government and that consequently risk is borne by water users.	Subject to necessary approvals, a Bill to amend the Water Act may be completed in 2011.

2005 (2004–05 performance indicator report)

NSW NSW had legislation that covered compensation for changes to current water sharing plans, and had passed legislation that specifically provided for the NWI framework to be used for future plans. For water resource areas outside the Murray–Darling Basin (MDB), NSW had legislated for the NWI risk assignment framework, which will apply from 2014 onwards as required under the NWI.

2009

(biennial assessment)

The NSW *Water Act 1912* 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 reduced 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.

For water resource areas within the MDB, NSW had implemented further legislative changes in accordance with the 2008 MDB intergovernmental agreement.

The enhanced Commonwealth risk sharing arrangement for new knowledge would apply to transitional water plans that expire after the Basin Plan takes effect. 2011 (jurisdictions' submissions)

For water resource areas outside the MDB, there has been no change since 2009.

For water resource areas within the MDB, NSW has implemented further legislative changes in accordance with the 2008 MDB intergovernmental agreement.

The enhanced Commonwealth risksharing arrangement for new knowledge will apply to transitional water plans that expire after the Basin Plan takes effect.

The Murray–Darling Basin Authority's Guide to the proposed Basin Plan states that the climate change component, for which the water entitlement holder is responsible, is 3% of the proposed reduction in current diversion limits for surface water, and 0% for groundwater. Once that is taken into consideration, the Australian Government should carry the full (100%) responsibility for the residual. Therefore, the Australian Government's share of reductions in current diversion limits necessary to implement sustainable diversion limits for the Basin Plan (Water Act s. 75(1)(d) and 75(2)) is 100% of the reduction for surface water, being:

- + all of the change due to the component covering changes in Australian Government policy
- + none of the change due to the new knowledge component.

MDB arrangements may vary upon the release of the Basin Plan.

	2005 (2004–05 performance indicator report)	2009 (biennial assessment)	2011 (jurisdictions' submissions)
Qld	Yes—As per NWI Agreement clauses 46–51.	Under the Qld <i>Water Act 2000</i> , 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 risk assignment process in accordance with the NWI.	Queensland noted in its submission to this assessment that adoption of the NWI risk assignment framework awaits clarity about how the <i>Water Act 2007</i> (Cwth) is to take effect and its impact on the Basin Plan.
		Queensland stated that it would 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.	
SA	Yes—Risks associated with changes in water availability are managed through the state's water allocation and planning process.	South Australia had 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).	Since the 2009 biennial assessment, South Australia has reviewed its risk assignment framework as foreshadowed in the South Australian NWI Implementation Plan. The review was
	The state Manager Minister to licences w it necessa (section 1 South Aus are closel considerin	The state's <i>Natural Resources</i> <i>Management Act 2004</i> enables the Minister to reduce water allocations of licences where the Minister considers	completed in 2010 and took into account the advent of the <i>Water Act 2007</i> and the 2008 intergovernmental agreement on MDB reform.
		it necessary or desirable to do so (section 156).	The result of the review is that the South Australian Government has committed to continuing its existing risk assignment policy framework.
		South Australia noted that licensees are closely involved in the process of considering reductions to water allocations.	
Tas.	Tasmania's NWI Implementation Plan stated that development of the post-2014 risk assignment framework would commence in 2011.	In accordance with Tasmania's NWI Implementation Plan, the development of a risk assignment framework would commence in 2011 for post-2014 arrangements.	No change reported since 2009.

	2005 (2004–05 performance indicator report)	2009 (biennial assessment)	2011 (jurisdictions' submissions)
Vic.	 Legislation had been enacted so that an expert assessment of the state's water resources would be made at 15-year intervals to determine whether: + the resource base had suffered a decline, and whether the burden had fallen disproportionately on the environment or water users + river health was deteriorating for flow-related reasons. If either were the case, the Minister would establish an open, consultative review of the balance between the water available for consumption and the Environmental Water Reserve, and of necessary corrective action. 	Victoria had adopted an alternative risk assignment framework, as per paragraph 51 of the NWI. The approach was developed as part of the Victorian Government's 2004 <i>Our water, our future</i> White Paper process in consultation with stakeholders. Subsequently, relevant amendments to the Victorian <i>Water Act 1989</i> were made.	No change reported since 2009.
	An assessment would occur in the 12th year of the 15-year period. If a review were necessary, it would begin soon after the assessment and its recommendations would be implemented at the end of the 15-year period.		
WA	WA had opted to apply a framework under section 51 of the NWI. Work had begun on developing a framework that could reflect the greatly varied climatic conditions in the state.	The WA <i>Rights in Water and Irrigation Act 1914</i> does not establish a risk assignment framework for any future reductions in the availability of water for consumptive use. The Western Australian Government was drafting a strategic policy that would outline how the state assigns risks for future reductions to water allocations.	The strategic policy on risk assignment was finalised in July 2009 and will guide the implementation of risk assignment should the enabling legislation be enacted.

NWI Objective 7: Water accounting which is manageable to meet the information needs of different water systems in respect to planning, monitoring, trading, environmental management and on-farm management

Performance indicator 7.1

Percentage of total water and proportion of water systems accounted for, audited and reconciled in accordance with the agreed accounting system standards.

Description of indicator

No description of this indicator was documented in the 2004–05 performance indicator report. However, the report noted that 'data collection for this indicator will not commence until the accounting standards have been developed.'

Update on progress

Progress continues to be made in developing a national framework and standards for water accounting.

The theoretical foundation of water accounting is contained in the *Water accounting conceptual framework for the preparation and presentation of general purpose water accounting reports*, the main purpose of which is to guide the development of Australian Water Accounting Standards to ensure that they remain cohesive and integrated.

In October 2010, the exposure draft of *Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports* was published by the Water Accounting Standards Board. It sets out requirements for the recognition, quantification, presentation and disclosure of specific water resources. Most jurisdictions contributed to the exposure draft, which is currently released for discussion and feedback. The New South Wales Office of Water has published general purpose water accounting reports for 2009–10 for three valleys using the draft Australian Water Accounting Standard: the Macquarie–Bogan catchment, Murrumbidgee and Namoi.

Comments and input on the exposure draft from preparers and users of water reports will be the next significant step in the standardisation of water information. The finalised standard will provide the basis for preparing and presenting consistent general purpose water reports.

The Bureau of Meteorology has published a pilot National Water Account, for which the water accounting standards were tested in five water management systems across Australia. The bureau's first National Water Account is expected to be published in 2011.

NWI Objective 8: Policy settings which facilitate water use efficiency and innovation in urban and rural areas

Performance indicator 8.1

Rate of use of more efficient irrigation systems.

Description of indicator

This indicator measures improvements in irrigation efficiency.

Context

Except where surface (flood) irrigation is carefully designed and managed for specific cases, it is often considered the least water-efficient irrigation method, followed by sprinklers. Drip or trickle irrigation is the most efficient.

In the 2009 biennial assessment, the Commission recommended that the NRMMC performance indicators for NWI Objective 8 be refined to better reflect the important policy principle that applying partial measures of productivity, such as technical water-use efficiency, may not necessarily be in the overall interests of the community or the environment. Often, the costs of improving technical water-use efficiency 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 (Recommendation 8.11).

Source of data

ABS, *Water use on Australian farms 2004–05, Water use on Australian farms 2008–09.* This data was not updated for the 2009–10 ABS report, which did not capture irrigation efficiency gains achieved through recent government irrigation infrastructure investments.

The figures used for this indicator are estimates with a relative standard error ranging up to 50%. Consequently, the data should be used with caution.

New South Wales figures include the Australian Capital Territory.

Cross-jurisdictional comparisons are not appropriate due to differences in crop types and climate between the jurisdictions.

Figure A.12: Irrigated area for each irrigation method, 2004–05 and 2008–09 (percentage of total irrigated area)



Note: These estimates have a relative standard error ranging up to 50%, and so should be used with caution. Comparisons between years can be unreliable, particularly for smaller percentages.

Performance indicator 8.2

Gross value of irrigated agricultural production (GVIAP) per megalitre of water, by state or territory.

Description of indicator

This indicator measures improvements in the productivity of the irrigated agriculture industry.

Context

GVIAP refers to the gross value of agricultural commodities that are produced with the assistance of irrigation. This is the value placed on recorded production at the wholesale prices realised in the marketplace. GVIAP is a core component of the ABS's Water Account Australia, which is produced every four years, although the ABS identifies GVIAP as an 'experimental estimate'.

For this performance indicator, the value of production was divided by the volume of water applied to determine the \$/ML value for each jurisdiction. Water use was estimated based on surveys and areas under particular crops, so the resulting \$GVIAP/ML values are possibly inaccurate.

The use of GVIAP as an indicator of efficiency gains has several limitations. For example, GVIAP is not the value that irrigation adds to production, or the net effect that irrigation has on production. It simply describes the gross value of agricultural commodities produced with the assistance of irrigation. Therefore, it is not a measure of productivity. Changes in GVIAP can also be attributed to seasonal conditions, such as water availability and variable global commodity prices. The GVIAP figures are not adjusted for inflation. They represent prices in a given year, and any comparison between years requires adjustment for inflation. Further discussion about GVIAP is in Section 2.1.1.

A range of factors drive water-use efficiency and innovation. For example, the prolonged drought led to significant private investment by farmers in order to use water more efficiently. State and territory governments also implemented a number of programs to improve on-farm water-use efficiency.

Source of data

ABS, Water account 2004–05, Water account 2008–09.

The 2004–05 figures given here differ from those in the 2004–05 performance indicator report because the ABS methodology for calculating GVIAP, and consequently the 2004–05 GVIAP figure, have changed since 2005. Figure A.13 uses revised ABS figures for both years.





Performance indicator 8.3

Water application rates for irrigated agriculture.

Description of indicator

This indicator assesses improvements to management practices in irrigated agriculture, including the take-up of more efficient practices or technologies.

Context

It is difficult to separate the effects of soil types, water availability, changes in irrigation efficiency and climatic conditions. This should be kept in mind when analysing the data used to populate this indicator.

The ABS reports noted that the figures used for this indicator are estimates with a relative standard error ranging up to 50%. Consequently, the data should be used only with caution.

Source of data

ABS, Water use on Australian farms 2004–05, Water use on Australian farms 2009–10.
	Australia		NSN		Vic.		QId		SA		WA		Tas.		NT	
	2004 -05	2009 -10	2004 -05	2009 -10	2004 -05	2009 -10	2004 -05	2009 -10	2004 -05	2009 -10	2004 -45	2009 -10	2004 -05	2009 -10	2004 -05	2009 -10
Pasture for grazing	3.4	3.2	2.5	2.3	3.8	3.3	2.5 ^a	3.1ª	6.1 ^a	4.7	n.p.	5.6	3.1	3.0	n.p.	3.2
Pasture for seed production	3.6	n.a.	3.1ª	n.a.	n.p.	n.a.	2.5ª	n.a.	4.3ª	n.a.	n.p.	n.a.	1.9	n.a.	n.p.	n.a.
Pasture for hay	3.8	3.1	4.0	3.6	3.2	2.4ª	4.9	3.2ª	5.3^{a}	3.6^{a}	n.p.ª	6.3	2.4	2.5	n.p.	10.8
Pasture for silage	n.a.	2.2	n.a.	2.3ª	n.a.	1.6	n.a.	2.5ª	n.a.	3.3 ^b	n.a.	n.p.	n.a.	n.p.	n.a.	I
Pasture for hay and silage	3.8	n.a.	4.0	n.a.	3.2	n.a.	4.9	n.a.	5.3^{a}	n.a.	n.p.ª	n.a.	2.4	n.a.	n.p.	n.a.
Cereal crops cut for hay	2.4	n.a.	2.7 ^a	n.a.	1.7 ^a	n.a.	2.6ª	n.a.	1.7 ^b	n.a.	3.6 ^b	n.a.	2.0ª	n.a.	I	n.a.
Cereal crops cut for grain or seed	2.6	2.6	2.7	2.6	1.8	1.7 ^a	2.6	3.0	2.1 ^a	1.3ª	4.1 ^b	n.p.	1.4	n.p.	I	n.p.
Cereal crops not cut for grain or seed	2.8	n.a.	3.1 ^a	n.a.	1.6 ^b	n.a.	2.8ª	n.a.	3.9ª	n.a.	4.7 ^b	n.a.	1.4	n.a.	I	n.a.
Rice	12.1	13.0	n.p.	n.p.	n.p.	n.p.	Ι	n.p.	Ι	I	I	Ι	Ι	Ι	I	Ι
Sugar cane	5.5	3.6	n.p.	n.p.	Ι	Ι	5.3	n.p.	I	Ι	n.p.	Ι	Ι	Ι	I	Ι
Cotton	6.7	5.6	6.6	5.9	Ι	Ι	6.9	5.2	I	Ι	I	Ι	Ι	Ι	I	Ι
Other broadacre crops	2.8	2.4	3.2	2.0ª	1.7 ^a	n.p.	2.6ª	2.3	3.0	2.2 ^b	n.p.	6.9	2.2	2.0	n.p.	n.p.
Fruit trees, nut trees, plantation or berry fruits	5.0	4.9	5.2	4.4	5.3	5.7	3.7	3.7	7.7	6.9	4.1	4.9	2.3ª	2.5	3.0	2.6
Vegetables for human consumption	3.8	4.0	4.2	4.6	3.3	3.7	3.3	3.0	4.9	6.2	6.9	6.3	3.0	3.0	3.7	2.1
Vegetables for seed	2.9	n.a.	5.0^{a}	n.a.	1.8	n.a.	4.5	n.a.	3.2ª	n.a.	2.6ª	n.a.	3.3	n.a.	Ι	n.a.
Nurseries, cut flowers or cultivated turf	4.7	4.8	5.1	4.8	3.6	3.7	4.3	4.6	5.4^{a}	3.7	6.7 ^a	9.3	3.6	n.p.	2.9	n.p.
Grapevines	4.0	3.2	4.7	4.0	5.5	4.1	2.2 ^b	n.p.	3.3	2.4	1.2ª	1.3	1.3	n.p.	7.7	n.p.
- = nil or rounded to zero (including null cells); n.a. $= n$	ot applicable (data not cc	llected in th	at year in th	at format); n	.p. = not pr	ovided.									

Estimate has a relative standard error of 10% to less than 25% and should be used with caution. Estimate has a relative standard error of 25% to 50% and should be used with caution.

p a

Table A.14: Water application rates for irrigated agriculture, average of all irrigated pastures or crops, 2004-05 and 2009-10 (ML/ha)

Performance indicator 8.4

Household water use per annum.

Description of indicator

This indicator measures domestic water-use efficiency.

Source of data

ABS, Water account 2004–05, Water account 2008–09.

Distributed water use was the amount supplied to households by water providers.

Self-extracted water used by households was calculated by applying average household use in each jurisdiction to households known not to be served by water utilities (estimated by subtracting households connected to water utilities from the total number of households in the jurisdiction). Data on domestic bore water use in Western Australia was provided by Western Australia's Department of Water.





Performance indicator 8.5

Percentage of water supplied to users, by source.

Description of indicator

This indicator assesses innovation in sourcing water supplies.

Context

Various types of water may be supplied as reuse water, including wastewater (from sewerage systems), drainage water and stormwater, and 'bulk' reuse water from other suppliers.

A number of large desalination plants were being constructed between 2004–05 and 2008–09 but the only major plant fully operational in 2008–09 was in Western Australia (Kwinana). Additional desalination plants in Sydney (Kurnell) and south-east Queensland (Tugun) are now completed, while the Melbourne (Wonthaggi) and Perth (Binninyup) plants are due for completion in 2011 and the Adelaide plant (Port Stanvac) is due for completion in 2012.

The data supplied covers all distributed water use by water supply, sewerage and drainage service industries but does not include water supplied by other industries, including the mining, manufacturing, electricity and gas supply industries.

The breakdown between surface water and groundwater for Tasmania and the Northern Territory was not provided in 2008–09.

Desalinated water includes seawater only, as opposed to desalinated groundwater.

Source of data

ABS, Water account 2004–05, Water account 2008–09.



Figure A.15: Water supplied to users, by source, 2004-05 and 2008-09 (%)

Note: Percentage of surface water for Tasmania and NT includes groundwater, as no breakdown was available. The ACT and Victoria have questioned the validity of the ABS's reuse water percentage; however, no alternative figures were available.

Performance indicator 8.6

Percentage of water losses in distribution systems.

Description of indicator

This indicator measures the efficiency of water supply services.

Context

The Commission's 2009–10 national performance reports for urban water utilities and rural water service providers have more recent data that is relevant to this indicator. However, that data is presented by provider and is not collated into jurisdictional categories for comparison with 2004–05 figures.

The *Water account 2008–09* notes: 'Water losses are difficult to measure and consequently the estimation of losses by water suppliers is problematic. There was considerable variation in the reporting of water losses in 2008–09 and the range of information presented ... is less than was available in 2004–05.'

Data for 2008–09 is not available for Queensland or Tasmania. The Northern Territory and the ACT do not report on independent irrigator providers.

Urban water providers include:

- + major utilities (>50 000 water or sewerage connections)
- + medium utilities (between 10 000 and 50 000 connections)
- + minor utilities (<10 000 connections).

One connection corresponds to one water meter or sewerage connection, regardless of the type of customer.

Source of data

ABS, Water account 2004–05, Water account 2008–09.





Performance indicator 8.7

Consistency of pricing arrangements—lower bound.

Description of indicator

This indicator shows whether utilities are achieving lower-bound pricing.

Context

This indicator was not directly reported in the 2004–05 performance indicator report.

There is no direct source of lower-bound pricing data for water service providers.

Instead, the net profit after tax (NPAT) ratio is used here. The NPAT ratio is defined as the utility's NPAT divided by its total income. It can be considered as the utility's net profit margin earned after tax. The figure used here is the NPAT disclosed in the utility's annual financial statements. The Commission acknowledges that there may be concerns that the NPAT ratio is unsuitable because of utilities' variability in managing non-operational costs and because NPAT will not always represent lower-bound pricing for individual entities. However, given the available alternatives, we have adopted it for this assessment.

NPAT ratios are not available for 2004–05, and available data from 2008–09 is used for comparison. NPAT data is not collected for rural water service providers. As a proxy indicator for lower-bound pricing among rural water service providers, see the economic real rate of return indicator for those providers (Figure A.18). The closer the entity's economic real rate of return is to zero, the closer it is to achieving lower-bound pricing.

Source of data

NWC, National performance report 2009–10: urban water utilities.



Figure A.17: Net profit after tax, urban water utilities, 2008-09 and 2009-10 (%)

- 1 Sydney Water (NSW)
- WC-Perth (WA) 2
- 3 SA Water (SA)
- 4 Yarra Valley Water (Vic.)
- 5 South East Water (Vic.)

+ rate of return being generated on asset base for rural providers

10 Barwon Water (Vic.) 11 Logan (Qld)

7 City West Water (Vic.)

8 Hunter Water (NSW)

9 ACTEW (ACT)

- 13 Cairns (Qld)
- 14 Gosford (NSW)
- 15 Coliban Water (Vic)
- 16 Gippsland Water (Vic)
- 17 Ipswich (Qld)
- 18 Central Highlands Water (Vic.)
- 19 Wyong (NSW)
- 20 Ben Lomond Water (Tas.)
- 21 Goulburn Valley Water (Vic.)

Brisbane (Qld) 6

Performance indicator 8.8

Consistency of pricing arrangements—upper bound:

- 12 Southern Water (Tas.)
- + rate of return being generated on asset base for urban providers.

Description of indicator

This indicator shows whether jurisdictions are achieving upper-bound pricing, monopoly rents, or both. This signals whether they are implementing water pricing reforms.

Context

This indicator was not reported in the 2004–05 performance indicator report. Instead, major water providers' returns on assets were reported.

An entity's economic real rate of return is defined as the revenue from water (and sewerage) business operations, less operating expenses (operating, maintenance and administration costs + current cost depreciation), divided by the written-down replacement cost of the business's operational assets. A range of approaches are currently used in calculating asset value.

Source of data

NWC, National performance report 2008–09: urban water utilities, National performance report 2009–10: urban water utilities, National performance report 2009–10: rural water service providers.



Figure A.18: Economic real rate of return, major utilities, 2005-06 to 2009-10 (%)





CICL = Coleambally Irrigation Co-operative Limited; MIL = Murray Irrigation Limited; MI = Murrumbidgee Irrigation Limited; SWC = State Water Corporation; FRW = Fitzroy River Water; SunW = SunWater; CIT = Central Irrigation Trust; G-MW = Goulburn–Murray Water; GWMW = Grampians Wimmera Mallee Water; LMW = Lower Murray Water; SRW = Southern Rural Water; HW = Harvey Water; OI = Ord Irrigation Cooperative.

Note: Murray Irrigation Limited (MIL) reported an economic real rate of return only for 2006-07 (-459.3%), which is excluded for clarity.

Performance indicator 8.9

Operating costs per megalitre of water delivered.

Description of indicator

This indicator measures the operational efficiency of water service providers.

Context

This indicator was reported only for major urban water utilities (those with more than 100 000 connections) in the 2004–05 performance indicator report. However, the methodology used to collate data into jurisdictions in that report was flawed and is not used here.

Presentation of utility data in dollars per megalitre delivered would require a complex calculation of multiple parameters. Such a calculation would increase the error margin in the final figure. Therefore, to illustrate urban water operational costs, the data is presented in a format that matches available data from the *National performance reports* without further manipulation.

Rural operating costs per megalitre are presented by rural water service provider rather than by jurisdiction, again to better match data currently collated. Operating costs exclude maintenance and administration costs.

Source of data

NWC, National performance report 2009–10: urban water utilities, National performance report 2009–10: rural water service providers.

Data is based on self-reporting by water service providers.

Figure A.20: Combined operating cost—water and sewerage, for utilities with 100 000+ connected properties, 2005–06 to 2009–10 (\$/property)





Figure A.21: Operating expenditure for rural water service providers, 2006–07 to 2009–10 (\$/megalitre supplied)

CICL = Coleambally Irrigation Co-operative Limited; MIL = Murray Irrigation Limited; MI = Murrumbidgee Irrigation Limited; SWC = State Water Corporation; FRW = Fitzroy River Water; SunW = SunWater; CIT = Central Irrigation Trust; G-MW = Goulburn–Murray Water; GWMW = Grampians Wimmera Mallee Water; LMW = Lower Murray Water; SRW = Southern Rural Water; HW = Harvey Water; OI = Ord Irrigation Cooperative.

Note: Fitzroy River Water reported an estimated operation cost only, while Central Irrigation Trust operational costs include only electricity costs.

NWI Objective 9: Addressing future adjustment issues that may impact on water users and communities

Description of indicator

No description was documented in the 2004–05 performance indicator report, which noted that there was no specific indicator and that compliance with the NWI requirements would be assessed as part of annual reporting to the NRMMC and COAG.

Context

A number of measures have been implemented to address adjustment issues related to NWI reforms (for example, the New South Wales groundwater program, buybacks and infrastructure investments). However, they have not always been based on transparent and robust assessments of their socioeconomic impacts.

The Commission considers that governments should make greater effort to improve our understanding of the socioeconomic impacts of water reform measures and structural adjustment interventions, particularly at local scales. Work commissioned for this assessment found that some water policies and adjustment interventions are not well coordinated with broader regional policies, or effectively communicated to the community. In some cases, this has reduced community confidence in the water reform effort. Water reform adjustment problems can vary greatly between regions, depending upon the history of reform and investments in a region and the interactions between local, state and national policies and programs.

We continue to hold the view we expressed in the 2009 biennial assessment—that in developing a coordinated policy response it is important to:

- + consider the specific 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 communicated clearly to irrigators, so that they can make informed and rational decisions
- + consider which public agency is best placed to lead the development of the coordinated approach, and which is best placed to interact with irrigators.

NWI Objective 10: Recognition of the connectivity between surface and groundwater resources and connected systems managed as a single resource

Performance indicator 10.1

Proportion and spatial areas of water plans:

- + with no assessment of connectivity between surface water and groundwater systems
- + that are assessed and have no connectivity between surface water and groundwater systems
- + that identify interconnected surface water and groundwater systems but do not have integrated management
- + that have integrated management for interconnected surface water and groundwater systems.

Description of indicator

This indicator assesses progress towards managing connected surface water and groundwater systems as a single resource.

Context

The source of data for the 2004–05 performance indicator report was the *AWR 2005: Level 2 report.* That data has not been updated. While the 2004–05 performance indicator report included quantitative data, it was stressed at the time that there were significant gaps in the datasets. That has not changed.

The 2009 biennial assessment noted that:

... by concentrating on the areas within water plans, the NRMMC 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.

The National Water Planning Report Card is currently collecting information that can meet the intent of this performance indicator, although not necessarily with the same structure. As the report card will not be completed until late 2011, the qualitative approach that was taken for the 2009 biennial assessment is adopted here to illustrate progress in the recognition and management of surface water – groundwater connectivity.

Source of data

Jurisdictions.

Jurisdiction	Indicator 10.1	Reported in 2009 biennial assessment	2011		
ACT	No assessment	All resources assessed	0%. The ACT recognises groundwater – surface water connectivity in water planning, management and data collection.		
	Assessment, no connectivity	n.a.	0%		
	Connectivity, no integrated management	n.a.	0%		
	Connectivity, integrated management	Integrated management for all resources	The ACT has three connectivity categories of water access entitlements: surface water, groundwater and mixed entitlements. Mixed entitlements assume 100% groundwater – surface water connectivity.		
NSW	No assessment	Connectivity assessed in all groundwater plan areas. ^a	NSW advised that state policy has been developed, providing a standard set of rules for water access where		
	Assessment, no connectivity	Great Artesian Basin	systems are identified as highly connected. Integrated plans are developed where connectivity is high.		
	Connectivity, no integrated management	None—where connectivity is assessed as high, integrated management is in place.	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.		
	Connectivity, integrated management	Of 51 water sharing plans that have commenced, 11 have been developed as combined surface water – groundwater plans. They include most of the more recent plans.	-		
NT	No assessment	The completed plans in the	The NT advised that groundwater recharge rates are not		
	Assessment, no connectivity	territory have been fully assessed for connectivity. All water plans being developed include an	well understood in some areas, and that broad estimates are used for sustainable limits for groundwater extraction in water plans. The water allocation plans (WAPs) for		
	Connectivity, no integrated management	assessment of connectivity.	Alice Springs and Ti Tree and the draft WAP for Western Davenport restrict surface water diversions to no more than 5% of the natural flow. In this way, they treat surface		
	Connectivity, integrated management		water and groundwater as integrated systems. However, there is very little consumptive use of the ephemeral surface water of the southern NT, while the Tindall Limestone Aquifer WAP limits groundwater extraction to maintain discharge into the Katherine River.		
			Other WAPs in preparation will focus on groundwater management and will limit extraction from the aquifers to maintain in-stream public benefit values in regional surface water resources.		

Table A.15: Recognition of surface water – groundwater connectivity, 2009 and 2011

Table A.15 continued

Jurisdiction	Indicator 10.1	Reported in 2009 biennial assessment	2011	
Qld	No assessment	State-wide assessment of impacts of groundwater extraction on surface water flows completed.	Queensland's <i>Water Act 2000</i> requires that there be only a single water resource plan (WRP) covering any part of the state. Therefore, where required, groundwater and	
	Assessment, no connectivity	No advice.	surface water are managed under a single integrated WRP. The only exception is the WRP for the Great Artesian Basin, which spans many surface catchments.	
	Connectivity, no integrated management	Identified high-risk systems are dealt with through explicit integrated management. For other	Queensland advised that the management of non-Great Artesian Basin groundwater is being progressively included in WBPs and is now covered in the WBPs for	
	Connectivity, integrated management	systems, integrated management is implicit, as modelling and assessments undertaken to develop water plans account for	the Barron, Burnett, Great Artesian Basin, Gulf, Georgina and Diamantina, Mary, Moreton, Mitchell, Pioneer and Whitsunday water planning areas.	
		connectivity.	Work is progressing on managing groundwater in the Burdekin, Fitzroy, Condamine and Balonne, Cooper Creek, Logan (Moreton Bay Sand Islands) and Wet Tropics catchments.	
			An enhanced level of groundwater management has been developed in the Burnett (Bundaberg), Fitzroy (Isaac Connors and Callide), Pioneer and Logan (Southern Moreton Bay Islands) plan areas, where connectivity has been determined to be high. In some areas, the groundwater contained in alluvial sands beneath and beside streams is treated as surface water for the purposes of planning.	
SA	No assessment	All 20 prescribed areas assessed.	SA reported that resources have not historically been	
	Assessment, no connectivity	No connectivity in 11 prescribed areas.	managed conjunctively due to the limited understanding of the connectivity between the key surface water and groundwater sources in the state from which water is	
	Connectivity, no integrated management	Surface water and groundwater have low levels of connectivity in five prescribed areas and are managed separately.	extracted for use. Most water allocation plans (WAPs) in SA are for groundwater resources. More recent WAPs are addressing both surface water and groundwater: the level of integrated management depends on the understanding	
	Connectivity, integrated management	Four prescribed areas are subject to integrated management; base-flow estimates for catchments are considered when determining groundwater sustainable yield.	of the connection between the resources. Both resources are covered in the WAPs for Clare, Marne Saunders and Barossa, which adopt an integrated management approach. A further three WAPs under development (Eastern and Western Mount Lofty Ranges and Baroota) will also adopt an integrated management approach.	
Tas.	No assessment	No assessments. There have	Tasmania reported that it has no combined surface	
	Assessment, no connectivity	been investigations of connectivityat key sites in the state.The development of a policy	water – groundwater management plans in place as yet, although surface water and groundwater are defined in the Tasmanian <i>Water Management Act 1999</i> and their	
	Connectivity, no integrated management	framework for the integrated management of surface water and groundwater began recently.	connectivity is explicitly recognised. A groundwater use register is planned for development	
	Connectivity, integrated management		ווו נוופ וענעופ.	

Table A.15 continued

Jurisdiction	Indicator 10.1	Reported in 2009 biennial assessment	2011
Vic.	No assessment	State-wide assessment of	Victoria advised that all sustainable water strategies
	Assessment, no connectivity	connectivity underway. Expect two or three systems with a high degree of connectivity.	recognise the importance of managing groundwater – surface water interaction. However, with the exception of the Upper Ovens
	Connectivity, no integrated management	Six management plans in place in systems assessed as having low connectivity.	water supply plan (draft) system, no surface water – groundwater systems are managed together.
	Connectivity, integrated management	One draft integrated management plan being developed (Upper Ovens).	
WA	No assessment	Planning for surface water and	WA advised that it has two combined groundwater -
	Assessment, no connectivity	groundwater systems is done separately.	surface water management plans in place (the Lower Gascoyne and South West Allocation Plan and the Upper Collie Surface and Groundwater plan)
	Connectivity, no integrated management	However, planning takes into account connectivity between surface water and groundwater.	In addition, all groundwater allocation plans treat connected aquifers as integrated systems.
	Connectivity, integrated management	Where planning for surface water and groundwater in an area is concurrent, connectivity is considered and provisions recognising that the system is connected will be put in place.	

a In several cases, recharge is estimated without quantitative data underpinning connectivity categorisations.

Note: Unless otherwise identified, the comments above are interpretations by the Commission of the current situation based on available information.



Appendices

Appendix B: Summary of progress on NWI actions

Australian Government

NWI actions	NWI clause	Commentary
Water access entitlements and plan	ning framework	
 Implementation of the framework: substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this agreement. 	26	 26(i)—At the commencement of the NWI, the Australian Government was not required to complete any commitments related to the commencement of water plans for overallocated systems under the 1994 COAG Water Reform Framework (COAG 1994). The Australian Government, through the Murray–Darling Basin Authority (MDBA), has assumed responsibility to complete a plan for the MDB (the Basin Plan) under the provisions of the <i>Water Act 2007</i> (Cwth). The plan will set sustainable diversion limits for groundwater and surface water sources and set parameters for state water resource plans.
Water access entitlements to be defined and implemented.	28–34	These clauses do not apply to the Commonwealth.
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	The Commonwealth Environmental Water Holder has a responsibility under the <i>Water Act 2007</i> (Cwth) to manage its water to protect and restore environmental assets. The environmental outcomes identified by the Commonwealth Environmental Water Holder to date have been determined in line with <i>A framework for determining Commonwealth environmental watering actions</i> (DEWHA 2009).
 Water plans to be prepared along the lines of the characteristics and components at Schedule D, based on the following priorities: + plans for systems that are overallocated, fully allocated or approaching full allocation + plans for systems that are not 	39–40	39–40—The <i>Water Act 2007</i> (Cwth) requires the Minister and the MDBA to have regard to the NWI when preparing and making the Basin Plan. The Basin Plan is not a water sharing plan. However, it is intended to have a significant effect on the progress of state water sharing plans towards NWI objectives. In particular, the setting of the sustainable diversion limit and the creation of an environmental watering plan will be important steps to establish a pathway to correct overallocation and overuse
yet approaching full allocation.		

NWI actions	NWI clause	Commentary
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41–43—The Australian Government had no National Competition Council commitments in relation to addressing overallocation through water plans. See comments on NWI clause 26.
Substantial progress towards adjusting all overallocated and/or overused systems.		The Australian Government is implementing the <i>Water for the Future</i> initiative, which is aimed at providing additional water to stressed systems by recovering water for environmental purposes through purchases on the water market and water savings made possible by infrastructure investments.
		The Australian Government is also a partner in the Great Artesian Basin Sustainability Initiative, which will reduce extractions of artesian water through bore capping, bore rehabilitation and piping.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—The Australian Government has adopted the NWI risk assignment provisions, including by amendments in the <i>Water Act 2007</i> (Cwth) which apply to MDB jurisdictions. This Act provides a mechanism for defining liabilities and making payments to affected entitlement holders for the Commonwealth's share of reductions in water allocations, or in the reliability of water allocations, in the MDB arising from the Basin Plan prepared under the Act.
		The Australian Government has also committed itself to bridging the gap between current water diversions and the final sustainable diversion limits in the Basin Plan through water purchases and through water savings generated by infrastructure investments.
Water plans to address Indigenous water issues.	52–54	55–54—The <i>Water Act 2007</i> requires the Minister and the MDBA to have regard to social, cultural, Indigenous and other public benefit issues when developing the Basin Plan.
		In developing the plan, the Murray–Darling Basin Commission and subsequently the MDBA have consulted the Murray Lower Darling River Indigenous Nations and the Northern Basin Aboriginal Nations on Indigenous issues in the basin.
Implementation of measures to address water interception by	55–57	55–57—The <i>Water Act 2007</i> (Cwth) requires the Minister and the MDBA to have regard to interception activities when developing the Basin Plan.
land-use change activities on a priority basis in accordance with water plans.		For the water resources of the MDB, the NWI interception commitments are likely to be addressed through the Basin Plan as required under section 22 of the Water Act.
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—The Australian Government is working with the state and territory governments to develop the National Water Market System, which will improve the efficiency of water registers and transactions and the availability of market information. The project is being funded with \$56 million from the Australian Government under the <i>Water for the Future</i> initiative.
+ full implementation.		The development of the National Water Market System is being coordinated by the Australian Government and is overseen by a project group involving jurisdictional representatives, the Commission (as an observer), and the Bureau of Meteorology (BoM). The project aims to implement a common registry system for all states except Queensland and Victoria, where enhancements will be made to existing registers. The project also includes a website that provides water market reports and information on trade processes, and an interoperability component that will improve the exchange of information between state registers (Australian Government 2010).

NWI actions	NWI clause	Commentary
Establish compatible institutional and regulatory arrangements	60	60—The Australian Government is working in collaboration with the states and territories to remove remaining institutional barriers to water trade.
that facilitate trade, including arrangements consistent with principles in Schedule G re institutional barriers to trade:		The 4% limit on out-of-district trading of permanent entitlements in the southern MDB has continued to be discussed through COAG, which has reaffirmed its commitment to reconsidering the limit.
+ remove barriers to temporary trade		The Australian Competition and Consumer Commission (ACCC) provided advice to the MDBA on the development of water trading rules for inclusion in the Basin Plan (ACCC 2010). The ACCC's report includes advice and
 remove barriers to permanent trade up to an annual threshold of 4% 		recommendations on a range of matters relating to water trading, including restrictions on trade, administrative processes and information requirements for a functional water market.
+ review impact on trade of interim threshold		The National Water Market System is being delivered with Australian Government funding to facilitate the trading elements of clause 60 and Schedule G of the NWI
+ full removal of barriers to trade.		See comments on NWI clauses 63 and 66 for further detail on water markets and trading.
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+ review of water products		61(iii) was satisfied by the Productivity Commission report,
 new approach to sharing delivery capacity and extraction rates among users 		Rural water use and the environment: the role of market mechanisms (PC 2006).
+ 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.		

NWI actions	NWI clause	Commentary
Relevant parties (Commonwealth, NSW, Vic. and SA) agree to:	63	63—The Commission has coordinated a number of reviews and evaluations of the effectiveness of the Australian water market. For example, 63(vi) is specifically
+ take necessary steps to enable the use of exchange rates and/		considered to have been satisfied by the 2009 biennial assessment.
or tagging for interstate trade		See comments on NWI clauses 60 and 66.
 reduce barriers to trade in southern MDB and establish an interim limit on permanent trade out of water irrigation areas of 4% per annum 		
 NSW make legislative changes to remove barriers and permit increased trade up to the interim limit 		
 Vic. and SA make change to remove barriers and permit increased trade up to the interim limit 		
 review actions to assess whether relevant parties have removed barriers to achieve interim limit 		
+ study into mechanisms necessary to enable interstate trade		
+ review outcome of actions by NSW		
+ NWC monitor impacts of interstate trade		
+ review the impact on trade under the interim threshold.		
Best practice water pricing and inst	itutional arrang	ements
Complete commitments under the 1994 COAG Water Reform	65	65—The NWI Pricing Principles were endorsed by the NRMMC on 23 April 2010 (DSEWPaC 2010).
Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.		The Australian Government is continuing to work with states and territories to encourage the implementation of the principles.

NWI actions	NWI clause	Commentary
Metropolitan: + continued movement towards upper-bound pricing	66	66—The NWI Pricing Principles (see NWI clause 65) comprise four sets of principles, two of which relate to the recovery of capital expenditure and water planning and management costs. The Australian Government has developed rules for implementing those principles.
 development of pricing policies for recycled water and stormwater 		The Water Charge (Termination Fees) Rules 2009 aim to promote the economically efficient use of water resources, including water infrastructure, and facilitate the efficient functioning of the market. Termination fees contribute
+ review and development of pricing policies for trade wastes		to the ongoing costs of maintaining irrigation infrastructure. Termination fee rules have been developed to ensure a balance between the interests of irrigators
 development of national guidelines for water accounts. 		who are leaving an irrigation district and irrigators wishing to remain. The Water Charge (infrastructure) Rules 2010 were made in December 2010
Rural and regional:		and came into effect on 12 January 2011, subject to various transitional periods. The rules relate to charges levied by irrigation infrastructure operators
 full cost recovery for all rural surface and groundwater 		and bulk water operators (ACCC 2011). The Water Charge (Planning and Management Information) Rules 2010
 based systems + continued movement towards lower-bound pricing per National Competition Council commitments 		commenced on 24 July 2010 and have a transitional period that ends on 30 June 2011. From 1 July 2011, government entities that determine water planning and management charges will need to publish information in accordance with the rules. The ACCC has released guidance material to assist jurisdictions in complying with the rules (ACCC 2011).
 achievement of upper-bound pricing for all rural systems, where practicable. 		66(iv)—The National Guidelines for Residential Customers' Water Accounts (2006) were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian and state and territory water ministers (NRMMC 2006).
Consistent approaches to pricing	67	67—The NWI Pricing Principles were endorsed on 23 April 2010 (DSEWPaC 2010).
planning and management.		The Australian Government has set conditions on project funding under the <i>Water for the Future</i> initiative that require full cost recovery, including the costs of water management and planning, to encourage the consistent application of the principles.
		See comments on NWI clause 66 about the Water Charge (Planning and Management Information) Rules 2010.
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before being approved.	69	The Australian Government and other jurisdictions have developed and published assessment frameworks and criteria to help assess funding applications for various infrastructure programs. In particular, the major components of the Australian Government's Sustainable Rural Water Use and Infrastructure Program (the state priority projects) are assessed in accordance with Schedule E of the 2008 Agreement on Murray–Darling Basin Reform. Other water-saving and infrastructure initiatives, such as the National Water Security Plan for Cities and Towns (DSEWPaC 2011e), the National Urban Water and Desalination Plan (DSEWPaC 2011d) and the Sustainable Rural Water Use and Infrastructure Program (DSEWPaC 2011c), include program guidelines that require cost-effectiveness, value-for-money, economic, environmental, technical and other criteria to be satisfied.
		Further governance oversight is provided for state priority projects under the 2008 Agreement on Murray–Darling Basin Reform, which gives the COAG Reform Council responsibility for annual reporting on progress.
Release of unallocated water.	70–72	The Australian Government does not have any direct responsibilities in relation to the allocation of new water access entitlements.

NWI actions	NWI clause	Commentary
Environmental externalities managed through a range of regulatory measures.	73	The Australian Government does not have any direct responsibilities in relation to environmental externalities. The government has commissioned studies on market mechanisms to address environmental externalities through past programs.
 Benchmarking efficient performance + independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies + develop nationally consistent report framework. 	75–76	75–76—The Commission produces annual national performance reports for all Australian urban water utilities and rural water service providers. The reports provide independent and public reporting of performance benchmarking for water service providers under a nationally consistent framework.
Independent pricing regulator	77	77—Under the Water Act 2007 (Cwth) and Competition and Consumer Act
+ independent pricing bodies to	J d	2010, the ACCC has four main functions:
set and review prices or pricing processes for water storage and delivery and publicly report.		 providing advice on water market and water charge rules to the Minister (currently the Hon, Tony Burke MP, the Minister for Sustainability, Environment, Water, Population and Communities), and advice to the MDBA on water trading rules
		 monitoring transformation arrangements, regulated water charges and compliance with the water market and water charge rules. The results of the ACCC's monitoring are reported to the Minister
		+ enforcing the water market and water charge rules
		+ enforcing fair trading legislation, applicable to all businesses, including those trading water.
		Under the Water Act, the ACCC's role does not relate to urban water supplies or water resources outside the MDB.
Integrated management of environn	nental water	
Recognising the different types of	79	79—See NWI clauses 39–40 for more detail.
surface water and groundwater systems:		79(i.b)—The Australian Government together with relevant state and territory
 + effective and efficient management and institutional 		governments has established management and institutional arrangements to ensure the achievement of environmental and other public benefit outcomes for resources shared by jurisdictions, including:
arrangements to ensure the achievement of the		+ the Murray–Darling Basin Agreement (Cwth et al. 2008)
environmental outcomes		+ the Lake Eyre Basin Intergovernmental Agreement Act 2001
+ where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the most effective and efficient mix of water recovery measures.		+ the Great Artesian Basin Sustainability Initiative.

NWI actions	NWI clause	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—The <i>Water Act 2007</i> (Cwth) assigns the BoM the role of 'compiling and maintaining water accounts for Australia, including a set of water accounts to be known as the National Water Account'. Among other obligations under this Act, the Director of Meteorology is required to publish the National Water Account annually in a form readily accessible to the public.
		Under the guidance of the BoM and the Water Accounts Standards Board, all jurisdictions are participating in the development of the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards (WASB 2010).
Consolidated water accounts:	82–83	83—The Commonwealth Environmental Water Holder is considering preparing
+ develop and implement robust water accounting		a set of draft water accounts for 2010–11 consistent with the Bow and water Accounts Standards Board water accounting standards and model water account (see NWI clause 81).
 identify situations where close interaction between surface water and groundwater exists 		· · · · ·
 implement systems to integrate the accounting of surface water and groundwater. 		
Environmental water accounting:	85	85—Standards for environmental water accounting are being addressed
+ develop an environmental water register and annual reporting		through national water accounting development activities under the direction of the BoM and the Water Accounts Standards Board (see NWI clause 81).
 arrangements + apply the environmental water register and annual reporting 		The Commission has released the <i>Australian environmental water management report 2010</i> , which provides information on environmental watering arrangements around Australia (NWC 2010b).
arrangements.		The MDBA is required under section 32 of the <i>Water Act 2007</i> (Cwth) to identify and account for held environmental water in the MDB each financial year.
		Also, COAG has agreed to publish six-monthly reports on progress in recovering environmental water in the MDB. The reports are now being published by the MDBA.
Implement information measures.	86	86—BoM is responsible for developing standards for information under the <i>Water Act 2007</i> (Cwth) and for collecting, storing and reporting that information.
Metering and measuring actions:	88	88—The NWI reforms continue to influence the extent of metering, and
+ develop metering and		substantial investment in capacity building and implementation is underway. The Department of Sustainability, Environment, Water, Population and
incasuring actions		Communities (DSEWPaC) is supporting industry capacity-building activities to
 measuring actions. 		ennance meter testing facilities and develop national standards for non-urban water meters. Most states and territories have developed implementation
		plans aligned with the National Framework for Non-urban Water Metering,
		and a National Implementation Plan is being developed by DSEWPaC. State and territory metering programs are also being rolled out by Victoria. Queensland
		the ACT, South Australia, NSW and Tasmania. Extensive ongoing effort will be required to ensure that all significant water users are accurately metered.

NWI actions	NWI clause	Commentary
National guidelines on water reporting:	89	89—The Australian Government has taken a lead role in the development of a range of national reporting requirements for water management in Australia.
 + develop national guidelines on water reporting + apply national guidelines on water reporting. 		Through the BoM Water Accounting Standards Board, the Australian Government has worked with other NWI parties to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). The BoM has used NSW information
		In its pilot National water Account (BOM 2010). Unauthorised water use has been recognised as a significant compliance issue by COAG, which in December 2009 agreed in principle to the development of the National Framework for Water Compliance and Enforcement as the basis for developing jurisdictional implementation plans. All jurisdictions support the national framework, and the Australian Government has committed \$60 million to enable the states and territories to improve capability and capacity in line with the framework's objectives. All jurisdictions but one have approved implementation plan agreements with the Australian Government and are making progress on projects to improve compliance and enforcement. When the final jurisdiction agrees to an implementation plan (which is expected by July 2011), all states and territories will be implementing the national framework as a COAG agreement.
Urban water reform		
Implementation of demand management measures, including: + implementation and compliance monitoring of the WELS Scheme,	91	91(i)—The Water Efficiency Labelling and Standards (WELS) Scheme is a joint initiative of the Australian Government and state and territory governments. The <i>Water Efficiency Labelling and Standards Act 2005</i> (Cwth) provides the legal framework for the WELS Scheme. The states and territories have enacted complementary legislation.
and minimum standards for agreed appliances		91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden
 + develop and implement 'Smart Water Mark' for garden activities 		Industry, Australia, and the Water Services Association of Australia. It is a not-for-profit scheme overseen by a steering committee with representation from the Australian Government and state and territory governments, water utilities, the four governing associations, and the chair of the Technical
+ review effectiveness of temporary water restrictions and associated public education strategies, and consider extending low-level restrictions to standard practice		Expert Panel (an independent panel that assesses applications to the scheme). The Australian Government supports the scheme with a grant from the Water Smart Australia program, which is administered by DSEWPaC.
 implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. 		

Ī

NWI actions	NWI clause	Commentary
Encourage further innovation in urban water use, including: + develop and apply national health and environmental	92	92—CSIRO evaluated existing water-sensitive urban design developments in 2009 in consultation with state and territory agencies. The <i>ICON water sensitive urban developments</i> report found that current policy and regulatory frameworks for urban water services have evolved to support conventional centralised
guidelines for water-sensitive urban designs for recycled water		service provision, but that further development would be required to support water-sensitive urban development (Tjandraatmadja et al. 2009).
 and stormwater + develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise 		The 2008 COAG Work Program on Water provided additional urban water reform actions including to 'examine the case for a micro-economic reform agenda in the urban water sector'. In consultation with state and territory governments, the Australian Government established an inquiry into the urban water sector to meet that objective (PC 2011). The inquiry started in July 2010 and will be complete in August 2011. A draft report was published in April 2011.
+ evaluate existing water-sensitive urban icon developments		In 2011, the Commission released <i>Urban water in Australia: future directions</i> (NWC 2011a).
 review institutional and regulatory models for integrated urban water cycle planning and management and develop best 		In consultation with state and territory governments, the Australian Government commissioned a review of historical incentives and barriers to stimulate innovation in water-sensitive urban design. This review is now a reference document for participating agencies.
practice guidelines+ review incentives to stimulate innovation.		In April 2010, the Australian Government committed \$15.7 million for projects supporting the COAG strategy on water and wastewater services in remote (including Indigenous) communities. The strategy was developed under the 2008 COAG Work Program on Water to provide sustainable, secure and safe water supplies and wastewater services; provide a level of service that meets the regulatory standards that would apply to any other community of similar size and location; and encourage responsible water use and, where appropriate, water conservation (DSEWPaC 2011a).
Community partnerships and adjust	ment	
Open and timely consultation with all relevant stakeholders in relation to: + pathways for returning	95	95—The Australian Government has established mechanisms for consultations with stakeholders through the Water Recovery and Environmental Use Stakeholder Reference Panel, the National Irrigation Efficiency Stakeholder Reference Panel and the Urban Water Stakeholder Reference Panel.
sustainable extraction levels		In addition, the Water Act 2007 (Cwth) includes consultation mechanisms for the
+ periodic review of water plans		MDBA, including establishing the Basin Community Committee and consultation process for the development of the Basin Plan.
 other significant decisions affecting the security of water access entitlements. 		
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—The MDBA has a communication and consultation strategy in place as part of the development of the Basin Plan.

NWI actions	NWI clause	Commentary
Address significant adjustment issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.	97	97(i)—The Australian Government was not a responsible party to this action. However, in relation to consultation on adjustment issues arising from changes in water availability, it undertook public consultations on its water purchasing program and other programs to assist rural communities to adapt to a future with less water. The consultations included 23 community information sessions in rural and urban communities during 2009 and 2010, and a public education campaign that included television advertising.
		97(ii)—Activity through Water for the Future is broadly addressing this action.
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken.	101	101(ii)—The 2008 COAG Work Program on Water included an action item to develop a National Water Knowledge and Research Plan as the basis for strategic collaboration and coordination on water research and development across Australia. Development of the plan began in 2009.
Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.		The work plan also called for the establishment of centres of excellence for recycling and desalination. The National Centre of Excellence in Desalination and the Australian Water Recycling Centre of Excellence were established in 2009 to develop and commercialise new technologies for desalination and water recycling.
		The Commission and the Australian Research Council have developed the National Centre for Groundwater Research and Training at the Flinders University to build a high-quality and integrated program for groundwater research.
		The eWater CRC has developed a suite of products and tools, including the eWater Source (a nationally compatible hydrologic modelling platform for water planning), to help water managers make confident decisions based on good, transparent science in line with the NWI.

Australian Capital Territory

NWI actions	NWI clause	Commentary
Water access entitlements and plan	ning framewor	k
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework. 	26	 26(i)—At the commencement of the NWI, the ACT was not required to complete any commitments related to the commencement of water plans for overallocated systems under the 1994 COAG Water Reform Framework (COAG 1994). Currently, the ACT has one water planning area, and the water plan for that area is complete. The ACT reports that it has no overallocated water systems. 26(ii)—The ACT has implemented NWI-consistent legislation. The <i>Water Resources Act 2007</i> (ACT) provides the statutory basis for water access entitlements (WAEs) in the ACT (NWC 2009).
+ legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this agreement.		
Water access entitlements to be defined and implemented.	28–34	28–33—The ACT has implemented NWI-consistent legislation. The <i>Water Resources Act 2007</i> (ACT) provides the statutory basis for WAEs in the ACT (NWC 2009). However, implementation of unbundled WAEs is limited and the rate of future unbundling is tied to requests by licence holders for their water assets to be separated from their land, or occurs if the land is sold or transferred.
		34—The ACT has not defined how it will implement NWI clause 34. However, it reported that there are no major mining activities currently occurring or likely to occur in the ACT.
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35—Water planning provides statutory recognition to environmental water and the arrangements necessary to achieve environmental and other public benefit outcomes in the ACT. Agreed arrangements are identified and documented in the ACT's water plan. Water for the environment is determined first, and the remainder is made available for consumptive uses (NWC 2010b).
		Water for the environment and other public benefit outcomes is 'rules based' and provided via in-stream flows. That water cannot be traded on the water market.
		However, in the ACT portion of the MDB, as in other MDB jurisdictions, environmental water is less secure at times of extremely low water availability. The 2008 Agreement on Murray–Darling Basin Reform (Cwth et al. 2008) states that critical human water needs are the highest priority water use for communities dependent on the water of the MDB. Consequently, during periods of 'extremely low water availability' when there is an extreme risk of failure to supply water for those needs in the next 12 months, Tier 3 water sharing is triggered and the ministerial council must intervene to ensure the supply of conveyance water and the delivery of water for critical human needs. In those conditions, no priority would be given to environmental water.

NWI actions	NWI clause	Commentary
Water plans to be prepared along the lines of the characteristics and components at Schedule D, based	39–40	39—The ACT has implemented water planning that is NWI-consistent. The ACT reported that it has no overallocated water systems. The ACT has one water planning area, and the plan for that area is complete.
 on the following priorities: + plans for systems that are 		40(i) and (ii)—The ACT reported that it monitors the performance of its water plan and has adaptive management systems in place.
overallocated, fully allocated or approaching full allocation		40(iii)—Currently, the ACT does not publicly report on the implementation of its water plan. The ACT advised that from 2010–11 it intends to report on the
+ plans for systems that are not yet approaching full allocation.		implementation of water planning annually through the ACT water report.
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41, 43–45—The ACT reported that it has no overallocated water systems; therefore, adjustments to address overallocation or overuse are not required.
Substantial progress towards adjusting all overallocated and/or overused systems.		
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—The <i>Water Resources Act 2007</i> (ACT) does not address the assignment of risk arising from future changes in the availability of water for the consumptive pool. In 2009, the ACT informed the Commission that provisions would be included in amended legislation in 2009. However, the ACT has not reported any such revisions to the Water Resources Act (NWC 2009).
Water plans to address Indigenous water issues.	52–54	52–54—The ACT has statutory requirements to consult all stakeholders, including Indigenous groups, in the development of water plans and to identify their water values and the water requirements to maintain them.
		The ACT advised that 'the ACT's <i>Native Title Act 1994</i> extinguishes any Native Title claim since under that legislation prior Commonwealth legislation overrides such claims.'
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with	55–57	55–57—The ACT does not have a specific policy for addressing water interception. The water planning process in the ACT requires estimates of unaccounted intercepted water within the water plan area, but it does not require the activity or location to be explicitly identified.
water plans.		Under the <i>Water Resources Act 2007</i> (ACT), the construction of all new on-stream dams greater than 2 ML requires a permit.
		The licensing of extractive industries outside of the consumptive pool is managed via the <i>Land (Planning and Environment) Act 1991</i> (ACT).
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—In the ACT, the Environmental Protection Agency (EPA) maintains a compatible register of all granted water access entitlements, surviving allocations in force, licences issued and transfers made. This information is publicly available, but not online (NWC 2010b).
+ pathways leading to full implementation		
+ full implementation.		

N۱	VI actions	NWI clause	Commentary
Es an tha an pri	tablish compatible institutional d regulatory arrangements at facilitate trade, including rangements consistent with nciples in Schedule G re stitutional barriers to trade:	60	60—In the ACT, water trading is currently restricted to intrastate entitlement trades, as interstate trade protocols have not been developed for trade between the ACT and other MDB jurisdictions. The ACT does not have other temporary or permanent barriers to trade.
+	remove barriers to temporary trade		
+	remove barriers to permanent trade up to an annual threshold of 4%		
+	review impact on trade of interim threshold		
+	full removal of barriers to trade.		
Cc co ree	mplete the following studies and nsider implementation of any commendations:	61	61(i) and 61(ii) were satisfied by 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+	review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, <i>Rural water use and the environment: the role of market mechanisms</i> (PC 2006).
+	new approach to sharing delivery capacity and extraction rates among users		
+	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.		
So	uthern MDB trade actions.	63	This clause does not apply to the ACT.
Be	st practice water pricing and instit	utional arrange	ements
Co the Fra pri an sy	mplete commitments under e 1994 COAG Water Reform amework to bring into effect cing policies for water storage d delivery in rural and urban stems.	65	65—The ACT has implemented its commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems (COAG 1994).

NWI actions	NWI clause	Commentary
Metropolitan:	66	66(i)—Upper-bound pricing of water storage and delivery has been achieved in
 continued movement towards upper-bound pricing 		66(ii)—The ACT is currently investigating full cost recovery pricing arrangements
 development of pricing policies for recycled water and stormwater 		for recycled water and stormwater. It reported that the Independent Competition and Regulatory Commission (ICRC) will apply some form of the water abstraction charge (WAC) to those water supplies (ICRC 2008).
 review and development of pricing policies for trade wastes 		66(iii)—Pricing policies for trade wastes have not been reviewed or developed in the ACT.
+ development of national guidelines for water accounts.		66(iv)—The National Guidelines for Residential Customers' Water Accounts (2006) were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian and state and territory water ministers
Rural and regional:		(NRMMC 2006).
 + full cost recovery for all rural surface and groundwater based systems 		66(v)—The ACT reported that full cost recovery for the storage and delivery of rural surface water and groundwater has been achieved in the territory.
 continued movement towards lower-bound pricing per National Competition Council commitments 		
 achievement of upper-bound pricing for all rural systems, where practicable. 		
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—Water management and planning costs have been recovered since 1999 through the ACT's water abstraction charge (WAC). The charge remains subject to a legal challenge. Concerns have been raised about the transparency of the charge (NWC 2011d).
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before being approved.	69	69—In the ACT, investment in new or refurbished infrastructure can be referred to the ICRC for an assessment of its economic viability and environmental sustainability.
Release of unallocated water.	70–72	70–72—Unallocated water is released in the ACT only when the water plan identifies that part of the consumptive pool has not been granted to an entitlement or licence. For potential new stormwater harvesting and reuse projects, the proponent will be required to obtain a water entitlement and pay a WAC.
Environmental externalities managed through a range of regulatory measures.	73	73—Environmental externalities are generally recovered through the ACT's WAC. The WAC has several components, including environmental costs from the flow of water downstream.

NWI actions	NWI clause	Commentary
Benchmarking efficient performance:	75–76	75—The ACT provides benchmarking information and data for the <i>National performance reports</i> on water utilities.
 independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies 		76—The costs of preparing national performance reporting are covered by the ACT Government. The ACT has not provided further information on whether, or how, those costs are recovered.
+ develop nationally consistent report framework		
 costs of operating the above performance and benchmarking systems met by jurisdictions through recovery of water management costs. 		
Independent pricing regulator	77	77—The ICRC has been in operation in the ACT since 1997 (NWC 2011d).
 independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report. 		
Integrated management of environn	nental water	
Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional arrangements to ensure	79	79(i.a)—The <i>Water Resources Act 2007</i> (ACT), the <i>Water Resources</i> <i>Environmental Flow Guidelines 2006</i> (<i>No. 1</i>) and the Territory Plan 2008 (<i>Planning and Development Act 2007</i> (ACT)) provide the statutory framework for environmental water in the ACT (Environment ACT 2006). Those arrangements give the ACT Environmental Protection Authority (EPA) the responsibility for achieving environmental water objectives.
 the achievement of the environmental outcomes + where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the 		79(i.b)—The ACT shares water resources with other MDB jurisdictions through the Murray–Darling Basin Agreement, which is Schedule 1 of the <i>Water Act 2007</i> (Cwth). The ACT, NSW and Australian governments have a separate agreement for other shared water resources: the Memorandum of Understanding for the Planning and Management of Cross Border Water Resources 2006 (ACT, NSW and Cwth 2006).
of water recovery measures.		79(i)c—The surface water and groundwater systems of the ACT are considered to be highly connected. As a result, ACT surface water and groundwater are managed as one water resource.
		79(i)d—The ACT EPA undertakes compliance monitoring of all licensed water extractions and conducts ongoing monitoring and assessment of environmental flows. The EPA also conducts five-yearly strategic reviews of the <i>Environmental flow guidelines</i> , which establish the components of flow required to maintain stream health.
		79(i.e)—Environmental water is rules-based and cannot be traded in the ACT.
		79(ii)—The ACT reported that there are no overallocated systems in the ACT, and that therefore no water recovery activities have been required.

NWI actions	NWI clause	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—The ACT has participated in the development of national water accounting standards and reporting frameworks, including the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards (WASB 2010).
Consolidated water accounts:	82–83	82-The ACT does not have consolidated water accounting and has not yet
+ develop and implement robust water accounting		adopted the water accounting standards. It reported that it intends to apply the accounting standards in information management for its water systems in the future.
 identify situations where close interaction between surface water and groundwater exists 		83—The ACT recognises groundwater – surface water connectivity in water planning, management and data collection. It has three connectivity categories for water access entitlements; surface water, groundwater and
 implement systems to integrate the accounting of surface water and groundwater. 		mixed entitlements. Mixed entitlements assume 100% groundwater – surface water connectivity.
Environmental water accounting:	85	85(i)—General purpose environmental water accounts are not produced by the
 develop an environmental water register and annual reporting arrangements 		ACT. However, the ACT contributed to the Commission's <i>Australian environmental water management report 2010</i> , which summarises the territory's environmental water provisions (NWC 2010b).
 apply the environmental water register and annual reporting arrangements. 		85(ii)—Under the <i>Water Resources Act 2007</i> (ACT), the delivery of environmental water is assured through assessments of compliance and licence conditions by the EPA. Compliance reports are not publicly accessible (NWC 2010b).
Implement information measures.	86	86—The ACT has participated in the development of national water accounting standards and reporting frameworks, producing the Water Accounting Conceptual Framework, the general purpose water accounting reports and the Preliminary Australian Water Accounting Standards (WASB 2010) . The ACT reported that it intends to apply the accounting standards for information management in its water systems in the future.
Metering and measuring actions:	88	88—The ACT has participated in the development of national water metering
+ develop metering and measuring actions		standards and reporting frameworks. Currently, 100% of licensed extraction in the ACT is metered. Stock and domestic use of surface water is not metered.
 implement metering and measuring actions. 		
National guidelines on water reporting:	89	89—The ACT has participated in the development of a range of national reporting requirements for water management.
+ develop national guidelines on water reporting		The ACT provides data and information for the production of the national performance reports for rural and urban water utilities, the <i>Australian water</i>
 apply national guidelines on water reporting. 		<i>markets reports</i> (89(ii)) and the <i>Australian environmental water management reports</i> (89(iii)), and is working with other NWI parties on compliance and reporting arrangements for water metering (89(i)).

Ubban water reform 91 91 (i)—The ACT has enacted the Water Efficiency Labelling and Standards Act 2005 (ACT) to inglement the Water Efficiency Labelling and Standards (WELS) Scheme. implementation of the Water Efficiency Labelling and Standards (WLS) Scheme. 91(i)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Carden including mandatory labelling and implement 91(i)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Carden including mandatory labelling and implement - develop and implement Smart Water Mark' for garden activities and associated public education stratagies, and consider extending low-level restrictions to standard practice 91(ii)—The ACT participated in the production of the Commission's national extending low-level restrictions and associated public education stratagies, and consider extending low-level restrictions and discharge system losses. including leakage, access pressure, overflows and other maintenance needs. 92 92—The ACT has participated in national working groups and committees to develop water quality didelines for recycled water and and scharge system losses. - develop and apply retirnal heath and environment aud developments in both new wutan subtivisions and high-rise in the ACT through the Planning and Land Maragement Act 2007 (ACT) as a code in the ACT through the Planning and Land Maragement Act 2007 (ACT) as a code in the ACT water sensitive wutan and discharge system losses. review intheritorional dualenes for evaluating options for water-sensitive wutan develop mena	NWI actions	NWI clause	Commentary
Implementation of demand 91 91(i)—The ACT has enacted the Water Efficiency Labelling and Standards Act 2005 ACOT is implement the Water Efficiency Labelling and Standards (WELS) Scheme. Act 2005 ACOT is implement the Water Efficiency Labelling and Standards (WELS) Scheme. Standards (WELS) Scheme. 91(i)—The Smat Approved WaterMark was established by four associations: the Australial Water Association, Irrigation Australia, the Nursery and Garden Industry. Australian Water Association, Irrigation Australia, the Nursery and Garden Industry. Australian Water Associations: the Australian Water Associations, Irrigation Australia, the Nursery and Carden Industry. Australian Water Associations, Irrigation Australia, The Nursery and Garden Industry. Australian, Water Associations, Irrigation Australia, The Nursery and Garden Industry. Australian, Water Associations, Irrigation Australia, The Nursery and Garden Industry. Australian, Water Associations, Irrigation Australia, The Nursery and Garden Industry. Australian, Water Associations, Irrigation Australia, The Nursery and Garden Industry Australian, Water Associations, Irrigation Australia, The Nursery and Garden Industry Australian, Water Associations, Irrigation Australian, Water Association Australian, Water Associations, Irrigation Austrand Vater Vasociation Australian, Water Associations, Irrigation A	Urban water reform		
91(i)—The Smart Approved WaterMark was established by four associlations: Efficiency Labelling and standards (MELS) Scheme, including mandatory labelling and minimum standards for agreed appliances + develop and implement "Smart Water Mark for garden activities 91(ii)—The Smart Approved WaterMark was established by four associations; industry labelling and minimum standards for not-for-profit scheme overseen by a steering committee with representation from the Australia, and the Water effectiveness of the four governing associations, and mesotients of the our governing associations, and associated public education strategies, and consumption were largely due to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely the to a combination of reductions in residential consumption were largely that to a sociate public deata the starge system losses, including leakage, excess pressure, owneds. Prower were were notifications for water-resensitive urban discharge system losses, including leakage, excess pressure, owneds. 92 Prevent water use, including in the austration in management resensoftive urban discharge system losses, includi	Implementation of demand management measures, including:	91	91(i)—The ACT has enacted the <i>Water Efficiency Labelling and Standards</i> <i>Act 2005</i> (ACT) to implement the Water Efficiency Labelling and Standards (WELS) Scheme.
 develop and implement 'Smart Water Mark' for garden activities review effectiveness of temporary water restrictions and associated public education strategies, and consider extending low-level restrictions to standard practice implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. Encourage further innovation in yeak water sestificions for water sensitive use, including: + develop and apply national health and environmental guidelines for recycled water and stormwater develop mational judielines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban vater cycle planning and managements in odvelop mests for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban vater cycle planning and managements in both new urban subdivisions and high-rise evaluate existing water-sensitive urban vater cycle planning and managements in both new urban subdivisions and high-rise evaluate existing water-sensitive urban vater cycle planning and managements in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise the ACT (Environment ACT 2004). The ACT advised that the strategy, including its institutional and management	monitoring of the Water Efficiency Labelling and Standards (WELS) Scheme, including mandatory labelling and minimum standards for agreed appliances		91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry, Australia, and the Water Services Association of Australia. It is a not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities, the four governing associations, and the chair of the Technical Expert Panel
 review effectiveness of temporary water restrictions in place for urban use. During the 2000s, reductions and associated public education strategies, and consider extending low-level restrictions to standard practice implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. Encourage further innovation in 92 develop and apply national head neuronmental guidelines for water sensitive urban designs for recycled water and stormwater is and stormwater in the developments in both new urban subdivisions and high-rise develop national guidelines for recycled water and stormwater is or active approach to the evelopments in both new urban subdivisions for water-sensitive urban developments for a terrestictione for water resultive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban developments in the ACT through the Planning and Land Management Act 2007 (ACT) as a code in the ACT. evaluate existing water-sensitive urban design for recycled water anagements for an integrated urban water grave planning and management is institutional and nergonators for water-sensitive urban design and high-rise evaluate existing water-sensitive urban design water-sensitive urban design and high-rise evaluate existing water-sensitive urban design and here-sensitive urban design and high-rise evaluate existing water-sensitive urban design and high-rise the ACT through the Planning and Land Management Act 2007 (ACT) as a code in the ACT. evaluate existing water-sensitive urban design and high-rise evaluate existing water-sensitive urban design and high-rise evaluate existing water-sensitive urban design and high-rise review institutional and reguidatory managements between the regulatory arrangements, is un	 develop and implement 'Smart Water Mark' for garden activities 		(an independent panel that assesses applications to the scheme). 91 (iii)—The ACT participated in the production of the Commission's national review of water restrictions (ISF and ACIL 2009). The ACT has both permanent
 to standard practice implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. Encourage further innovation in urban water use, including: 92 92—The ACT has participated in national working groups and committees to develop water quality guidelines for recycled water and stormwater use. The guidelines for recycled water and stormwater develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments evaluate existing water-sensitive urban icon developments evaluate existing water-sensitive urban icon developments guidelines for integrated urban water cycle planning and management and develop best practice guidelines review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines enview incentives to stimulate innovation. 92(v)—Under the ACT's water resource strategy. Think water, act water, there are incentive programs to encourage more efficient water use by individuals and households. The programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004). 	 review effectiveness of temporary water restrictions and associated public education strategies, and consider extending low-level restrictions 		and temporary water restrictions in place for urban use. During the 2000s, reductions in residential consumption were largely due to a combination of restrictions, conservation campaigns and investment in technical water-use efficiency. Increases in the volumetric price for water, including through inclining block tariffs, also played a role in influencing demand.
 Produing reakage, excess pressure, overflows and other maintenance needs. Encourage further innovation in 92 92—The ACT has participated in national working groups and committees to develop water quality guidelines for recycled water and stormwater use. The guidelines have been included in local policies through amendments to the Environmental guidelines for water-sensitive urban designs for recycled water and stormwater t develop national guidelines for water-sensitive urban designs for recycled water and stormwater t develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise t evaluate existing water-sensitive urban developments t evaluate existing water-sensitive urban is under review. A revised water strategy, including its institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines t review incentives to stimulate innovation. 	 to standard practice + implement management responses to water supply and discharge system losses, including leakage, excess 		91(iv)—Water supply and discharge systems losses have largely remained the same since 2003–04 (NWC 2011c). The ACT has an active approach to managing system losses.
Encourage further innovation in urban water use, including:9292—The ACT has participated in national working groups and committees to develop water uselity guidelines for recycled water and stormwater use. The guidelines for recycled water and stormwater use. The guidelines have been included in local policies through amendments to the <i>Environment Protection Act 1997</i> (ACT) and the <i>Public Health Act 1997</i> (ACT).+develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-riseThe ACT has also participated in the development of guidelines for the evaluation of options for water-sensitive urban developments in both new urban subdivisions and high-riseThe ACT has also participated in the ACT through the <i>Planning and Land Management Act 2007</i> (ACT) as a code in the Act.+evaluate existing water-sensitive urban ison developments92(iv)—The ACT's water resources strategy, <i>Think water, act water,</i> revised institutional arrangements for an integrated urban water planning cycle in the ACT (Environment ACT 2004). The ACT advised that the strategy, including its institutional and the valued existing water-sensitive urban water cycle planning and management and develop best practice guidelines92(iv)—Under the ACT's water resource strategy, <i>Think water, act water, there</i> are incentive programs to encourage more efficient water use by individuals and households. The programs include rainwater tank and toilet rebates. However, there are no specific programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004).	pressure, overflows and other maintenance needs.		
 develop and apply national health and environmental guidelines for water-sensitive urban designs for recycled water and stormwater develop national guidelines for evaluating options for evaluating options for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments evaluate existing water cycle planning and management and develop best practice guidelines review incentives to stimulate innovation. 	Encourage further innovation in urban water use, including:	92	92—The ACT has participated in national working groups and committees to develop water quality guidelines for recycled water and stormwater use.
guidelines for water-sensitive urban designs for recycled water and stormwaterThe ACT has also participated in the development of guidelines for the evaluation of options for water-sensitive urban design and for evaluating existing water-sensitive urban icon developments (Tjandraatmadja et al. 2009), which have been applied in the ACT through the <i>Planning and Land Management Act 2007</i> (ACT) as a code in the Act.+develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise92(iv)—The ACT's water resources strategy, <i>Think water, act water</i> , revised institutional arrangements for an integrated urban water planning cycle in the ACT (Environment ACT 2004). The ACT advised that the strategy, including its institutional and to a lesser extent its regulatory arrangements, is under review. A revised water strategy is expected to be released in 2012. Regulatory models for integrated urban water cycle planning and management and develop best practice guidelines92(iv)—Under the ACT's water resource strategy, <i>Think water, act water</i> , there are incentive programs to encourage more efficient water use by individuals and households. The programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004).	 develop and apply national health and environmental 		<i>Environment Protection Act 1997</i> (ACT) and the <i>Public Health Act 1997</i> (ACT).
 develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines review incentives to stimulate innovation. been applied in the ACT through the <i>Planning and Land Management Act 2007</i> (ACT) as a code in the Act. 92(iv)—The ACT's water resources strategy, <i>Think water, act water</i>, revised institutional arrangements for an integrated urban water planning cycle in the ACT (Environment ACT 2004). The ACT advised that the strategy, including its institutional and to a lesser extent its regulatory arrangements, is under review. A revised water strategy is expected to be released in 2012. Regulatory arrangements between the regulator and the water utility are not expected to change. 92(v)—Under the ACT's water resource strategy, <i>Think water, act water</i>, there are incentive programs to encourage more efficient water use by individuals and households. The programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004). 	guidelines for water-sensitive urban designs for recycled water and stormwater		The ACT has also participated in the development of guidelines for the evaluation of options for water-sensitive urban design and for evaluating existing water-sensitive urban icon developments (Tjandraatmadja et al. 2009), which have
 water-sensitive urban developments in both new urban subdivisions and high-rise evaluate existing water-sensitive urban icon developments review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines review incentives to stimulate review incentives to stimulate water-sensitive urban incondevelop best review incentives to stimulate water cycle planning and <l< td=""><td> develop national guidelines for evaluating options for </td><td></td><td>been applied in the ACT through the <i>Planning and Land Management Act 2007</i> (ACT) as a code in the Act.</td></l<>	 develop national guidelines for evaluating options for 		been applied in the ACT through the <i>Planning and Land Management Act 2007</i> (ACT) as a code in the Act.
 + evaluate existing water-sensitive urban icon developments + review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines + review incentives to stimulate innovation. including its institutional and to a lesser extent its regulatory arrangements, is under review. A revised water strategy is expected to be released in 2012. Regulatory arrangements between the regulator and the water utility are not expected to change. 92(v)—Under the ACT's water resource strategy, <i>Think water, act water</i>, there are incentive programs to encourage more efficient water use by individuals and households. The programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004). 	water-sensitive urban developments in both new urban subdivisions and high-rise		92(iv)—The ACT's water resources strategy, <i>Think water, act water</i> , revised institutional arrangements for an integrated urban water planning cycle in the ACT (Environment ACT 2004). The ACT advised that the strategy,
 review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines review incentives to stimulate innovation. review incentives to stimulate 	+ evaluate existing water-sensitive urban icon developments		including its institutional and to a lesser extent its regulatory arrangements, is under review. A revised water strategy is expected to be released in 2012.
 92(v)—Under the ACT's water resource strategy, <i>Think water, act water</i>, there are incentive programs to encourage more efficient water use by individuals and households. The programs include rainwater tank and toilet rebates. However, there are no specific programs to encourage developers or industry to undertake efficient water-use schemes (Environment ACT 2004). 	+ review institutional and regulatory models for integrated		expected to change.
 review incentives to stimulate innovation. 	urban water cycle planning and management and develop best practice guidelines		92(v)—Under the ACT's water resource strategy, <i>Think water, act water</i> , there are incentive programs to encourage more efficient water use by individuals and households. The programs include rainwater tank and toilet rebates.
	+ review incentives to stimulate innovation.		to undertake efficient water-use schemes (Environment ACT 2004).

NWI actions	NWI clause	Commentary
Community partnerships and adjustr	nent	
Open and timely consultation with all relevant stakeholders in relation to:	95	95(i)—There are no reported overallocated systems in the ACT, and therefore no consultation is required for the determination of water recovery activities in the territory.
 pathways for returning overallocated systems to sustainable extraction levels 		95(ii)—The <i>ACT water report</i> has been produced annually from 1996, but has not been made public since 2009. The reports cover water resources
+ periodic review of water plans		(allocations, licences), water condition (quality) and community activities.
 other significant decisions affecting the security of water access entitlements. 		95(iii)—Water planning is participatory and consultative in the ACI. It involves initial notification and consultation with the community and stakeholders, the public exhibition of draft plans and the use of stakeholder advisory committees. Although it is clear that the public was consulted during the development of the plan, the processes associated with decision making and trade-offs (i.e. how the results of the public consultation were used to make decisions) lacked transparency.
		The development and implementation of the ACT <i>Think water, act water</i> policy included a consultation strategy that established a community reference group to target the engagement of key stakeholder groups and the delivery of public education programs and information campaigns (Environment ACT 2004).
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—The effectiveness of water plan implementation is reported annually in the <i>ACT water report</i> , but the report has not been made public since 2009. The monitoring and reporting are mandated by the ACT Government's <i>Think</i> <i>water, act water</i> policy and are conducted for a range of variables, including water quality, in-stream and riparian zone condition, flow gauging, and some groundwater parameters (Environment ACT 2004).
Address significant adjustment 97 issues affecting water access	97	97—There are no reported overallocated systems in the ACT, and therefore significant adjustment issues have not affected water access entitlement holders.
entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.		There are strong mechanisms available to the Minister to amend water access entitlements by imposing conditions on or amending existing conditions of entitlements. The Minister is required to provide compensation if an entitlement holder is adversely affected.
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken.	101	101(i)—No specific work has been undertaken to identify key science or knowledge and capacity priorities to assist in the implementation of the NWI. The ACT has an internal strategic workplace knowledge, skills and capacity-building program for its staff. A knowledge gap on the effectiveness of the territory's environmental flows has been noted.
to ensure the research effort is well coordinated and publicised, and any gaps are addressed.		101(ii)—The ACT supports national water knowledge by contributing funds to the eWater CRC. ACT staff also participate in intergovernmental forums and jurisdictional working groups, contributing to their development of skills, knowledge and capacity.

New South Wales

NWI actions	NWI clauses	Commentary
Water access entitlements and plann	ing framework	<
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAC Water Reference Framework 	26	26(i)—At the commencement of the NWI, NSW identified 31 water sharing plans (WSPs) and six inland groundwater plans to complete its remaining commitments on overallocated systems under the 1994 COAG Water Reform Framework (COAG 1994). NSW has completed all required water plans. Currently in NSW, 51 water plans have commenced, a further two have been approved to commence on 1 July 2011, one is on exhibition, five are finalised for approval for public exhibition, four are being finalised for approval for public exhibition and another eight are being finalised for commencement.
 + legislative and administrative regimes amended to incorporate the elements of the entitlements 	legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this26(ii)—NSW has implemented <i>Management Act 2000</i> (NSW) entitlements (NWC 2009).Most (~95%) entitlements have consistent with the NWI. Those the <i>Water Act 1912</i> (NSW) and They apply mainly to unregulat and account for less than 5% of licences are tradeable but not w SP has commenced.	26(ii)—NSW has implemented NWI-consistent legislation. The <i>Water Management Act 2000</i> (NSW) provides the statutory basis for water access entitlements (NWC 2009).
and allocation framework in this agreement.		Most (~95%) entitlements have now been unbundled and are tradeable, consistent with the NWI. Those that remain bundled are licences specified under the <i>Water Act 1912</i> (NSW) and exist in areas where a WSP is yet to commence. They apply mainly to unregulated surface water and groundwater resources and account for less than 5% of licensed water in NSW by volume. The bundled licences are tradeable but not with the same flexibility as those in areas where a WSP has commenced.

NWI actions	NWI clauses	Commentary
Water access entitlements to be defined and implemented.	28–34	28–33—The <i>Water Management Act 2000</i> (NSW) provides the statutory basis for NWI-consistent water access entitlements in NSW. Water access entitlements are defined and implemented through WSPs, consistent with the five-year State Water Management Outcomes Plan (NWC 2009).
		34—NSW has been addressing mining and petroleum activities under the Water Management Act as per clause 34 of the NWI, which provides for state management arrangements. Under those arrangements, interception by mining and petroleum activities requires a licence in NSW. Only prospecting and fossicking are exempt under clauses 18, 38 and 39 of the Water Management (General) Regulation 2004 (NSW). NSW advised that this is to be done by 1 July 2011.
		NSW advised that the NSW Office of Water (NOW) requests applicants for mining developments under the <i>Environmental Planning and Assessment</i> <i>Act 1979</i> to undertake predictive modelling related to groundwater and surface water take and potential impacts on aquifers, groundwater-dependent ecosystems, other water users and rivers. The applicants are also required to demonstrate access to adequate water resources, including by purchasing water entitlements in the market for their operational and post-closure water requirements. NOW considers water legislation and relevant WSP provisions in the development and provision of advice to applicants and the Department of Planning and Infrastructure or other determining authorities.
		If approved by the Department of Planning and Infrastructure, a mining development is required to secure licensed access to cover all water take. NSW advised that this is required under all climatic conditions and in situations in which water is restricted, such as reductions in allocations. NOW also requests the activity, once operational, to report actual take and impacts and comparisons against modelled predictions. Legal support for the NSW position has been provided in a recent Land and Environment Court decision requiring one mine to scale back activities when sufficient water is not available.
		Take is considered for the post-closure water requirements; access licences are not tradeable until groundwater conditions return to an acceptable state.
		In NSW, the Minister for Primary Industries has responsibility for assessing possible impacts of coal-seam gas and other mining activities on surface and groundwater sources and their dependent ecosystems.
		Currently, if a mining proposal is made for an area in which a WSP is not yet in place, the <i>Water Act 1912</i> (NSW) will apply and water licences may need to be held for both the exploration and production phases of operations. Alternatively, when a proposal is made for an area in which a WSP is in place, the <i>Water Management Act 2000</i> (NSW) will apply. NSW advised that the proponent may be exempt from the need to hold water licences and approvals for exploration proposals depending on the scale of water impacts and the exploration activity's purpose, although during the production phase a licence will be required.
		The <i>Water Management Amendment Act 2010</i> contains a provision (section 60I) which clarifies that mines need to hold a licence for any water taken, including water taken incidentally as a result of mining operations. NSW advised that this provision will commence upon the completion of the Aquifer Interference Policy, which will set out all the requirements for mining and other extractive activities that affect aquifers. NSW also advised that it will be consulting stakeholders on the draft Aquifer Interference Policy in July 2011, after which regulations to

implement the policy will be drafted.

NWI actions	NWI clauses	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35(i) and (ii)—In NSW, licensed environmental water has the same level of security as water access licences for consumptive purposes. Where licensed environmental water has been purchased from consumptive users, 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 for consumptive water, depending on the rules. For example, minimum flows have a higher level of security than consumptive water. Water to achieve some other public benefit outcomes also has the same level of security of water for consumptive uses. Section 58 of the <i>Water Management Act 2000</i> (NSW) specifies that local water utility access licences (town water), major utility access licences and domestic and stock access licences have priority over all other access licences. Some water plans include entitlements for Aboriginal community development.
		However, in the NSW portion of the MDB, as in other MDB states, environmental water is less secure at times of extremely low water availability. The 2008 Agreement on Murray–Darling Basin Reform (Cwth et al. 2008) states that critical human water needs are the highest priority water use for communities dependent on the water of the MDB. Consequently, during periods of extremely low water availability when there is an extreme risk of failure to supply water for critical human needs in the next 12 months, Tier 3 water sharing is triggered and the ministerial council must intervene to ensure the supply of conveyance water and the delivery of water for critical human needs. In those conditions, no priority would be given to environmental water.
		35(iii)—Under the <i>Water Management Act 2000</i> (NSW), the Water Minister provides three categories of environmental flows: 'environmental health water', 'supplementary environmental water' and 'adaptive environmental water'

'supplementary environmental water' and 'adaptive environmental water'. Only adaptive environmental water, which is water granted under a water access licence (WAL) for a specific environmental purpose, can be traded or converted to a consumptive use by the Minister. In practice, this would be at the request of the licence holder, in circumstances in which trade might provide for better watering outcomes over the long term, such as selling allocation once annual watering needs have been met to fund purchases in times of drought.

NWI actions	NWI clauses	Commentary
Water plans to be prepared along the lines of the characteristics and components at Schedule E based	39–40	39—NSW has implemented a water planning process that is NWI-consistent. NSW transparently prioritised the development of WSPs for those water resources that are most intensively used and developed.
 + plans for systems that are overallocated, fully allocated or approaching full allocation + plans for systems that are not 		40(i)—In NSW, the state-wide Natural Resources Monitoring Evaluation and Reporting Strategy 2010–2015 provides for strategic coordination of the monitoring of natural resources, including water (DECCW 2010). It provides a framework for cooperation between agencies responsible for natural resource management. State Water (water usage), NOW (flows and water levels) and the Office of Environment and Heritage (OEH) (water quality and ecosystem health) all undertake monitoring that is used to evaluate the achievement of water plan objectives. There is no monitoring of the achievement of cultural or Indigenous water plan objectives, but NSW advised that it is beginning work to address that (see NWI clause 52). The NSW Natural Resources Commission also has a statutory role in auditing WSP performance.
yet approaching full allocation.		
		The <i>Water Management Act 2000</i> (NSW) requires a review of WSPs between years 5 and 9 of their 10-year duration to assess their contribution to state natural resources management standards and targets. A number of reviews of WSP progress, using the monitoring described above, have been undertaken by NOW, including of both regulated and unregulated systems.
		40(ii)—In NSW, monitoring of water flow and level is regularly used to update hydrological models that are used to make available water determinations under each plan. In new and revised WSPs (such as the Bega and Brogo WSP), there are provisions to change the plan rules as new information becomes available. In some WSPs there is explicit recognition of specific studies that could alter the WSP in the future.
		40(iii)—All relevant NSW agencies report on performance of water management and planning activities in their annual reports. State-wide reporting of natural resource activities and condition, using information generated by the Natural Resources Monitoring, Evaluation and Reporting Strategy, is undertaken through state-of-the-environment reports; regional reporting is through catchment report cards, published on the OEH website. In addition to this reporting, the results of specific reviews are also published by NOW. The OEH, as the environmental water holder in NSW, has commenced annual reporting on environmental water management performance, including both planned and adaptive environmental water.
Substantially complete addressing overallocation as per National Competition Council commitments. Substantial progress towards adjusting all overallocated and/or overused systems.	41, 43–45	41—See clause 26(i) for details of progress.
		43—NSW has implemented water recovery pathways in many WSPs. As NSW WSPs specifically address the risks to sustainability of the water resource, in many cases the plans set out a pathway to progressively reduce water entitlements over the life of the plan. An example of this is the staged 10-year reduction of overallocated deep aquifer extractions in the WSP covering the Lower Murrumbidgee Groundwater Area.
		44—Progress towards returning overallocated and overused systems to sustainable levels of extraction can be demonstrated. NOW has published its review of progress for some areas, such as for the inland aquifers that include the Lower Murrumbidgee Groundwater Area.
		45—See actions associated with NWI clause 97 for more detail. In NSW, adjustment issues have been addressed in the development of groundwater WSPs via compensation payments to entitlement holders through the Achieving Sustainable Groundwater Entitlements program (NOW 2011a).

NWI actions	NWI clauses	Commentary
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—For areas outside the MDB, NSW has legislated for the NWI risk assignment framework, which will apply from 2014 onwards as required under the NWI. Until 2014, section 87 of the <i>Water Management Act 2000</i> (NSW) provides for risks associated with any reduction in or less reliable water allocations 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 to be borne by users.
		For areas in the MDB, NSW has implemented further legislative changes required under the Agreement on Murray–Darling Basin Reform (Cwth et al. 2008). The Australian Government's risk sharing framework will apply to transitional WSPs that expire after the Basin Plan takes effect.
Water plan to address Indigenous water issues.	52-54	52–53—The NSW water planning framework engages Indigenous communities, along with other stakeholders, to identify their water values and requirements during water planning. If required, catchment management authorities coordinate additional consultations through their Aboriginal reference groups or committees and via forums with Aboriginal communities and groups to assess whether the WSP will adequately protect Indigenous values and can provide community development opportunities.
		With funding from the Commission, NSW is undertaking a state-wide program of consultations with Aboriginal communities to identify water-dependent cultural assets for inclusion in WSPs. This project will develop a database of Indigenous sites and their water requirements for NSW, and is expected to be completed in early 2012.
		The <i>Water Management Act 2000</i> (NSW) recognises native title rights (current and future) as part of the basic landholder rights provisions, and that is reflected in WSPs. NSW advised that discussions are underway with Indigenous leaders on defining what native title rights might mean with respect to water volumes.
		The WSPs also allow additional access to water for cultural purposes by way of an Aboriginal cultural water access licence and, for plans outside of the MDB that are not fully allocated, provide for the issuing of additional Aboriginal community development licences. The plans allow Indigenous people to apply for water licences for cultural purposes without having to purchase them in the market.
NWI actions	NWI clauses	Commentary
--	-------------	--
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with water plans.	55–57	55–57—NSW has developed and implemented a number of policies to deal with water interception issues. Other aspects, such as the implementation of a robust compliance monitoring regime for interception activities, remain incomplete.
		NSW reported that a framework is being developed for implementing aquifer interference approvals for mining activities (including coal-seam gas exploration or extraction) and other activities, except where exemptions apply or approvals are not required under the Water Management Act. The requirement for an aquifer interference approval is established independently of the requirement for a water licence, since there are some activities that may affect an aquifer but not actually extract water.
		NSW advised they will consult stakeholders on the draft Aquifer Interference Policy in July 2011. Regulations will then be developed to implement the regulatory aspects of the final policy.
		NSW has also made significant progress on developing a Floodplain Harvesting Policy, which will lead to volumetric licences for floodplain harvesting. The policy is being revised by the new state government before further consultation with stakeholders in the second half of 2011. The finalisation and implementation of the policy are dependent on Australian Government funding under the Sustaining the Basin initiative.
		In NSW, WSPs for unregulated surface water sources and for groundwater sources include quantified estimates of domestic and stock rights within the water sources. The plans include those quantified estimates in the long-term average annual extraction limits for those water sources. In addition, Harvestable Rights Orders limit the amount of runoff that can be captured by farm dams. Mandatory Guidelines for Domestic and Stock Rights that place volumetric limits on domestic and stock rights are also being finalised by the NSW Government before further consultation with stakeholders in the second half of 2011.
		NSW has recently commenced a five-year, \$16 million Commonwealth-funded project to implement the National Framework for Compliance and Enforcement Systems for Water Resource Management. This will include a robust monitoring regime.
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering	59	59—In NSW, a number of registers provide publicly accessible water information online. They include:
water access entitlements and trades consistent with Schedule F: + pathways leading to full		
implementation + full implementation.		+ the Water Share Register, which provides information about temporary and permanent trades of water access licence share components to another licence holders in the same water source; the register is managed by NOW and is publicly available, including online
		+ a range of other registers managed by NOW that provide information on allocation trades, the status of applications for water approvals, the approvals, water access licence conditions, available water determinations and water access licence statistics
		+ the Environmental Water Register, which provides information for water users and the general public on the types of environmental water held.
		At the national level, NSW provides its water market and trading data and information to the National Water Market System and to the Department of Sustainability, Environment, Water, Population and Communities, which is developing an online national water trade register.

NWI actions	NWI clauses	Commentary
Establish compatible institutional and regulatory arrangements	60	60(i), (ii), (iii)—NSW has implemented NWI-consistent institutional and regulatory arrangements that facilitate intrastate and interstate trade.
that facilitate trade, including arrangements consistent with principles in Schedule G re institutional barriers to trade:		60(iv)—In NSW, barriers to temporary trade and the interim threshold limit have been removed, including the embargo on the sale of entitlements to the Australian Government for environmental purposes that was introduced in May 2009. The embargo on allocation trading from the Murrumbidgee Valley
+ remove barriers to temporary trade		into the Murray Valley was removed in January 2010 (NWC 2010b).
 remove barriers to permanent trade up to an annual threshold of 4% 		The current memorandum of understanding between the NSW and Australian governments limits the volume of general security entitlement that can be sold to the Australian Government for environmental purposes until the end of 2012–13.
 + review impact on trade of interim threshold + full removal of barriers to trade. 		In NSW, water trading as envisaged by the NWI is facilitated in those areas with a WSP. Currently, WSPs cover approximately 95% of water extraction in NSW. NSW reported that more than 98% of water licences in the state (by number)
		The only entitlements that cannot be traded are specific purpose licences. That includes licences for stock and domestic uses, town water utilities and major water supply and power generation utilities, which can purchase entitlements in the market but can only sell their entitlements to be used for the same purpose. Town water supplies can apply for further entitlements in response to population growth. Groundwater supplementary licences also cannot be traded, as they are issued as part of a structural adjustment process.
		New trading rules are being developed by the MDBA as part of the Basin Plan. Ultimately, those rules will determine whether amendments to NSW trading arrangements are required.
		60(vi)—NSW continues to pursue opportunities to deal with inefficient infrastructure or unsustainable irrigation schemes, but advised that uncertainty about MDB planning arrangements is delaying the completion of negotiations.
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006) .
+ review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, <i>Rural water</i>
 new approach to sharing delivery capacity and extraction rates among users 		use and the environment; the role of market mechanisms (PC 2006).
+ 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.		

NWI actions	NWI clauses	Commentary
Relevant parties (Commonwealth, NSW, Vic. and SA) agree to:	63	63(i)—The Commonwealth Water Charge (Termination Fees) Rules 2009 were developed to help minimise barriers to water entitlement trading in the MDB while maintaining the financial viability of irritation infrastructure operators
 take necessary steps to enable the use of exchange rates and/or tagging for interstate trade 		The termination fee rules commenced on 23 June 2009. Most provisions did not come into full effect until 1 September 2010.
 reduce barriers to trade in southern MDB and establish an interim limit on permanent trade out of water irrigation areas of 4% per annum 		Basin states have collaborated on interstate water trading issues such as exchange rate tagging and tagged trading. The tagged trade method has been adopted by states to facilitate interstate entitlement trading. Growth in tagged trading in NSW has so far been limited, while temporary interstate trading of allocations has increased significantly. Approaches to improve tagged trading are currently being investigated by the MDBA Water Trading Group and the
 + NSW make legislative changes to remove barriers and permit 		COAG Water Reform Committee.
increased trade up to the interim limit		63(iii), (iv), (v), (vi), (vii)—The Commission has coordinated a number of reviews and evaluations on the effectiveness of the Australian water market. For example, 63(vi) is specifically addressed by the Commission's 2007 and
 Vic. and SA make change to remove barriers and permit increased trade up to the interim limit 		2010 <i>Impacts of trade</i> reports; 63(vii) is considered to have been satisfied by the 2009 biennial assessment.
 review actions to assess whether relevant parties have removed barriers to achieve interim limit 		
 study into mechanisms necessary to enable interstate trade 		
+ review outcome of actions by NSW		
+ NWC monitor impacts of interstate trade		
+ review the impact on trade under the interim threshold.		
Best practice water pricing and institution	tutional arrange	ements
Complete commitments under the 1994 COAG Water Reform	65	65–65(i)—NSW has implemented consumption-based pricing in both rural and urban systems.
Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.		65(ii)–(iii)—See actions associated with NWI clause 66 for more detail.

NWI actions	NWI clauses	Commentary
Metropolitan:	66	66(i)—NSW has achieved lower-bound pricing, and price setting is consistent with or moving towards upper-bound pricing for metropolitan water storage and delivery.
 continued movement towards upper-bound pricing 		The NSW Government has issued Guidelines for Best-Practice Management
 development of pricing policies for recycled water and stormwater 		guidelines. The guidelines note that a local water utility's total annual income and projected bills should generally result in a positive economic real rate of return (ERRR). The 2009–10 <i>National performance report</i> for urban water
+ review and development of pricing policies for trade wastes		utilities shows that the four major metropolitan utilities (Sydney, Gosford, Hunter and Wyong) reported a positive ERRR (NWC 2011c).
+ development of national guidelines for water accounts.		In contrast, recent NSW state performance reports define full cost recovery as earning either a positive real ERRR or a positive return on assets (NOW 2010). Based
Rural and regional:		on that broader definition, 96% of the utilities achieved full cost recovery for water supply in 2008–09. Notably, however, 35 (of 106) utilities reported a negative ERRR.
 + full cost recovery for all rural surface and groundwater based systems 		The performance reports also note that the recent drought had a marked effect on ERRR due to the loss of income from water usage charges (NWC 2011a).
 + continued movement towards lower-bound pricing per National Competition Council commitments 		On 3 March 2011, NSW issued a circular to the non-metropolitan NSW utilities, removing the previous requirement for an inclining block tariff for residential customers. The circular also provides guidance on an evidence base for estimating future water demand, which should minimise the risk of overestimating future revenue. The NSW Government noted in its May 2011
 achievement of upper-bound pricing for all rural systems, where practicable. 		submission to the Productivity Commission inquiry into Australia's urban water sector that it encourages water utilities to use a two-part tariff, with a uniform water usage charge per kilolitre for all water use (NSW Government 2010).
		Utilities that have met all of the best-practice management requirements are encouraged to pay a dividend from the surplus of their water supply and sewerage businesses to the council's general revenue. Utilities that pay such a dividend will be moving towards upper-bound pricing, which is required under the NWI where practicable.
		66(ii)—Pricing policies for recycled water and stormwater are set out in <i>Pricing arrangements for recycled water and sewer mining—Sydney Water Corporation, Hunter Water Corporation, Gosford City Council and Wyong Shire Council</i> (IPART 2006). In 2008, NSW abolished developer charges payable to Sydney Water and Hunter Water for potable water and sewerage services. Developer charges for recycled water services to new developments may continue to be levied, but there would be case-by-case negotiations with customers, guided by the IPART guidelines.
		66(iii)—The NSW Government released the Liquid Trade Waste Regulation Guidelines in 2009 (DWE 2009). The guidelines set out the NSW Framework for Regulation of Sewerage and Trade Waste, which requires compliance with a number of measures, including full cost recovery with an appropriate sewer usage charge, trade waste fees and charges and a trade waste regulation policy. The guidelines also require a noncompliance trade waste usage charge and noncompliance excess mass charges to provide a strong financial incentive for each discharger to comply consistently with the conditions of their approval.

66(iv)—The National Guidelines for Residential Customers' Water Accounts were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian and state and territory water ministers (NRMMC 2006).

The 2009–10 NSW Water Supply and Sewerage Performance Monitoring Report shows that 20% of the local water utilities in non-metropolitan NSW now have residential billing in accordance with the guidelines. A further 25% have made significant process towards such billing.

NWI actions	NWI clauses	Commentary
	66 continued	66(v)—IPART is responsible for setting the prices that State Water, the NSW bulk water supplier, can charge for making its water available. The prices are based on the costs that State Water incurs in harvesting, storing and transporting water. In addition, IPART sets prices for the water resource management activities of NOW.
		The 2009–10 <i>National performance report</i> for rural water service providers (NWC 2011b) reported that State Water achieved an ERRR of 2.9% in 2009–10.
		In June 2010, IPART released its final determination for State Water's bulk water prices, which included price increases for some customers. IPART noted that on average across all valleys, water prices will be around 28% higher in 2013–14 than in 2009–10. Under the final determination, increases in water bills for high security customers will vary over the four years of the determination, from 2% in the Murrumbidgee Valley to 73% in the Border Valley. For general security customers, changes in water bills will also vary, from falls of 4% in the Murrumbidgee Valley to an increase of 47% in the Lachlan Valley. Higher costs contribute 11% to the price increases, and lower than expected water sales contribute 15% (IPART 2010a).
		IPART does not have a role in determining prices for rural retail water services provided by privately owned irrigation companies. In the 2009–10 <i>National performance report</i> for rural water service providers (NWC 2011b), two of the three independent irrigation operators reported a negative ERRR and one did not report an ERRR. Although these figures raise questions as to whether water providers have reached lower-bound pricing, external factors such as low allocations are likely to have had a strong influence on financial performance in the reporting period.
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—IPART is responsible for setting water prices for the water planning and water management activities undertaken by NOW. The charges are transparent, independently reviewed, and set on a cost-recovery basis. The costs of each water planning and management activity are shared between licensed water users and government on an impactor-pays basis. Charges are set for each water system (valley and water source) based on the water users' share of water planning and management costs for each system. Consequently, charges are linked closely to the costs of the activities concerned.
		NSW advised that the transition to full cost recovery for water planning and management activities will be virtually complete by the end of IPART's 2010 determination in 2013–14, by which time cost recovery for all water sources is projected to reach 94%. Most surface water systems are at or approaching full cost recovery for water planning and management attributable to water users (projected to be 93%–95% by 2013–14), as are groundwater areas (projected to be 90% by 2013–14) (IPART 2010b, NWC 2011a).
		IPART's 2010 determination for NOW's water planning and management charges rejected proposals to include cost recovery relating to the national water reforms (IPART 2011).

NWI actions	NWI clauses	Commentary
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before being approved.	69	69—Since 2009, the NSW Government has completed and released the updated New South Wales Metropolitan Water Plan, which was prepared in accordance with the COAG Urban Water Planning Principles. IPART encourages economic prosperity and prudent and efficient investment in utility infrastructure. IPART noted in its submission to the Productivity Commission's inquiry into Australia's urban water sector that:
		there have been some recent cases where government at all levels have rushed in to subsidise urban water infrastructure and you might wonder about the wisdom of that, or whether that's not actually distorting what infrastructure gets built or moving us away from the most efficient ways of meeting people's water needs (IPART 2010b).
		In non-metropolitan NSW, the NSW Government's Best-Practice Management of Water Supply and Sewerage Guidelines require the development and implementation of a 30-year integrated water cycle management strategy by each water utility. This involves identifying and implementing the scenario that provides the best value for money on the basis of social, environmental and economic considerations (a triple bottom line basis).
		When infrastructure is approved, it needs to be consistent with relevant legislation, such as the <i>Fisheries Management Act 1994</i> .
Release of unallocated water.	70–72	70–72—Under the <i>Water Management Act 2000</i> (NSW), the Minister may grant new water access licences, subject to the requirements of the Act and provisions of a WSP. Certain 'specific purpose' access licences can be applied for directly. Specific purpose access licences are typically for non-commercial purposes. In some plan areas where there is unassigned water, the right to apply for access licences that can be used for commercial purposes is to be acquired by auction, tender or other market mechanisms. Where new specific purpose access licences are applied for and granted, there is currently no pricing mechanism associated with the value of the water.

NWI actions	NWI clauses	Commentary
Environmental externalities 73 managed through a range of regulatory measures.	73	73(i)—NSW has continued to manage environmental externalities through a range of regulatory measures, including water extraction limits specified under WSPs, WSP rules, mandatory water access licence rules and the environmental protection licensing regime.
		73(ii)—Some of these activities are subject to cost recovery (externalities are effectively internalised in prices because costs identified under the 'impactor-pays' approach are recoverable through the pricing process). In general practice, most of the activities concerned are attributed to the government as impactor rather than to water users because of the diffuse nature of the impacts and remoteness from the point ('extractive') source. Market-based instruments also address some other (quality-related) environmental externalities of water use, such as through the Hunter River Salinity Trading Scheme (OEH 2011a) and the Load-based Licensing Scheme (OEH 2011b).
		For non-metropolitan NSW, environmental regulators' requirements are included in the projected cost of water supply and sewerage systems and are recovered through customer charges. The externality costs for water supply and sewerage for each NSW local water utility are disclosed in tables 11 and 16 of the 2008–09 NSW water supply and sewerage benchmarking report (NOW 2010a).
		73(iii)— IPART regularly reviews the feasibility of pricing externalities into customer water charges and the need to maintain ecologically sustainable development when it considers maximum prices for monopoly water services provided by government agencies (s. 15 of the <i>Independent Pricing and Regulatory Tribunal Act 1992</i> (NSW).
Benchmarking efficient performance:	75–76	75–76—NSW provides benchmarking information for 32 urban water service providers and four rural water service providers to the Commission for inclusion in the <i>National performance report</i> .
reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery		76—Costs for the preparation of national performance reporting are considered to be overheads in NSW State Water's cost structure for rural reporting entities, so they are incorporated into the 'operating expenditure' used by IPART for pricing determinations.
 agencies using a nationally consistent report framework + costs of operating the above performance and benchmarking systems are met by jurisdictions through recovery of water 		NOW included the costs related to Commonwealth water reform actions (including water consumption reporting and compliance with national standards) in its submission to the IPART review of bulk water pricing (NOW 2010b). While the costs were estimated to be 57 FTE, most were subsequently rejected by IPART on the basis that it was not appropriate to consider them in bulk water pricing.
management costs.	NOW annually reviews each utility's level of compliance with the 19 requirements of the <i>Best-Practice Management Guidelines</i> and publishes the results in Appendix C of the annual <i>Performance monitoring report</i> . The 2009–10 report indicates that overall level of compliance with the requirements is 85% compared to 46% five years ago.	
Independent pricing regulator: + independent pricing bodies to	77 e to icing e and t.	77(i)—In NSW, IPART determines prices for the metropolitan businesses, bulk water services provided by State Water, and water planning and management charges. This covers price-setting processes for government water service providers.
set and review prices or pricing processes for water storage and delivery and publicly report.		77(ii)—Through its pricing determinations and related submissions, IPART ensures that water pricing by NSW Government water service providers is transparently reported. Reporting of pricing by private water services is not complete.

NWI actions	NWI clauses	Commentary
Integrated management of environme	ental water	
Recognising the different types of surface water and groundwater systems:	79	79(i.a) –Administrative arrangements give NOW (Department of Primary Industries) and the OEH (Department of Premier and Cabinet) responsibility for the management of environmental water. The OEH is responsible for the deliver of discretionary water (planned environmental water allocations and water access licences held by the NSW Government for an environmental purpose), while NOW is responsible for the implementation of WSPs, including the implementation of non-discretionary rules-based environmental water.
 effective and efficient management and institutional arrangements to ensure the achievement of the 		
 environmental outcomes + where it is necessary to recover water to achieve environmental 		79(i.b)—NSW has established management and institutional arrangements to ensure the achievement of environmental and other public benefit outcomes for shared resources with other jurisdictions, including:
outcomes, to adopt the principles for determining the most effective and efficient mix		 + the NSW–Queensland Border Rivers Intergovernmental Agreement 2008 + the Murray–Darling Basin Agreement (Cwth et al. 2008)
of water recovery measures.		+ the <i>Water (Commonwealth Powers) Act 2008</i> (NSW), which refers NSW state powers to the Commonwealth in order to implement the MDB-focused <i>Water Act 2007</i> (Cwth)

+ the Snowy Water Inquiry Outcomes Implementation Deed, the Snowy Water Licence, the Snowy Scheme Long Term Arrangements Deed, and the Snowy Bilateral Deed.

79(i.c)—In NSW, surface water and groundwater are defined in the *Water Management Act 2000* (NSW). NSW advised that integrated plans are developed where connectivity is high. 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. For macro WSPs, NSW classifies water systems as either gaining systems, losing systems or highly connected systems. Based on that classification, a suite of management rules is proposed for consideration. Further work has also been undertaken on the assessment of connectivity across inland river systems to inform planning. Currently, of the 51 completed WSPs, 10 have been developed as combined surface water – groundwater plans.

79(i.d)—In NSW, the OEH, as environmental water holder, monitors, evaluates and reports on environmental watering annually (DECCW 2011). This is supported by NOW monitoring and reporting of general WSP performance, including the achievement of environmental and other public benefit outcomes. At present, progress reports are not available for all WSP areas. Progress reports on the ecological monitoring of planned environmental water have been completed for the Macquarie, Namoi, Gwydir, Border Rivers and Northern Rivers and are available on NOW's website. However, several systems, such as the Lachlan and Murrumbidgee, do not yet have such progress reports. A monitoring and evaluation framework is being developed for WSPs in NSW, as is a framework for the setting of more specific ecological objectives in WSPs, but the framework is not currently integrated with each WSP.

In addition, NSW produces cap compliance reports annually for the MDB that specify extractions compared to MDB cap limits.

For regulated river plans, NSW has adopted an approach set out in *Integrated monitoring of environmental flows* (NOW 2011b). This program assesses the effectiveness of the environmental water provisions of WSPs in meeting the ecological objectives of the plans. A similar program is in place for the state's unregulated rivers. However, for unregulated rivers, monitoring is limited to those existing plan areas where extraction is identified as a high risk to the in-stream values of the system, to ensure that limited resources are applied commensurate with risk. NOW publishes reports on specific monitoring programs as they are completed.

NWI actions	NWI clauses	Commentary
	79 continued	79(i.e)—Environmental water in NSW is provided for in WSPs as 'planned' environmental water and 'adaptive' environmental water (DECCW 2011). Only adaptive environmental water can be traded.
		79(i.f)—While there are no specific statutory obligations to protect high ecological value aquatic ecosystems (HEVAEs), there are 15 pieces of NSW legislation, 13 policies and 11 types of framework that contribute to the protection of HEVAEs. For unregulated systems, HEVAEs are considered using the value and the risk matrix approach. Default water trading rules and more restrictive water access rules are applied to such assets. For regulated systems, environmental water advisory groups advise on annual flow release strategies for both planned and adaptive environmental water. Groundwater-dependent ecosystems that are HEVAEs are identified in the WSPs, and provisions are established to protect those values. NSW advised that it has a program in place to enhance the capture of river value and groundwater-dependent ecosystem information. Information is captured to be used in plan development or evaluation.
		79(ii)—In NSW, to address overallocation, a number of major groundwater systems in the MDB have been subjected to progressive entitlement reductions since 2004. NSW established the Achieving Sustainable Groundwater Entitlements Program during the development of the groundwater WSPs that defined the rules for reductions, which resulted from significant discussions with stakeholders.
		In NSW, a number of programs have supported the recovery of water for the environment through the purchase of water access licences or investments in efficient water delivery and management infrastructure, including NSW RiverBank, the Rivers Environmental Restoration Program, the Hawkesbury–Nepean River Recovery Package, the Wetland Recovery Program and The Living Murray Initiative. Led by the OEH, by 31 May 2011 those programs had recovered a total of 341.4 GL. NSW makes this information publicly available on the OEH website (OEH 2011c).
		NSW also operates buyback programs, for example the RiverBank program, through the environmental water holder (OEH 2011d).
		There is no evidence of specific policies for comparing plans for extraction limit reductions and water buybacks with other recovery measures, such as investment in more efficient water infrastructure.
Water resource accounting		
Benchmarking of accounting systems.	81	81—NSW has participated in the development of a range of national water accounting standards and reporting frameworks, including:
		+ the Water Accounting Conceptual Framework, general purpose water accounting reports, the Preliminary Australian Water Accounting Standards and the exposure draft of the Australian Water Accounting Standards.
		 national performance reporting of urban and rural water service providers (81(ii), (iii)).
		+ a number of online databases and registers for the management of water resources in NSW (see NWI clauses 59, 81(i) and 81(iv)).

NWI actions	NWI clauses	Commentary
Consolidated water accounts: + develop and implement robust	82–83	82—NOW has adopted the exposure draft of the Australian Water Accounting Standards of the Water Accounting Standards Board and is currently using them to produce general purpose water accounting reports that consider both surface
 water accounting identify situations where close interaction between surface water and groundwater exists 		water and groundwater and their interactions. In 2009–10, NOW published detailed online reports on the Murrumbidgee, Namoi–Peel, Macquarie and Lachlan systems; a report on the Gwydir system was expected before 30 June 2011. NOW intends to use the standards to produce reports on all catchments for which sufficient data is available.
 Implement systems to integrate the accounting of surface water and groundwater. 		While NSW has not yet produced annual consolidated water accounts, it advised that it is working with the MDBA to develop consolidated accounts for the MDB, as well as working closely with the Bureau of Meteorology (BoM) to produce the 2011 National Water Account.
		83—NSW advised that its water accounting systems recognise connectivity between groundwater and surface water systems. It also advised that general purpose water accounting reports published to date have all included some material on surface water – groundwater interaction. In addition, NOW has developed methodologies for surface water – groundwater account reporting.
Environmental water accounting: + develop an environmental water	85	85(i)—Standards for environmental water accounting are being addressed in national water accounting development under the direction of the BoM and the Water Accounting Standards Board (see NWI clause 81)
 register and annual reporting arrangements + apply the environmental water register and annual reporting arrangements. 		NOW has developed and implemented the Environmental Water Register, which provides information for water users and the general public on the types of environmental water held, rules-based environmental water and adaptive environmental water-use plans.
		85(ii)—In NSW, managers of adaptive environmental water are not compelled under legislation or WSPs to monitor and report on environmental watering outcomes. However, a range of regular reports are published by relevant agencies.
		The current reporting arrangements for environmental water include:
		+ the Environmental Water Register, which produces periodic reports on the assignment of water allocations to and from adaptive environmental water access licences and on changes in the share component of adaptive environmental water access licences over time
		+ the <i>Environmental water use in NSW: annual report</i> , which reports on discretionary environmental water holdings, actions, events and outcomes (DECCW 2011)
		+ <i>Water for the Environment News</i> , which reports environmental water actions, events and outcomes
		+ regular updates on the OEH website of environmental water holdings recovered through water recovery programs (OEH 2011c)
		+ general water plan audit and review reporting, which is the only formal arrangement for reporting on activity and compliance with the environmental water rules; however, no report under these arrangements has yet been published
		+ periodic reporting on the implementation of specific WSPs, which includes details of environmental water delivery (NWC 2010b).
		NSW has provided data and information for the production of the Australian environmental water management report.

NWI actions	NWI clauses	Commentary
Implement information measures.	86	86—NSW has participated with other NWI parties and the Bureau of Meteorology (BoM) in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act</i> <i>2007</i> (Cwth), the BoM has been mandated to play a national water data and information role.
		NSW has negotiated with the Australian Bureau of Statistics (ABS) to provide it annually with all its data requirements for non-metropolitan local water utilities from the NSW Performance Monitoring System. This has required the extension of the performance monitoring system to add a further 10 performance indicators and has removed the need for completion of a separate ABS survey by each local water utility.
		In addition, the round table group responsible for managing the national performance framework for urban water utilities has negotiated with the BoM to add a further 30 performance indicators to the framework and to modify nine existing indicators to avoid duplication and confusion through different definitions in BoM's requirements for Category 7 data (as shown in <i>BoM Bulletin</i> 7, December 2010, which is available on the BoM website.
 Metering and measuring actions: + develop metering and measuring actions + implement metering and measuring actions. 	88	88—NSW has participated in the development of national water metering standards and reporting frameworks. It has released the NSW Interim Water Meter Standards to guide the selection and approval of water meters until the full national standards are able to be implemented (NOW 2009). NSW has also begun to modify the administrative and legislative arrangements that will enable the national water meter standards to be fully enforced for non-urban water extraction. NSW has submitted its State Implementation Plan for Non-Urban Water Metering to the Australian Government, with the aim of metering approximately 95% of water usage in all water sources.
		Recently, NSW obtained funding to commence the installation of government water meters in the upper Murray Valley. This is a pilot of the full \$221 million NSW Metering Scheme for the installation of meters throughout the whole NSW MDB. Currently in NSW, most of the regulated river systems are metered, about 50% of extraction in groundwater systems (mainly inland alluvial aquifers) is metered, and very few unregulated river systems are metered.
		With funding from the Australian Government, NSW has begun to install meters that comply with the national standards across the Hawkesbury–Nepean system, covering 95% of extractions. NSW has also made regulations under the <i>Water Management Act 2000</i> (NSW) for the Minister to own and maintain meters in unregulated and groundwater systems, while State Water (the NSW bulk water utility) will own and maintain meters on regulated rivers. NSW has implemented cost recovery for this program from users, using IPART processes.

NWI actions	NWI clauses	Commentary
National guidelines on water reporting:	89	89—NSW has participated in the development of a range of national reporting requirements for water management.
 + develop national guidelines on water reporting + apply national guidelines on water reporting. 		It provides data and information for the production of the <i>National performance reports</i> for rural and urban water utilities, the <i>Australian water markets report</i> (89(ii)) and the <i>Australian environmental water management report</i> series (89(iii)), and is working with other NWI parties on compliance and reporting arrangements for water metering (89(i)).
		NSW has also worked with the BoM Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). NSW has applied the standard to prepare its published <i>General</i> <i>purpose water accounting report 2009–2010: Murrumbidgee.</i> The BoM has used NSW information in its pilot National Water Account (BoM 2010).
		89(ii)—The National Water Market System (NWMS) was launched in late 2010 (Australian Government 2010). The objective of the NWMS is to strengthen Australia's water market through the efficient management of improved state and territory water registers and water transactions and greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions.
		A major element of the NWMS is the development of a common registry system—a standardised national water register that will replace existing water registers in NSW, Western Australia, South Australia, Tasmania, the Northern Territory and the ACT. The existing Victorian and Queensland water registers have recently been upgraded and will be further enhanced as part of the project.
		See also the discussion on water accounting under NWI clause 82.

NWI actions	NWI clauses	Commentary
Urban water reform		
Implementation of demand management measures, including:	91	91(i)—The WELS Scheme is a joint initiative of the Australian, state and territory governments. The Commonwealth <i>Water Efficiency Labelling and Standards Act 2005</i> provides the legal framework for the scheme. NSW enacted
monitoring of WELS, including mandatory labelling and minimum standards for agreed		 complementary legislation in the <i>Water Efficiency Labelling and Standards</i> (<i>New South Wales</i>) Act 2005. 91(ii)—The Smart Approved WaterMark was established by four associations:
appliances		the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry, Australia, and the Water Services Association of Australia. It is a
Water Mark' for garden activities		not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state governments, water utilities, the
+ review effectiveness of temporary water restrictions		four governing associations and the chair of the Technical Expert Panel (an independent panel that assesses applications to the scheme).
strategies, and consider extending low-level restrictions to standard practice]	91 (iii)—NSW participated in the production of the Commission's national review of water restrictions. Water restrictions are managed by the individual water utilities, and contributed to observed reductions in residential consumption during the 2000s. The reductions were largely due to a combination of
 implement management responses to water supply and discharge system losses, including leakage, excess 		restrictions, conservation campaigns and investments in technical water-use efficiency, such as leak detection. Increases in the volumetric price for water, including through inclining block tariffs, also played a role in influencing demand. The estimated social cost of water saved through restrictions in Sydney is
maintenance needs.		91(iv)—Observed reductions in residential consumption during the 2000s were largely due to a combination of restrictions, conservation campaigns and investments in technical water-use efficiency. However, increases in the volumetric price for water also played a role in influencing demand.
		In non-metropolitan NSW, the state-wide median water usage charge was 150c/kL in 2008–09, compared to 80c/kL in 1996–97 (NOW 2010a). NSW advised that it has strong price signals and that incentives to become more water efficient have contributed to a slight reduction in the typical water supply residential bill for non-metropolitan NSW over the past 15 years.
		The proportion of residential revenue from water usage charges increased from 20% to 73% (due to more efficient water use and the strong pricing signals noted above) over that period, and there has been a 47% reduction in average annual residential water supplied since 1991.
		NSW advised that 48 local water utilities have recently carried out a reservoir drop test, waste metering or night flow analysis in order to determine their current leakage losses and to identify opportunities for leakage reduction.

NWI actions	NWI clauses	Commentary
Encourage further innovation in urban water use, including:	92	92(i), (ii) and (iii)—NSW has participated in national working groups and committees to develop the Australian guidelines for water recycling: managing
 develop and apply national health and environmental 		health and environmental risks. It has adopted the guidelines and has released interim guidelines for the management of private recycled water schemes.
guidelines for water-sensitive urban designs for recycled water and stormwater		92(i)—Water-sensitive urban design principles have been built into land-use planning guidelines in NSW, including through the BASIX scheme for development assessment. A range of guideline documents also deal with managing urban
 develop national guidelines for evaluating options for 		stormwater, including harvesting, reuse, and erosion and sediment control for a range of activities.
water-sensitive urban developments in both new urban subdivisions and high-rise		92(iii) and (iv)—NSW monitors and reviews the effectiveness of the water savings components of BASIX annually (Stormwater Trust 2006). BASIX five-year outcomes summaries report on the effectiveness of the planning system overall and integrated urban water cycle planning components in particular (BASIX 2011).
 + evaluate existing water-sensitive urban icon developments 		The NSW Metropolitan Water Independent Review Panel also reviews the
 review institutional and regulatory models for integrated 		achievement of the metropolitan water plan, including water conservation performance.
urban water cycle planning and management and develop best practice guidelines		92(iv)—In 2008, NSW undertook an independent inquiry that comprehensively reviewed institutional and regulatory models for non-metropolitan NSW, including the delivery and implementation of integrated water cycle planning
 review incentives to stimulate innovation. 		(Armstrong and Gellatly 2008). The NSW Government is still considering its response to the inquiry.
		92(v)—The NSW Best-Practice Management of Water Supply and Sewerage Management Guidelines require each non-metropolitan utility to identify the most cost-effective demand management initiatives and to subsidise and promote at least two of them (DWE 2007).
		Following the release of the 2010 Metropolitan Water Plan, the Metropolitan Water CEOs' Committee reviewed and revised the governance arrangements for future metropolitan water planning for greater Sydney and the Lower Hunter to better integrate metropolitan water, wastewater and land-use planning.

NWI actions	NWI clauses	Commentary
Community partnerships and adjustn	nent	
Open and timely consultation with all relevant stakeholders in relation to:	95	95(i)—Where water recovery activities are required in NSW, water planning provides a process for consultation with affected communities. In groundwater
 pathways for returning overallocated systems to sustainable extraction levels 		WSPs with water recovery objectives, NSW advised that significant discussion is undertaken with stakeholders and ongoing consultation occurs through written correspondence or individual enquiries to staff. In addition, NSW recently
+ periodic review of water plans		established the Achieving Sustainable Groundwater Entitlements program, which defines the rules for recovering water in groundwater systems.
+ other significant decisions affecting the security of water		95(ii)—NSW advised that it does not have processes in place for consultations with stakeholders during the periodic review of WSPs.
access entitlements.		An audit of the implementation of WSPs commenced in 2004 has been completed but is yet to be approved and released. The audit was by an audit group appointed by the Minister and recommended that, if plan amendments are required as a result of the audit, stakeholders be consulted where appropriate. NSW advised that no further action has been taken in response to those recommendations.
		95(iii)—NSW has statutory requirements for stakeholder consultation during the development of WSPs. The consultation addresses issues related to significant decisions that will affect the security of entitlement holders and sustainable water use. NSW has not advised how it deals with consultation on other issues, such as coal-seam gas.
		The 2006 Metropolitan Water Plan represented a shift in long-term sustainable water planning for greater Sydney, towards a more diversified system to secure supplies for the long term (dams, recycling, desalination and water-use efficiency). Building community understanding and support for such a major shift requires a sustained and transparent approach to community education and meaningful engagement with the people of greater Sydney. NSW advises that the Water for Life Education Program is a strong community engagement and education model for the NSW Government and plays a role in the review and implementation of the Metropolitan Water Plan.
		In developing the 2010 Metropolitan Water Plan, NOW coordinated a two-stage community consultation process to gain a better understanding of the

The first stage of the consultation consisted of a series of workshops in which the general community and key stakeholders were informed about the issues and asked to identify their priority areas and values. In the second stage of the consultation, participants were involved in discussions about the measures proposed for inclusion in the plan.

community's priorities, values and attitudes about water management, so that

they could be incorporated into decision making.

With a target of saving 24% of Sydney's water needs through water efficiency by 2015, education continues to be a core component of the Metropolitan Water Plan. Since 2004, Water for Life social marketing campaigns, water education projects and training for local government and other stakeholders have all increased community understanding and encouraged people and businesses to play their part.

NOW contributed a paper on community engagement and education for the Commission's Developing Future Directions for the Urban Water Sector project.

NWI actions	NWI clauses	Commentary
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—NSW publishes reports of reviews of water plan progress, and also provides a range of real-time water management data and information for stakeholders through online registers and databases.
		When WSPs have been suspended, information on water management has been provided to meet the needs of water users during the drought. This has included:
		+ fortnightly or monthly teleconferences with a committee of key stakeholders constituted for that purpose in each affected valley
		 regular press releases and detailed communiqués to advise on water availability and on any changed management arrangements
		+ media releases announcing the recommencement of the plans, usually at least six months before they recommenced
		+ staged recommencement of key sections of plans as climatic conditions allowed.
		Ministerial decisions to suspend WSPs are based the presence of a 'severe water shortage', but that term is not defined, leading to uncertainty for water access entitlement holders about the circumstances that might trigger a WSP suspension, or the circumstances under which the suspension would be revoked.
Address significant adjustment issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.	97	97—NSW has addressed adjustment issues in a number of water systems where water recovery activities have taken place. For example, the Achieving Sustainable Groundwater Entitlements program outlines the rules for water recovery activities under the WSPs and compensation arrangements for affected communities (NOW 2011).
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken.	101	101(i)—NOW has implemented a graduate employment program to cover water planning, implementation and science, to maintain its capacity and to allow succession planning. NSW advised that a total of 11 graduates were employed in 2009–10, and that most of them have now gained permanent ongoing employment with NOW.
to ensure the research effort is well coordinated and publicised, and any gaps are addressed.		NSW reported that capacity, expertise and knowledge remain a challenge in resourcing the implementation of national water reforms and the NSW reform and legislative agenda.
		101(ii)—NSW has not developed proposals to more effectively coordinate the national water knowledge effort. It reported that it considers that a National Water Knowledge and Research Strategy under the COAG Work Program is a prerequisite for resolving a preferred model for institutional and funding arrangements across jurisdictions and for prioritising research efforts to support NWI implementation. However, NOW has developed a draft Science Strategy aligned with legislated policy and management needs and outlining programs to address priorities for knowledge, skills and capacity.
		NSW advised that the OEH is developing the Water and Wetlands Knowledge Strategy to target key information and knowledge gaps. The Department of Primary Industries has also developed a Science Strategy.

Northern Territory

NWI actions	NWI clause	Commentary
Water access entitlements and plann	ning frameworl	K
 Implementation of the framework: + substantial completion of plans to address any existing 	26	26(i)—The NT had no commitments under 26(i), as the 1994 Water Reform Framework agreed that no territory river systems or groundwater resources were overallocated (COAG 1994).
overallocation for all river systems and groundwater		More recently, the NT has implemented a water allocation plan (WAP) to manage the fully allocated Tindall Aquifer at Katherine.
resources in accordance with commitments under the 1994 COAG Water Reform Framework		26(ii)—The NT has not implemented NWI-consistent legislation. <i>The Water Act 1992</i> (NT) currently provides the statutory basis for water licences that are issued in the territory.
 + legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this 		Under the <i>Water Act 1992</i> (NT), water licences are fully separated from land title and permanent and temporary trading of water licences is allowed, but trading is restricted to trades within water control districts.
 agreement + plans developed for the 1994 COAG framework reviewed to ensure that they meet the 		26(iii)—Before the NWI, the Ti Tree Region Water Resource Strategy 2002 was the only plan developed and declared under the 1994 COAG Water Reform Framework. It was reviewed, amended and reissued in 2008 to cater for NWI requirements.
requirements of this agreement in terms of transparency of process, reporting arrangements and risk assignment		The Alice Springs Water Resource Strategy 2006–2015 was developed under the 1994 COAG framework, but it was not declared until after the commencement of the NWI. Because of that timing, the development of this plan accounted for requirements under the NWI.
 new plans developed on a priority basis, consistent with clause 38 		26(iv)—The NT has prioritised the development of further water plans. The territory published the Tindall Limestone Aquifer Katherine WAP in 2009. WAPs for the Oolloo Dolostone Aquifer, the Daly region and the Tindall Limestone Aquifer at Maternaka are expected to be completed in 2011. WAR have
+ risk assignment framework applied.		also been drafted for groundwater resources in the Western Davenport and Great Artesian Basin water control districts.
		26(v)—See comments on NWI clauses 46-51.
Water access entitlements to be defined and implemented.	28–34	28–33—Under the <i>Water Act 1992</i> (NT), consumptive water use requires a licence. Stock and domestic use does not require a licence.
		Water licences issued under this Act consist of two separate parts. The first part specifies those matters pertinent to an entitlement, and the second part specifies those matters pertinent to water use, including compliance requirements.
		Permits for water works in surface water and groundwater resources are issued separately from water licences under the <i>Water Act 1992</i> (NT).
		The territory has not passed legislation enabling the provision of NWI-consistent water access entitlements.
		34—The NT has not applied NWI clause 34. The Department of Natural Resources, Environment, the Arts and Sport, responsible for water management, has a memorandum of understanding with the Department of Primary Industries, Fisheries and Mines to deal with water issues in mining.
		Under section 7 of the <i>Water Act 1992</i> , mining activity is exempt from all water licence and permit provisions, except for the requirement for a licence to dispose of waste underground by means of a bore outside the mining site.

NWI actions	NWI clause	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be	35	35(i) and (ii)—In the NT, water allocation planning provides statutory recognition to environmental water and the arrangements that are required to meet environmental and other public benefit outcomes identified in water plans.
defined, provided and managed.		35(iii)—Rules-based environmental water cannot be traded.
Water plans to be prepared along the lines of the characteristics and components at Schedule E based on the following priorities:	39–40	39—The NT has implemented processes for water planning that are NWI-consistent. It has prioritised the development of WAPs for those systems that are overallocated, fully allocated or approaching full allocation. The WAP for the Tindall Limestone Aquifer, Katherine, covers a fully allocated aquifer.
 plans for systems that are overallocated, fully allocated or approaching full allocation 		40(i) and (ii)—The monitoring, evaluation and adaptive management arrangements for a water plan are outlined in a schedule to the plan. There are no publicly available reports on the progress of implementing
+ plans for systems that are not yet approaching full allocation.		those arrangements.
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41–45—The NT advised that there are no overallocated systems in the territory, but that the Howard East Aquifer in the Darwin Rural Area is potentially overallocated. A WAP for that resource is currently being developed.
Substantial progress towards adjusting all overallocated and/or overused systems.		The NT Government is a partner in the Great Artesian Basin Sustainability Initiative, which will reduce water extractions in the Great Artesian Basin through bore capping, bore rehabilitation and piping.
		In its NWI Implementation Plan, the NT committed to addressing potential overallocation in the Katherine–Daly and Darwin Rural areas. The Tindall Limestone Aquifer, Katherine, WAP was declared in 2009, and the Oolloo Dolostone Aquifer, Daly Region, WAP is expected to be completed in 2011. A WAP for Berry Springs, Darwin Rural Area, is expected to be completed in 2012, and a WAP for Howard East, Darwin Rural Area, is expected to be completed in 2013.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–51—The <i>Water Act 1992</i> (NT) as amended in 2008 does not address the NWI risk assignment provisions. Currently, all risks of reduced water availability are carried, prima facie, by water extraction licence holders, subject to appeal against regulatory decisions to grant or amend licences.
		The NT advises that drafting instructions have been prepared for incorporating the risk assignment framework into the Act.
Water plans to address Indigenous water issues.	52–54	52—Water planning in the NT includes assessments for the identification and maintenance of Indigenous water values. Planning advisory groups have Indigenous membership.
		53—WAPs provide for the inclusion of native title claims.
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with water plans.	55–57	55—The NT advised that drafting instructions have been prepared for incorporating interception activities and approaches to address climate change in water planning under the <i>Water Act 1992</i> (NT), and that a territory-wide policy for forestry interception is under development.
		56—Water planners estimate volumes of water intercepted through unlicensed stock and domestic use, farm dams and forestry. There are also arrangements for monitoring growth in stock and domestic rights.
		57—See clauses 55 and 56 for more detail.

NWI actions	NWI clause	Commentary
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—The NT has developed a register of water entitlements and licences that have been granted to use and trade surface water and take groundwater. The register is managed by Controller of Water Resources and is publicly available online. The territory is working with other jurisdictions to develop a
+ pathways leading to full implementation		common registry system, which is part of the National Water Market System.
+ full implementation.		
Establish compatible institutional and regulatory arrangements that facilitate trade, including arrangements consistent with principles in Schedule G re institutional barriers to trade:	60	60—Water licences granted for a water resource that is subject to a WAP may be traded in accordance with that plan.
+ remove barriers to temporary trade		
 remove barriers to permanent trade up to an annual threshold of 4% 		
+ review impact on trade of interim threshold		
+ full removal of barriers to trade.		
Complete the following studies and consider implementation of any recommendations:	61	NWI clauses 61(i) and 61(ii) were satisfied by the <i>National Water Initiative water trading study</i> undertaken by PricewaterhouseCoopers in 2006 on behalf of the Department of the Prime Minister and Cabinet.
+ review of water products		NWI clause 61(iii) was satisfied by the Productivity Commission's 2006 report,
 new approach to sharing delivery capacity and extraction rates among users 		Rural water use and the environment: the role of market mechanisms.
+ 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.		
Southern MDB trade actions.	63	63—This clause does not apply to the NT.
Best practice water pricing and insti	tutional arrang	ements
Complete commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.	65	65—The NT has partly completed the implementation of the 1994 COAG Water Reform Framework pricing principles.

NWI actions	NWI clause	Commentary
Metropolitan:+ continued movement towards upper-bound pricing	66	66(i) and 66(v)—The NT advised that drafting instructions are in preparation to incorporate the NWI Policy Principles for recovering the costs of water planning and management activities into the <i>Water Act 1992</i> (NT). The Bill to amend the Act is avagated to be introduced to the Lagislative Accomplexies 2011.
 development of pricing policies for recycled water and stormwater 		Act is expected to be introduced to the Legislative Assembly in 2011. In 2009, the NT announced a three-year transitional pricing path that is intended to achieve lower-bound pricing by 2011–12.
 review and development of pricing policies for trade wastes 		66(ii)—The territory has not adopted pricing principles for recycled water and stormwater reuse. However, a draft pricing policy for recycled water is being developed to come into effect on 1 July 2011, subject to approvals.
 + development of national guidelines for water accounts. 		66(iii)—The current pricing policy for trade waste licensees has been in place since 2002. The NT advises that the NT Power and Water Corporation (PAWC)
Rural and regional:		intends to review pricing policies for trade waste in 2011–12.
+ Tuil cost recovery for all rural surface and groundwater based systems		66(iv)—The NT provides information and data to the <i>National performance reports</i> on water utilities, which provide comparative information on household water use.
 + continued movement towards lower-bound pricing per National Competition Council commitments 		66(v)—Through a community service obligation, the NT currently subsidises utilities' services in remote Indigenous communities through the Indigenous Essential Services Grants paid by the Department of Housing, Local Government and Regional Services. In 2010–11, funding for the grants was \$69.6 million.
 achievement of upper-bound pricing for all rural systems, where practicable. 		
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—The NT has not yet implemented this commitment. Drafting instructions are in preparation to incorporate the NWI Policy Principles for recovering the costs of water planning and management activities into the <i>Water Act 1992</i> (NT). The Bill to amend the Act is expected to be introduced into the Legislative Assembly in 2011.
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before being approved.	69	69—There has been no independent review of major water infrastructure investments in the territory since 2009, but some processes are in place. In 2010, PAWC conducted a number of studies investigating the recommissioning of Manton Dam to provide additional capacity and more diverse emergency water supplies in Darwin, Palmerston and the rural area (NWC 2011d).
Release of unallocated water.	70–72	70–72—Unallocated water is released only when part of the consumptive pool is identified in a water plan as not being granted to a water entitlement or licence. There have been no releases of unallocated water in NT water control districts since the end of 2009.
Environmental externalities managed through a range of regulatory measures.	73	73—The NT advised that water planning and management decisions are required to reflect environmental externalities to the extent that environmental and other public benefit outcomes have been rigorously and comprehensively established through planning. Limits are placed on consumptive pools through water plans to avoid, limit or control environmental externalities.
		Despite the consideration of externalities in planning, the territory does not require specific consideration of environmental externalities through the pricing of urban and regional water storage and delivery (NWC 2011d).

NWI actions	NWI clause	Commentary
Benchmarking efficient performance	75–76	75— PAWC submits benchmarking information to the <i>National performance reports</i> for urban water service providers.
 Independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies 		76—The costs of activities under NWI clause 75 are met by PAWC (NWC 2011d).
+ develop nationally consistent report framework.		
Independent pricing regulator:	77	77-The NT Government sets water prices and may seek advice from
+ independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report.		the economic regulator, the Utilities Commission, when setting them. The 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 independent reviews of PAWC's capital and asset management programs (NWC 2011d).
Integrated management of environm	nental water	
Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional	79	79(i)—The <i>Water Act 1992</i> (NT) and the <i>Lake Eyre Basin Intergovernmental Agreement Act 2009</i> provide the statutory frameworks for the management of environmental water. Those arrangements give the Minister for Natural Resources, Environment, the Arts and Sport the responsibility for management, compliance and public reporting of the delivery of environmental water.
arrangements to ensure the achievement of the environmental outcomes		79(i.b)—The territory is a signatory to a number of agreements for shared water resources, including the Lake Eyre Basin Intergovernmental Agreement 2000 and the Great Artesian Basin Agreement.
 + where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the 		79(i.c)—Surface water and groundwater are defined in the territory's Water Act, but their connectivity is not explicitly recognised in the Act. However, in practice, water plans consider that connectivity is highly likely. Some plan rules specifically address connectivity impacts.
most effective and efficient mix of water recovery measures.		79(i.d)—Consistent with the <i>Water Act 1992</i> (NT), the territory conducts compliance reporting and reviews on the delivery of environmental water. Each WAP has measures to ensure compliance with the environmental water commitments. No assessments are independent, and public reporting has been limited.
		79(i.e)—Rules-based environmental water cannot be traded.
		79(ii)—The NT advised that there are no overallocated systems in the territory and therefore no water recovery activities are required. The Howard East Aquifer in the Darwin Rural Area is considered to be potentially overallocated, and a WAP for that resource is currently being developed. The development of the water plan will assess water recovery approaches, if they are necessary.
		The NT Government is partner in the Great Artesian Basin Sustainability Initiative, which will reduce water extractions in the basin through bore capping, bore rehabilitation and piping.

NWI actions	NWI clause	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—The NT has participated in the development of national water accounting standards and reporting frameworks, including the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards.
Consolidated water accounts:	82–83	See actions associated with NWI clause 81.
+ develop and implement robust water accounting		
 identify situations where close interaction between surface water and groundwater exists 		
 implement systems to integrate the accounting of surface water and groundwater. 		
Environmental water accounting:	85	85(i)-The NT does not have general purpose environmental water accounts,
 develop an environmental water register and annual reporting 		as its environmental water is rules based. In the absence of environmental water entitlements, the territory has not developed an environmental water register.
arrangements		85(ii)—Consistent with the <i>Water Act 1992</i> (NT), each WAP includes measures
 apply the environmental water register and annual reporting arrangements. 		reporting is limited (NWC 2010b).
Implement information measures.	86	86—The NT has participated in the development of national water accounting standards and reporting frameworks, including the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards.
		The NT's WAPs detail the information required to assess their implementation.
Metering and measuring actions:	88	88—The NT has participated in the development of national water metering
+ develop metering and measuring		standards and reporting frameworks.
 + implement metering and measuring actions. 		it expects to complete its metering implementation plan in 2011.
National guidelines on water	89	89—The NT has participated in the development of national water accounting standards and reporting frameworks, including the Water Accounting Conceptual
reporting:		
+ develop national guidelines on water reporting		Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards.
 apply national guidelines on water reporting. 		The NT provides information and data to the <i>National performance reports</i> on water utilities, which provide comparative information on household water use.

NWI actions	NWI clause	Commentary
Urban water reform		
Implementation of demand management measures, including:	91	91(i)—The WELS Scheme is a joint initiative of the Australian Government and state and territory governments. The Commonwealth <i>Water Efficiency and</i>
 implementation and compliance monitoring of WELS, including mandatory labelling and 		Labelling Standards Act 2005 provides the legal framework for the scheme, and each state or territory was required to enact complementary legislation. The NT's <i>Water Efficiency and Labelling Standards Act</i> came into effect on 1 March 2011.
minimum standards for agreed appliances		91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden
+ develop and implement 'Smart Water Mark' for garden activities		not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities,
 review effectiveness of temporary water restrictions and associated public education 		the four governing associations, and the chair of the Technical Expert Panel (an independent panel that assesses applications to the scheme).
strategies, and consider extending low-level restrictions to standard practice		91(iii)—The NT participated in the National Water Commission's national review of water restrictions. The territory has no water restrictions in place, although Darwin and Alice Springs have the highest per household water consumption (NWC 2010c).
 implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. 		91(iv)—The NT is yet to implement effective management responses to water supply and discharge losses, which in the territory have increased significantly since 2006–07. The territory provides rebates to residents of Alice Springs and Tennant Creek of up to \$50 for specified water-saving products and \$500 for plumbing services.
Encourage further innovation in urban water use, including:	92	92(i), (ii), (iii)—The NT has participated in national working groups and committees to develop water quality guidelines for recycled water and
+ develop and apply national health and environmental		stormwater use, and guidelines for evaluating options for water-sensitive urban design and for evaluating existing water-sensitive urban icon developments.
guidelines for water-sensitive urban designs for recycled water and stormwater		92(iv)—I he NI has reviewed its policies for integrated urban water cycle planning. It has developed fact sheets and design manuals for water-sensitive urban design for the wet/dry tropics, which are included in lease agreements with developers
 develop national guidelines for evaluating options for water- appriitive urban developments in 		in new suburbs at Bellamack, Johnston and Zuccoli. The territory advised that it is developing guidelines for hot arid areas and that, when both sets of guidelines are completed, they will be incorporated into the NT Planning Scheme.
both new urban subdivisions and high-rise		92(v)—The NT has participated in national working groups for water-sensitive cities, which reviewed incentives to stimulate innovation.
+ evaluate existing water-sensitive urban icon developments		
 review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines 		
 review incentives to stimulate innovation. 		

NWI actions	NWI clause	Commentary
Community partnerships and adjustr	nent	
Open and timely consultation with all relevant stakeholders in relation to:	95	95(i), (ii) and (iii)—The NT water planning framework is participatory and consultative. The consultation process involves initial notification and
 pathways for returning overallocated systems to sustainable extraction levels 		consultation with the community and stakeholders, public exhibitions of draft WAPs and the use of stakeholder advisory committees. However, under the <i>Water Act 1992</i> (NT), the establishment of a community advisory committee is optional for the development of a WAP
+ periodic review of water plans		
 other significant decisions affecting the security of water access entitlements. 		
Provision of accurate and timely information to all relevant stakeholders in relation to	96	96—The <i>Water Act 1992</i> (NT) requires WAPs to be in force for not longer than 10 years and to be reviewed at intervals not longer than five years. It does not require reviews to be made available to the public.
the progress of water plan implementation and other issues relevant to the security of water access entitlements.		So far, only the Ti Tree Region WAP has been reviewed. The NT advised that the review used a transparent public process, which resulted in the amended water plan being reissued in 2008.
Address significant adjustment97issues affecting water accessentitlement holders andcommunities that may arise fromreductions in water availability as aresult of implementing the NWI.	97—The NT advised that there are no overallocated systems in the territory, but that the Howard East Aquifer in the Darwin Rural Area is considered to be potentially overallocated. A WAP for the resource is being developed and will assess water recovery approaches if they are necessary.	
		The NT Government is a partner in the Great Artesian Basin Sustainability Initiative, which will reduce water extractions in the basin through bore capping, bore rehabilitation and piping.
Knowledge and capacity building		
Identify the key science priorities to support implementation of the	101 s y	101(i)—In the NT, no specific work has been undertaken to identify key science or knowledge and capacity priorities to assist in the implementation of the NWI.
NWI and where this work is being undertaken.		101(ii)—The NT has continued to be strongly involved in a range of Australian Government and cross-jurisdictional water knowledge research programs
Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.		aimed at improving water planning, knowledge of groundwater – surface water connectivity, and water resource monitoring. New knowledge from those sources is integrated through attendance at meetings and seminars and direct presentations to water resource management staff and consequently incorporated into water management where practicable.
		In the territory there are current knowledge, skills and capacity shortfalls in environmental water requirements; Indigenous and non-Indigenous cultural water requirements; socioeconomic analyses; and wet/dry tropics hydrological modelling.

Queensland

NWI actions	NWI clauses	Commentary
Water access entitlements and plann	ning framework	ς.
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 	k: 26 J	26(i)—At the commencement of the NWI, Qld did not have any overallocated systems to address under the 1994 COAG Water Reform Framework, but gave an undertaking to the Commission to complete 23 water resource plans (WRPs) and 22 resource operations plans (ROPs). Qld has completed 22 of the WRPs, two of which are being renewed after their first 10 years (second-generation WRPs for these planning areas have been released for community consultation), and is developing a WRP for its last remaining planning area.
 COAG Water Reform Framework + legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this agreement. 		There are currently 18 ROPs in place and four under development (Baffle Creek, Mary Basin, Whitsunday and Cooper Creek). Qld expects the four ROPs currently under development to be complete by early 2012.
		26(ii)—Qld has implemented NWI-consistent legislation and policies. WRPs exist for all identified priority catchments. The plan for the remaining catchment (the Wet Tropics) is currently under development. The <i>Water Act 2000</i> (Qld) provides the statutory basis for water access entitlements in all areas whether a ROP is in place or not. Where there is not a ROP, the only type of entitlement that can be granted is a water licence to take unsupplemented water or an interim water allocation for supplemented water, both of which are attached to a land title (NWC 2009).
Water access entitlements to be defined and implemented.	28–34	28–33—The <i>Water Act 2000</i> (Qld) provides the statutory basis for NWI-consistent water access entitlements in the state.
		34—Qld reported that in most instances, the use of water associated with these industries is in accordance with NWI requirements. An exception exists where the taking of water occurs as a consequence of petroleum and gas extraction. Those operations are regulated under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> (Qld); there are further requirements under the <i>Water Act 2000</i> (Qld) and the <i>Environmental Protection Act 1994</i> (Qld). Negotiations with existing mining companies that hold rights to water under special legislation separate from the Water Act have been undertaken in some instances to transition those rights into volumetric water access entitlements consistent with other water users. Only one such special arrangement remains in operation.

35	
35	35(i) and (ii)—'Environmental water' is not explicitly defined in the <i>Water Act 2000</i> (Qld). However, statutory WRPs must include environmental flow and water allocation security objectives where water allocations are created, while statutory ROPs contain rules that achieve environmental objectives. In practice, ROPs incorporate a range of rules that are consistent with planned environmental water (NWC 2010b).
	Also, in the Qld portion of the MDB, as in other MDB states, environmental water is less secure at times of extremely low water availability. The 2008 Agreement on Murray–Darling Basin Reform (Cwth et al. 2008), states that critical human water needs are the highest priority water use for communities dependent on the water of the MDB. Consequently, during periods of extremely low water availability when there is an extreme risk of failure to supply water for critical human needs in the next 12 months, Tier 3 water sharing is triggered and the ministerial council must intervene to ensure the supply of conveyance water and the delivery of water for critical human needs. In those conditions, no priority would be given to environmental water.
	Under the proposed Schedule H of the Murray–Darling Basin Agreement, a conveyance reserve would ensure that there is enough conveyance water in any year to deliver states' critical human water needs as the first priority, then the following year's conveyance reserve, followed by state allocations in the consumptive pool and then the environment.
	35(iii)—The <i>Water Act 2000</i> (Qld) does not provide for environmental water to be held by the state as a water access entitlement. As a result, environmental water delivered by the state is rules-based, not entitlement-based, and so cannot be traded. There is nothing to prevent a person from holding a water entitlement to use for environmental benefit (even if that means they hold it so that it is not used to take any water). Tradeable water entitlements are issued for a specified purpose (for example, 'any', 'rural', 'agricultural' or 'urban'). WRPs and ROPs use a rules-based approach for delivering environmental water needs. Qld reported that this approach is preferred because it recognises that in ephemeral and irregular-flow systems, environmental needs) rather than as an annual volume. This involves the specification of rules and arrangements that service providers and other water users are required to adhere to in order to ensure that their operations do not impinge upon the achievement of environmental flow objectives.

NWI actions	NWI clauses	Commentary
Water plans to be prepared along the lines of the characteristics and components at Schedule E based on the following priorities:	39–40	39—The Qld water planning process is NWI-consistent. It includes stakeholder consultation; the application of the best available scientific knowledge; adequate opportunity for consumptive use, environmental, cultural and other public benefit issues to be identified and considered in an open and transparent way; reference
 plans for systems that are overallocated, fully allocated or approaching full allocation 		to broader regional natural resource management planning; and consideration of, and synchronisation with, cross-jurisdictional water planning. Qld has prioritised the preparation of ROPs based on risk, which includes the consideration of whether or not a system is overallocated or approaching full allocation.
 plans for systems that are not yet approaching full allocation. 		Under the <i>Cape York Peninsula Heritage Act 2007</i> (Qld), WRPs in the Cape York Peninsula region must include provision for an Indigenous water reserve to assist Indigenous people to achieve their economic and social aspirations.
		Trading of water licences separately from land is not yet facilitated in all planning areas or in all parts of planning areas. Qld advised that this is because either there is no demand for trading (particularly in remote or underdeveloped catchments) or there is insufficient information available to be able to determine rules to ensure that any such trading would not negatively affect either the environment or other water users. Its approach to water trading has been to focus on areas where the competition for water is high.
		40(i) and (ii)—WRPs and ROPs require monitoring and include provisions to change the rules of the plan in response to monitoring and new knowledge.
		40(iii)—Qld publishes a WRP annual report that indicates whether WRPs with ROPs in place are achieving their stated objectives.

NWI actions	NWI clauses	Commentary
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41—Qld did not identify any overallocated systems requiring a water plan by 2005 as part of its National Competition Council commitments, but recognised that there could be the potential for overallocation in some groundwater systems. Potential overallocation is being identified and addressed through WRP processes.
adjusting all overallocated and/or overused systems.		43—Through its water planning processes, Qld has identified several water systems that are overallocated or overused. In each case, a WRP and ROP that contain management strategies aimed at returning the system to sustainable levels of extraction have been or are being developed. The following systems have been identified as overallocated or overused:
		+ Pioneer Valley Water aquifer system (Pioneer ROP)
		+ Bundaberg Groundwater Management Area (Burnett WRP)
		+ Management Area A of the Atherton Subartesian Area (Barron WRP)
		The following systems have been identified as overallocated or overused, and management strategies (for their respective WRPs and/or ROPs) are currently under development:
		+ Callide Valley subcatchment of the Fitzroy Basin (Fitzroy Basin WRP)
		+ Condamine River and Tributary Alluvium aquifer (Condamine and Balonne WRP area)
		+ Toowoomba South Basalts Groundwater Management Unit (Condamine and Balonne WRP area).
		44—Qld has implemented specific strategies in the relevant WRPs to address groundwater overuse in the Pioneer, Burnett and Barron catchments and has prepared a draft amendment to the Fitzroy WRP to address aquifer overallocation and overuse in the Callide Valley. Qld has implemented a system of announced allocations in the Central Condamine Alluvium aquifer to progressively reduce groundwater use to a sustainable level. The development of a draft WRP amendment to deal with future groundwater management in the Central Condamine Alluvium has commenced. Qld advised that the amendment is currently being reassessed to ensure compatibility with the MDB Plan and the Australian Government agreement to 'bridge the gap' through entitlement buybacks and related measures.
		45—Adjustments to entitlements are generally based on historical usage. Qld provides assistance to farmers wishing to improve water-use efficiency through the Rural Water Use Efficiency Program (DERM 2011b). See NWI clause 97 for more detail.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—Under the <i>Water Act 2000</i> (Qld), 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 in accordance with the NWI. Qld previously stated that it would make its best endeavours to amend legislation to adopt the NWI risk assignment framework by 30 June 2009. No amendments have been made as yet.
		Qld notes that further work towards the adoption of the NWI risk assignment framework awaits clarity about how the <i>Water Act 2007</i> (Cwth) is to take effect and about its impact on the Basin Plan.

NWI actions	NWI clauses	Commentary
Water plans to address Indigenous water issues.	52–54	52—Under the <i>Water Act 2000</i> (Qld), Indigenous water values and their water requirements are determined through public consultation through a community reference panel and through specific studies into Indigenous water values as part of the water planning process. Qld reported that the recognition and protection of Indigenous cultural values are inherent in Qld's WRPs. For example, they are expressed through the following provisions:
		 general outcomes (a complementary and balanced set of responses for the sustainable management of a plan area's water resources)
		+ matters to be considered for environmental management rules
		+ restrictions on taking water from waterholes or lakes
		+ processes for dealing with unallocated water.
		These provisions appear in all recently finalised plans (e.g. Baffle and Whitsunday WRPs) and in the new draft plans (e.g. Fitzroy and Cooper Creek WRPs), as well as in older plans (e.g. Gulf WRP 2007 and Gold Coast WRP 2006).
		In the Cape York region, the <i>Cape York Peninsula Heritage Act 2007</i> (Qld) requires water to be provided to Indigenous communities for them to achieve their economic and social aspirations.
		53—Water plans are required to take into account the possible existence of native title claims to rights to water in the plan area.
		54—The holders of native title to land are recognised to have rights to take water for domestic purposes from any watercourse, lake or spring that is on the land for which they hold native title. Similarly, they are also able to take overland flow water or non-artesian groundwater for their domestic needs without the need for a water licence.
		Consistent with the requirements of the Commonwealth <i>Native Title Act 1993</i> , Qld notifies the relevant native title representative bodies about proposals to grant any new entitlement to take water, and considers any implications for native title holders before granting that entitlement.
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with water plans.	55–57	55–57—Qld recognises interception activities in the <i>Water Act 2000</i> (Qld), identifies interception risks through WRPs, and then manages them through ROPs. Water planning identifies interception activities and determines the level of risk they pose to the achievement of WRP objectives. Through this process, Qld identifies and determines risks to the water resource as a result of the capture of overland flow, plantation forestry, farm dams, mining and other unaccounted water uses.
		Qld advised that interception risks related to forestry are not considered to be significant in any Qld catchment. Qld reports that there is no evidence that forestry has any more impact on water availability than other land uses.
		Where identified interception activities are considered to be significant, water use is estimated and included in hydrological modelling.
		57—Qld has addressed specific interception issues related to overallocated systems that have been prioritised for water planning.

NWI actions	NWI clauses	Commentary
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F: + pathways leading to full	59	59—Qld has developed and implemented the Queensland Water Allocations Register, which records ownership, dealings, interests, encumbrances and the resource attributes of water allocations. It is managed by the Registrar of Water Allocations (who also acts as the Registrar of Land Titles). The register information is online and publicly available through a fee-based search (DERM 2011c).
+ full implementation.		At the national level, Qld provides its water market and trading data to the Bureau of Meteorology (BoM). The data is then published on the National Water Markets System website (Australian Government 2010).
Establish compatible institutional and regulatory arrangements	60	60—With the implementation of ROPs in Qld, barriers to trade have been progressively removed.
that facilitate trade, including arrangements consistent with principles in Schedule G re		Qld is continuing to create tradeable water allocations through the completion of ROPs. There are currently 18 ROPs in place and four under development.
institutional barriers to trade:		Qld advised that unbundling will occur only if there is sufficient information
+ remove barriers to temporary trade		(such as hydrological and ecological information) available to properly identify a water product available for trade and whether there is demand for trade. Where there is insufficient demand for trade in a plan area to warrant the expense of converting entitlements to tradeable water allocations, Qld does not propose that unbundling will occur (for example, in the Georgina Diamantina, where there are only four entitlements).
 remove barriers to permanent trade up to an annual threshold of 4% 		
+ review impact on trade of interim threshold		
+ full removal of barriers to trade.		
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the <i>National Water Initiative water trading study</i> produced by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet in June 2006 (PWC 2006).
+ review of water products		61(iii) was satisfied by the Productivity Commission report, Rural water use and
 new approach to sharing delivery capacity and extraction rates among users 		<i>the environment: the role of market mechanisms</i> , published in 2006 (PC 2006).
+ 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.		
Southern MDB trade actions.	63	This clause is not applicable to Qld.

NWI actions	NWI clauses	Commentary
Best practice water pricing and insti	tutional arrang	ements
Complete commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems	65	65—Qld has completed commitments under the 1994 COAG Water Reform Framework to bring into effect consumption-based pricing and full cost recovery of water storage and delivery services for urban entities in south-east Qld (SEQ).
		In SEQ, state bulk water entities provide bulk water via the SEQ Water Grid to council-owned water businesses. The state, through the SEQ Water Grid Manager, buys the bulk water from state entities at cost-reflective prices. The SEQ Water Grid Manager then sells the bulk water at a subsidised price (using the state's 10-year bulk water price path) to the council-owned water businesses. Qld first published its 10-year bulk water price path in May 2008.
		For two years, from 1 July 2011, the distribution and retail charges (water and sewerage, excluding trade waste and recycled water) will be capped at the CPI. The cap applies to households and small businesses. Qld advised that the CPI cap was imposed in direct response to the SEQ community seeking price relief from high water and wastewater prices. The state is also requiring the councils to implement price mitigation plans and at least a five-year price path to manage price increases after the CPI period.
		Qld reported that local governments are required to price for water and wastewater.
		In general, Qld's pricing practices are consistent with the NWI Pricing Principles in regional and rural areas. For example, for local governments outside SEQ, the <i>Local Government Act 2009</i> (Qld) sets out the framework for charging for water. The framework was developed as part of Qld's reforms in the local government sector and has been ongoing since the mid-1990s. The reforms include improvements for transparency and recovery of costs. There are many small and medium sized water providers in regional Qld. Consequently, the framework provides local governments with some discretion in their price-setting arrangements and, in particular, in relation to the rate of return on capital to be charged. The Local Government Act also requires all local governments outside SEQ to implement consumption-based pricing.

NWI actions	NWI clauses	Commentary
Metropolitan:	66	66(i)—The rate of return on water infrastructure assets constructed during the
+ continued movement towards upper-bound pricing		drought (such as the Gold Coast desalination plant and the Western Corridor Recycled Water Scheme) recovers only the cost of debt (NWC 2011d).
 development of pricing policies for recycled water and stormwater 		66(ii) and (iii)—For local governments outside SEQ, the <i>Local Government</i> <i>Act 2009</i> (Qld) sets out the framework for charging for water. The framework was developed to improve cost transparency and the recovery of costs for the many small and medium sized water providers in regional Qld. It gives local
+ review and development of pricing policies for trade wastes		governments some discretion about their price-setting arrangements and, in particular, in relation to the rate of return on capital to be charged. The Local
+ development of national guidelines for water accounts.		Government Act requires all local governments outside SEQ to implement consumption-based pricing. Inside SEQ, the Queensland Competition Authority (QCA) undertakes price monitoring for all water sources
Rural and regional:		Old is a signatory to the NMI Pricing Principles, which provide broad policy guidance.
+ full cost recovery for all rural surface and groundwater based		to stimulate efficient water use by service providers, including where the service providers incorporate recycled water and stormwater as source water.
 + continued movement towards lower-bound pricing per National Compatition Council 		66(iv)—The National Guidelines for Residential Customers' Water Accounts were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian and state and territory water ministers (NRMMC 2006).
 + achievement of upper-bound pricing for all rural systems, where practicable. 		66 (v)—The SunWater price path for the period from 1 July 2006 to 30 June 2011 was determined as a result of negotiations between SunWater and its rural irrigation customers under the overall policy framework set by the Qld Government. The policy framework broadly continued to transition schemes to recover their efficient lower-bound costs (based on 2005–06 costs). For those schemes already above lower bound, the government did not charge an additional rate of return on capital. All new capital investment was to include a commercial return.
		On 19 March 2010, the Qld Government announced that the QCA would provide an independent recommendation to the government on rural irrigation water prices to apply to specified SunWater water supply schemes for the next price path, from 1 July 2011 to 30 June 2016. On 30 May 2011, recognising that the QCA required more time to develop its draft advice and prices, the Qld Government announced that the next price path would commence on 1 July 2012 and run until 30 June 2017.
		Qld advised that the intent is that any future price shocks should be moderated and transitioned to recover SunWater's efficient operating, maintenance and administration costs and refurbishment costs to ensure the utility's financial viability. Prices are to exclude any rate of return on existing rural irrigation assets unless current prices are already above the level required to recover lower-bound costs.
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—In 2006, Qld introduced new state-wide water planning and management charges, which were subsequently suspended in March 2006. Since the suspension, the government's position is that decisions on new water planning and management charges will be made only after a national picture of water pricing emerges.
		Qld currently levies water planning and management charges on water taken in water management areas (WMAs) and groundwater management areas declared by the Department of Environment and Resource Management (DERM). Under the Queensland State Metering Policy, meter service charges are also levied (DERM 2005).

NWI actions	NWI clauses	Commentary
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before being approved.	69	69—Recent large-scale water supply augmentation investments in SEQ operate on a rate of return sufficient to recover only the cost of debt. Under the <i>Guidelines for financial and economic evaluation of new water infrastructure in Queensland</i> , new water infrastructure investments should only proceed if they can be demonstrated to be economically viable and ecologically sustainable (Queensland Government 2000).
Release of unallocated water.	70–72	70–72—Unallocated water available to be granted under a water entitlement for consumptive use is identified through the water planning process. WRPs and ROPs identify the quantity and location of unallocated water available, the process for releasing unallocated water from a reserve, and the forms in which it may be available for purchase (i.e. water allocation or water licences).
Environmental externalities managed through a range of regulatory measures.	73	73—Qld manages environmental externalities by setting extraction limits in WRPs and by ensuring that applicants for unallocated water for irrigation use complete a land and water management plan.
		Where costs are incurred by water providers in addressing environmental externalities as a result of their activities, those costs are incorporated into the fees paid by irrigators for the supply of irrigation water.
 Benchmarking efficient performance: + independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies 	75–76	75–76—Qld has provided benchmarking information and data to the <i>National performance reports</i> on urban and rural water utilities since the first such report. It is an active participant in the national roundtable groups that advise the Commission on the reporting process. Before the publication of the current reports, Qld water service providers participated in the Water Services Association of Australia <i>WSAA facts</i> and <i>Australian non-major urban water utilities</i> reports.
+ develop nationally consistent report framework.		
 Independent pricing regulator: + independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report. 	77	77—In Qld, there has been institutional separation of water resource management, standard setting and regulatory enforcement roles from service provision roles since 1999. The QCA investigates pricing and undertakes monitoring on matters referred to it by the relevant ministers (NWC 2011d). The authority has been directed to conduct an independent review and to recommend rural irrigation water prices for SunWater's new rural irrigation price path to apply from 1 July 2012 to 30 June 2017. The Qld Government will make the final decision on irrigation prices for SunWater's new price path based on the recommendation from the QCA.
		In addition, Qld is developing regulatory oversight arrangements for bulk, distribution and retail entities as part of the reform process in SEQ (NWC 2011d). Commencing in 2011–12, the QCA will recommend grid service charges for state bulk water entities in SEQ. The QCA has a price monitoring role for the council-owned distributor–retailers in SEQ.

NWI actions	NWI clauses	Commentary
Integrated management of environme	ental water	
 Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional arrangements to ensure the achievement of the 	79	79(i) a)—Qld's <i>Water Act 2000, Environmental Protection Act 1994</i> and <i>Lake Eyre Basin Agreement Act 2001</i> provide the statutory basis for environmental water managers and the provision of environmental water as rules-based flows. Those arrangements give the Qld Minister for Finance, Natural Resources and the Arts and the Minister for Environment responsibility for the delivery of environmental water, and DERM the responsibility for managing environmental water (NWC 2010b).
 + where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the most effective and efficient mix of water recovery measures. 		 79(i) b)—For shared water resources, Qld has arrangements with a number of other NWI parties, including through the: + Water (Commonwealth Powers) Act 2008 (Qld)
		 + Lake Eyre Basin Intergovernmental Agreement Act 2001. + National Partnership Agreement on the Great Artesian Basin Sustainability Initiative
		+ NSW-Queensland Border Rivers Intergovernmental Agreement 2008
		+ Murray–Darling Basin Agreement (Cwth et al. 2008).
		79(i) c)—Qld is progressively addressing surface water – groundwater connectivity through WRPs. It has completed a state-wide risk assessment of the impacts of groundwater extraction on surface water flows. For identified high-risk priority

areas, responses include immediate intervention (such as a moratorium), as well as the setting up of long-term management frameworks through the water planning process. During planning, individual catchments and groundwater management areas are assessed for connectivity, which is then quantified through modelling. Groundwater allocation and management strategies, including water allocation security objectives and environmental flow objectives, are then defined taking the connectivity into account. An enhanced level of groundwater management has been developed in the Burnett (Bundaberg), Fitzroy (Isaac Connors and Callide), Pioneer and Logan (Southern Moreton Bay Islands) plan areas where connectivity has been determined to be high.

79(i) d)—Qld has a number of reporting requirements for the achievement of environmental and other public benefit outcomes in water plans, including the following:

- + Resource operations licence operators, such as SunWater, report to DERM on their adherence to the rules outlined in ROPs. The reports are not published.
- + The Minister prepares annual reports on the implementation of all WRPs. The reports are publicly available.
- + Qld has begun to produce general purpose water accounts that disclose information about water delivered for environmental benefit.
- + Near real-time data from DERM's network of hydrological monitoring sites across the state is publicly available.
- + Whether WRPs are achieving their planned environmental outcomes is assessed at years 8 to 10 of the 10-year water planning cycle under the Environmental Flows Assessment Program. The report is published.

79(i) e)—In Qld, environmental water held by the government is rules-based and cannot be traded on the water market. There are no restrictions on the trading of privately held water access entitlements that are used for environmental watering.

NWI actions	NWI clauses	Commentary
	79 continued	79(i) f)—The draft national high ecological value aquatic ecosystems (HEVAE) framework has not been adopted in Qld, but has been trialled in the Lake Eyre Basin, three Gulf catchments and the MDB. Qld has its own policy approaches for the identification of HEVAEs. It uses the AquaBamm method to identify high ecological value waters under the Environmental (Water) Protection Policy 2009 as part of water planning under the <i>Water Act 2000</i> (Qld). The use of AquaBamm, which in general aligns with the principles and criteria of the HEVAE framework, has resulted in HEVAEs being identified in each of the 21 finalised WRPs.
		79(ii) b)— A WRP is developed based on information provided by socioeconomic, environmental and hydrologic technical assessments in addition to information and feedback gathered through community consultation.
		The socioeconomic assessment is usually undertaken to provide a baseline assessment of the economic and social condition of the plan area and trends in economic growth and community water needs (based on data from the Australian Bureau of Statistics, population forecast data and agricultural outlook data from ABARES).
		In those areas where cutbacks are necessary, the socioeconomic assessments are used to inform the approach taken to achieve the necessary reductions, including transitional arrangements and complementary arrangements associated with the Rural Water Use Efficiency Initiative.
		DERM also prepares regional water supply strategies in areas of the state that will experience future high levels of demand for water. Detailed socioeconomic analyses (e.g. cost-benefit analyses of water infrastructure and capacity-to-pay assessments) contribute towards the development of a regional water supply strategy. The socioeconomic assessment, along with the strategy, is considered in developing the draft WRP and WRP socioeconomic assessments.
Water resource accounting		
Benchmarking of accounting systems.	81	81—Qld has participated in the development of a range of national water accounting standards and reporting frameworks, including:
		 the Water Accounting Conceptual Framework, general purpose water accounting reports, the Preliminary Australian Water Accounting Standards and the exposure draft of the Australian Water Accounting Standards.
		+ national performance reporting of urban and rural water service providers (81(ii), (iii))
		+ a number of online databases and registers for the management of water resources in Qld. See NWI clause 59 for more detail (81(i), (iv)).
Consolidated water accounts: + develop and implement robust water accounting	82–83	82—Qld prepared the Pioneer Valley Water Account for 2008–09 in accordance with the Preliminary Australian Water Accounting Standards. The exposure draft of Australian Water Accounting Standard 1 will be used for the 2009–10 financial year to prepare state water accounts for Pioneer Valley and south-east Qld (SEQ). They are
 identify situations where close interaction between surface water and groundwater exists 		available on the DERM website as part of the annual report on WRPs (DERM 2011a). Contextual information, data and disclosure notes for SEQ have been provided to the
 implement systems to integrate the accounting of surface water and groundwater. 	BoM for the National Water Account 2010 SEQ subaccount in accordance with the ED AWAS1. Qld has not yet formally adopted the proposed Australian Water Accounting Standards. It advised that it is undertaking water accounting as part of its contribution to the development of robust water resource accounting policy and practices.	
		Qld advised that policy is currently under development for future arrangements for water accounts.
		83—Qld's water accounting systems recognise connectivity between groundwater and surface water systems.

NWI actions	NWI clauses	Commentary
 Environmental water accounting: + develop an environmental water register and annual reporting arrangements 	85	85(i)—Qld does not have a compatible register of new and existing environmental water. The Qld Government provides environmental water only as rules-based flows, not as volumetric water access entitlements. Privately held environmental water in the form of a water access entitlement is not required to be identified separately in the Water Allocations Register (NWC 2010b).
 apply the environmental water register and annual reporting arrangements. 		85(ii)—Qld does not produce consolidated environmental water accounts, but has a range of reporting requirements related to the implementation of ROPs and the achievement of environmental and other public benefit outcomes from environmental water. See NWI clause 79(i)(d) for more information.
Implement information measures.	86	86—Qld has participated with other NWI parties and the BoM in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act 2007</i> (Cwth), the BoM has been mandated to perform a national water data and information role.
 Metering and measuring actions: + develop metering and measuring actions + implement metering and measuring actions. 	88	88—Qld has a State Implementation Plan for Non-Urban Water Metering in place. The plan was developed in accordance with the national metering standards required under the NWI. It outlines how the metering program will be implemented, the implementation timeframes and the priority areas to be metered (DERM 2010). Meter testing facilities for pattern approval are not yet available in Australia, but Qld is monitoring this closely.
		In Qld, approximately 10 500 entitlements may require meter installation. Current state funding will enable around 2900 meters to be installed during the four-year work program. Those numbers will be refined after site assessments and further analysis of high-priority areas across the state. DERM was provided with \$3.3 million of state funding over four years to install water meters on non-urban properties across the state.
		Further metering will depend on the availability of funding and regional priorities. Qld has submitted the implementation plan to the Australian Government.
 National guidelines on water reporting: + develop national guidelines on water reporting + apply national guidelines on 	89	89—Qld has participated in the development of a range of national reporting requirements for water management. It is working with other NWI parties on compliance and reporting arrangements for water metering (clause 89(i)), and provides data and information for the production of the <i>Australian water markets reports</i> (clause 89(ii)) and the <i>Australian environmental water management reports</i> (clause 89(iii)).
water reporting.		Qld has also worked with the BoM Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). The BoM has used Qld information in its pilot National Water Account and the first National Water Account 2010 (BoM 2010).
		89(ii)—The National Water Market System (NWMS) was launched in late 2010. The objective of the NWMS is to strengthen Australia's water market through the efficient management of improved state and territory water registers and water transactions and the greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions. The Qld Water Register has recently been upgraded and will be further enhanced as part of the project. Qld has developed its own water registration system, but is committed to working collaboratively with the Australian Government to ensure compliance with key NWMS requirements.
NWI actions	NWI clauses	Commentary
---	-------------	--
Urban water reform		
Implementation of demand management measures, including: + implementation and compliance	91	91 (i)—The WELS Scheme is a joint initiative of the Australian Government and state and territory governments. The Commonwealth <i>Water Efficiency and Labelling Standards Act 2005</i> provides the legal framework for the scheme. Each state or territory was required to enact complementary legislation. The Old <i>Water Efficiency</i>
monitoring of WELS, including mandatory labelling and minimum standards for agreed appliances		and Labelling Standards Act 2005 came into effect on 10 April 2006. 91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry,
 + develop and implement 'Smart Water Mark' for garden activities + review effectiveness of 		Australia, and the Water Services Association of Australia. It is a not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities, the four governing associations, and the chair of the Technical Expert Panel (an independent panel
temporary water restrictions		that assesses applications to the scheme).
strategies, and consider extending low-level restrictions to standard practice	on Is	91(iii)—The Queensland Water Commission is reviewing its permanent water conservation measures in the light of changed climatic conditions and is developing a region-wide drought response plan to expand on the framework in the SEQ Water Strategy.
+ implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs.		Qld has continued to support water service providers to promote water efficiency through the continued development and implementation of a range of Waterwise products and programs, including the Waterwise schools program, posters for councils to use in school education, gardening information, the Waterwise Plant Selector, and water education workshops. In addition, Qld advised that it monitors attitudes and behaviours in relation to the efficient use of water through a six-monthly online panel survey and through regular focus groups among the general community. The research has been conducted throughout Qld and shows continued support for conserving water and water-saving behaviours. Qualitative research is consistent with those results, but shows some regional variation where water is considered to be plentiful.
		91(iv)—In SEQ, implemented programs have achieved significant reductions in losses and are ongoing, as required in statutory instruments. Water grid data is also being reviewed to develop better methodologies for identifying how and where losses occur.
		The Qld-funded Urban Water Security Research Alliance has been carrying out research into system leakage and real-time water quality monitoring as a way to monitor breaches of trade waste regulations or illegal dumping into sewerage systems.
		Qld has implemented legislation to ensure that water service providers provide more regular comparative data about household water usage on water bills and water advice notices to tenants. That information will help to better identify possible leakages where significant and unaccountable increases in household water usage have occurred.
		Qld has also developed legislation to require each water service provider to have an approved system leakage management plan directed at minimising water

an approved system leakage management plan directed at minimising water losses from leakage from the provider's distribution system. The plans must state the details of measures the provider will take to reduce leakage, including a leakage reduction program. Leakage may be caused by a number of problems, such as excess pressure and poor maintenance. Qld has recently deferred the date for outstanding system leakage management plans by retail and drinking water service providers outside SEQ until July 2013; however, any existing plans previously approved by the regulator remain in place and must be complied with.

NWI actions	NWI clauses	Commentary
Encourage further innovation in urban water use, including:	92	92(i), (ii), (iii)—Qld has participated in national working groups and committees to develop the <i>Australian guidelines for water recycling</i> , and has applied them through the <i>Water Supply (Safety and Reliability) Act 2008</i> (Qld). To evaluate options for water-sensitive urban design projects and existing ICON water-sensitive urban design developments, Qld has developed the <i>Guidelines for evaluating urban water sensitive design and ICON water sensitive urban developments</i> and developed the <i>Water sensitive future handbook</i> , which is designed to help water managers take a more holistic planning approach to urban water challenges.
+ develop and apply national health and environmental guidelines for water-sensitive urban designs for recycled water and stormwater		
 + develop national guidelines for evaluating options for water- sensitive urban developments in both new urban subdivisions and high-rise 		In addition, all local governments in Qld are required to prepare total water cycle management plans that consider all elements of the water cycle to deliver the community's needs and aspirations for water in a way that optimises social and environmental benefits and minimises costs. In SEQ, there is also a requirement for subregional total water cycle management plans for key growth areas.
+ evaluate existing water-sensitive urban icon developments		Guidelines developed for the plans recognise interactions with other planning processes, such as water-sensitive urban design.
 review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines 		92(iv)—Qld has undertaken a range of reviews on the appropriate institutional and regulatory models to address the challenges of providing safe and reliable water services to communities. The reviews have resulted in ongoing institutional change in the SEQ water industry since 2005–06. Those reforms have resulted in the establishment of the SEQ Water Grid to secure supply, the streamlining of SEQ
 review incentives to stimulate innovation. 		water industry operations through modernised management, a rationalisation of the number of organisations involved in managing and distributing water supplies in the SEQ Water Grid (from 21 entities to six), and the streamlining of ownership arrangements for water and wastewater supply through the development of consistent service standards throughout SEQ, enhanced staff technical expertise and optimised network planning.

92(v)—Qld has developed the Cleantech Strategy and associated funding programs, including the Cleantech Industry Pipeline as well as sustainable industries programs, with funds through ecoBIZ and the Queensland Sustainable Energy Innovation Fund to help fund the commercial development of innovative products.

The Qld Government funded Urban Water Security Research Alliance has conducted research and is now completing a report on the water savings achieved by installing plumbed-in water tanks. The analysis compares those houses with Independent Pricing Tribunal and those without. The data demonstrates that there have been significant water savings per household per year in SEQ.

NWI actions	NWI clauses	Commentary
Community partnerships and adjustr	nent	
 Open and timely consultation with all relevant stakeholders in relation to: + pathways for returning overallocated systems to sustainable extraction levels 	95	95(i)—Where water recovery is required, the water planning process in Qld provides for consultation with affected communities. The development of WRPs and ROPs involves extensive consultations with expert and community reference panels, community meetings and the publication of draft plans. Industry and community adjustment issues are closely considered in the finalisation of resource plans.
+ periodic review of water plans		95(ii)—See NWI clause 79(i)(d).
+ other significant decisions affecting the security of water access entitlements.		95(iii)—QId advised that the way the water planning framework in QId is designed (and set out in the state's <i>Water Act 2000</i>) means that once a WRP and/or a ROP is in place decisions about the sustainable management of water resources must be consistent with the plans. If there is a decision under consideration that is potentially inconsistent with the plans, either:
		+ the decision under consideration must be modified so that it is consistent with the plans
		or
		+ if the decision has potential social, economic or environmental benefits, a process must be undertaken for proposing amendments to the plans in order for the decision to be made (these types of amendments can only proceed after extensive community consultation has occurred, as per the process set out in the Qld <i>Water Act 2000</i>).
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—A public annual report summarises the implementation of the state's WRPs and assesses the effectiveness of their implementation, through the ROPs, in achieving the general and specific ecological outcomes of the plans. This includes whether each plan's objectives are continuing to promote ecologically sustainable development. For each WRP, the report includes information about changes to the plan; the number of water entitlements; water use; water operations (including the impact of storage operations on downstream ecosystems); research and monitoring under the plan; and emerging compliance and operational issues. The document reports on all WRPs across the state that have a ROP in place. In 2008–09, the Cooper Creek WRP was also included, although it does not require a ROP.
		In some water plan areas, some stakeholders are concerned that monitoring data provided by mining companies is not publicly available.
Address significant adjustment issues affecting water access entitlement holders and communities that may arise from	97	97—In the development of WRPs and ROPs, Qld consults extensively with expert and community reference panels, holds community meetings and publishes draft water plans. Industry and community adjustment issues are closely considered in the finalisation of ROPs.
reductions in water availability as a result of implementing the NWI.		Assistance is provided to water access entitlement holders for water recovery activities through rural water-use efficiency initiatives (DERM 2011b).

NWI actions	NWI clauses	Commentary
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken. Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.	101	 101(i)—DERM manages and participates in initiatives to identify priority areas for building and maintaining knowledge, skills and capacity. The current Capability and Capacity Project identified a number of policy and technical skill areas as priority areas over the next three to five years. DERM's dedicated training and development team has developed a training program to match the priority areas. Its Water Fundamentals program covers a broad range of water-related themes to develop skills and capacity among its staff. 101(ii)—DERM's Science Strategy provides a framework for managing and prioritising water science in Qld. Key areas of research activity in Qld are: + environmental water, for which the effort in SEQ is led by the Healthy Waterways Partnership + urban water research coordinated by the government-funded Urban Water Security Research Alliance, which has addressed a number of knowledge and management gaps in relation to traditional alterative urban water supplies. The Qld Government has been managing the Healthy Headwaters Study, which is funded by the Australian Government, to examine opportunities and risks associated with the use of treated coal-seam cas water to assist in transitioning.
		irrigation communities to lower water use and securing the viability of ecological assets within the Qld MDB.

South Australia

NWI actions	NWI clauses	Commentary
Water access entitlements and plann	ing framework	ς.
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework 	26	26(i)—At the commencement of the NWI, SA identified six areas where a water allocation plan (WAP) was required in order to complete the state's remaining commitments on overallocated systems under the 1994 COAG Water Reform Framework (COAG 1994). Of the six areas, four now have WAPs, the consultation for one draft WAP has been completed (Western Mount Lofty Ranges) and one draft plan is out for consultation (Eastern Mount Lofty Ranges). SA reported that scientific investigations and community engagement and consultation have extended the timeframes for completing the plans.
+ legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this agreement.		Under the <i>Natural Resources Management Act 2004</i> (SA), a water resource is prescribed when it is considered to be at risk or potentially at risk from current or future development. Prescription triggers the development of NWI-consistent WAPs. Twenty-seven water systems in SA are prescribed, of which 24 are or will be covered by a WAP. The remaining three prescribed areas are managed under a separate regulation for the purposes of salt production. There are currently 20 WAPs in SA.
		26(ii)—SA has implemented NWI-consistent legislation. The Natural Resources Management Act provides the statutory basis for water access entitlements. It has only been applied to the unbundling of water licences in the SA River Murray Prescribed Water Course (PWC). SA has a program for unbundling water licences in other priority areas, including the Peake, Roby and Sherlock Prescribed Wells Area (PWA), the Mallee PWA and the Noora PWA(DFW 2011).
		With the exception of the River Murray PWC, water licences for all prescribed resources remain bundled, but are separate from land and tradeable under the Natural Resources Management Act.
Water access entitlements to be defined and implemented.	28–34	28–33—The <i>Natural Resources Management Act 2004</i> (SA) provides the statutory basis for NWI-consistent water access entitlements in SA (NWC 2009).
		SA advised that it can establish licences for environmental water and that licences currently exist for the regulated River Murray. However, in most prescribed water resources water is set aside as environmental water to be retained in the system, outside the consumptive pool (planned environmental water).
		34—The extraction of groundwater through petroleum wells (as 'co-produced' water) can be licensed. This occurs in the Far North PWA, where oil and gas production is concentrated. Under provisions in the Far North PWA WAP, a licence and allocation of 60 ML per day has been issued to the Minister for Mineral Resources Development. This allocation covers all co-produced water, the production of which is reported by individual companies to that Minister under requirements in the <i>Petroleum and Geothermal Act 2000</i> (SA).
		Mining operations that occur in a prescribed water resource area require a licence (with allocation and volume specifications) managed under the Natural Resources Management Act, unless exempted or authorised separately by the Minister. In SA, mining operations can occur in a non-prescribed area and do not require a licence. The reporting of water extraction volumes may be requested through the mining and rehabilitation plan approval process under the <i>Mining Act 1971</i> (SA). Indentures also operate outside water planning mechanisms. They are uncommon, and steps are being taken to bring mining operations within planning structures as water plans are developed.

NWI actions	NWI clauses	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35—In SA, licensed environmental water (water within the consumptive pool) has the same level of security as water access entitlements for consumptive use. The security of planned environmental water (water outside the consumptive pool) may or may not be the same. This is dependent on the rules in the WAP for determining the consumptive pool from time to time, particularly the response to variability in water availability,
		The water required to meet environmental objectives set in a statutory WAP has a statutory basis through the plan, regardless of whether the water is planned or licensed environmental water. However, in the SA portion of the MDB, as in other MDB states, environmental water is less secure at times of extremely low water availability. The 2008 Agreement on Murray–Darling Basin Reform (Cwth et al. 2008) states that critical human water needs are the highest priority for communities dependent on the water of the MDB. Consequently, during periods of extremely low water availability when there is an extreme risk of failure to supply water for critical human needs in the next 12 months, Tier 3 water sharing is triggered and the ministerial council must intervene to ensure the supply of conveyance water and the delivery of water for critical human needs. In those circumstances, no priority would be given to environmental water.
		In SA, other types of environmental water, including water held under programs such as The Living Murray and the Commonwealth Environmental Water Holder, also have the same level of security as water for consumptive uses, but are also subject to the critical human water requirements of the 2008 Agreement on Murray–Darling Basin Reform.
		35(iii)—Environmental water takes two forms in SA. Planned environmental water is water set aside outside of the consumptive pool established within a WAP. Licensed environmental water is set within the consumptive pool established in a WAP and is statute based.
		Only licensed environmental water is tradeable in SA. It can be traded on a temporary or permanent basis, subject to provisions in the relevant WAP.
Water plans to be prepared along the lines of the characteristics and components at Schedule E based	39–40	39—SA has implemented a water planning process that is NWI-consistent. The development of a WAP is triggered when the water resource is prescribed. See clause 26(i) for details on progress.
 on the following priorities: + plans for systems that are overallocated, fully allocated or approaching full allocation 		40—SA's State Natural Resources Management Plan sets out the state's monitoring and evaluation framework, which is consistent with the National Monitoring and Evaluation Framework (DLWBC 2006). NRM boards produce annual reports that provide a general update on progress in WAP development or implementation as part of a broader regional NRM plan.
yet approaching full allocation.		Under the <i>Natural Resources Management Act 2004</i> (SA), WAPs must be formally reviewed at least once during each five-year period from the date of adoption. 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 (NWC 2009).
		The Department for Water is developing a methodology to assess the effectiveness of WAPs using a monitoring, evaluation, reporting and improvement framework.

NWI actions	NWI clauses	Commentary
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41—SA identified 15 stressed water systems to be addressed by 2005 under National Competition Council commitments. Water allocation plans were completed for all 15 systems by 2002, and a 16th plan by 2003. SA continued to identify stressed systems for prescription (see clause 26(i) for details of progress).
adjusting all overallocated and/or overused systems.		43–44—Pathways for water recovery to address overallocation and/or overuse are being incorporated into recent WAPs to achieve environmental and public benefit outcomes.
		Through its water planning processes, SA has begun the implementation of a range of mechanisms to return overallocated and/or overused systems to sustainable levels of extraction. The pathways include reductions in licensed use, schemes set out in separate regulations to reduce unlicensed use, and water recovery through irrigation efficiencies (such as bore capping and rehabilitation). SA also employs management mechanisms such as moratoriums on new allocations, groundwater and surface water monitoring, and limits on interception activities.
		There is currently no specific reporting of the achievement of sustainable levels of extraction.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–51—SA has adopted an alternative risk assignment framework, as per NWI clause 51. The <i>Natural Resources Management Act 2004</i> (SA) enables the Minister to make reductions to water licences under certain circumstances, primarily when a WAP is revised and less water is available for consumptive use under the revised plan. Licences can be altered to be consistent with the current WAP.
Water plans to address Indigenous water issues.	52–54	52–54—The SA water allocation planning framework engages Indigenous communities, along with other stakeholders, to identify their water values and requirements through the WAP consultation process.
		SA has authorised water to be taken for native title purposes in the Western Mount Lofty Ranges Prescribed Water Area under section 128 of the <i>Natural Resources</i> <i>Management Act 2004</i> (SA). This provides for the taking of water for the purpose of satisfying personal, domestic, cultural, spiritual or non-commercial communal needs and occurs in the exercise or enjoyment of native title rights and interests. The taking of water in those circumstances must not involve stopping, impeding or diverting the flow for those purposes. SA is considering potential approaches for other prescribed water resources.

NWI actions	NWI clauses	Commentary
Implementation of measures to address water interception by	55–57	55–57—SA recognises that some land uses have the potential to intercept water resources and has implemented policies to address interception activities.
land-use change activities on a priority basis in accordance with water plans.		In 2009, SA adopted a state-wide policy framework for managing the water resource impacts of plantation forests (DLWBC-DPI 2009). The framework provides a decision-support tool to assist water resource managers in determining the best option to manage plantation forestry impacts in a specific set of circumstances. It recommends that a forest water licensing mechanism be included in the <i>Natural Resources Management Act 2004</i> (SA) to provide an additional tool for managing impacts in areas of significant interception.
		Currently, permit approvals are required in areas where the interception impacts of forestry expansion are an issue for water resources management, including the south-east, the Mount Lofty Ranges and Kangaroo Island. This system complements the existing licensing system for other users and is included in a Bill introduced to parliament in 2010. SA advises that the Bill will be considered during 2011.
		The impacts of dams and bores can be managed in non-prescribed water resources under the policy for managing water-affecting activities, which can be included in natural resource management plans. Where a surface water system is prescribed, the impacts of dams are accounted for in water allocation planning. Stock and domestic water is taken into account, but impacts are usually estimated, whereas other diversions and extractions are metered if possible or otherwise estimated through land-use and water-use surveys and modelling.
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—In SA, water access entitlements and water trades are registered and administered through the Water Information and Licensing Management Application, which records information about water access entitlements, allocations, site use approvals, work approvals and usage, and is managed
+ pathways leading to full implementation		by the Department for Water. Information about those instruments is available through the South Australian Natural Resources Management Register, which is public and available online.
+ full implementation.		
Establish compatible institutional and regulatory arrangements that facilitate trade, including arrangements consistent with principles in Schedule G re institutional barriers to trade:	60	60(iv)—The 4% limit, or any other limit on trade out of an irrigation district, is not applied in SA. The <i>Irrigation Act 2009</i> (SA) and the <i>Renmark Irrigation Act 2009</i> (SA) provide that an irrigation trust is not able to restrict permanent trades of water out of its network and must facilitate trade both in and out of a trust network at the request of its members in accordance with the <i>Water Act 2007</i> (Cwth).
+ remove barriers to temporary trade		
 remove barriers to permanent trade up to an annual threshold of 4% 		
+ review impact on trade of interim threshold		
+ full removal of barriers to trade.		

NWI actions	NWI clauses	Commentary
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+ review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, <i>Rural water</i>
 new approach to sharing delivery capacity and extraction rates among users 		use and the environment: the role of market mechanisms (PC 2006).
+ 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.		
Relevant parties (Commonwealth, NSW, Vic. and SA) agree to:	63	63(i) and 63(ii)—Interstate entitlement trade using tagging is available; however, in 2009–10 only one tag was established (from NSW to SA). Interstate allocation trade is active between the various espected trading appear in NSW Via
 take necessary steps to enable the use of exchange rates and/ or tagging for interstate trade 		SA. In 2009–10, 274 634 ML was traded into SA and 22 099 was traded out (NWC 2010b).
 reduce barriers to trade in southern MDB and establish an interim limit on permanent trade out of water irrigation areas of 4% per annum 		The 4% limit, or any other limit on trade out of an irrigation district, is not applied in SA. The <i>Irrigation Act 2009</i> (SA) and the <i>Renmark Irrigation Act 2009</i> (SA) provide that an irrigation trust is not able to restrict permanent trades of water out of its network and must facilitate trade both in and out of a trust network at the request of its members in accordance with the <i>Water Act 2007</i> (Cwth).
 + NSW make legislative changes to remove barriers and permit increased trade up to the interim limit 		63(iii), (iv), (v), (vi), (vii)—The National Water Commission has coordinated a number of reviews and evaluations of the effectiveness of the Australian water market. For example, 63(vi) is specifically addressed by the Commission's 2007 and 2010 <i>Impacts of trade</i> reports, and 63(vii) is considered to have been satisfied by the 2009 biennial assessment.
 Vic. and SA make change to remove barriers and permit increased trade up to the interim limit 		63(iii)—The Commonwealth Water Charge (Termination Fees) Rules 2009 were developed to help minimise barriers to water entitlement trading in the MDB while maintaining the financial viability of irrigation infrastructure operators. The termination fee rules commenced on 23 June 2009. Most provisions
 review actions to assess whether relevant parties have removed barriers to achieve interim limit 		did not come into full effect until 1 September 2010.
 study into mechanisms necessary to enable interstate trade 		
+ review outcome of actions by NSW		
+ NWC monitor impacts of interstate trade		
+ review the impact on trade under the interim threshold.		

NWI actions	NWI clauses	Commentary	
Best practice water pricing and institutional arrangements			
Complete commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban	65	65(i)—SA has implemented consumption-based pricing in rural and urban systems.65(ii) and (iii)—See discussion below.	
Systems Metropolitan:	66	66/i)SA Water prices consist of a fixed (supply) charge and a volumetric	
 + continued movement towards upper-bound pricing 	00	(water usage) price, which rises with consumption under a three-tier inclining block structure. The usage charges take into account long-run marginal costs, which SA regards as being in line with the NWI Pricing Principles. The proposed	
 development of pricing policies for recycled water and stormwater 		first tier for 2011–12 brings prices closer to long-run marginal costs. The second tier is set at the upper limit of SA Water's estimate of long-run marginal cost. The third tier usage charge is a penalty charge for additional residential	
+ review and development of pricing policies for trade wastes		water use and has not changed. Uniform water prices apply to SA Water's urban and regional customers through the application of a state-wide pricing policy. The government provides SA Water with a community service obligation	
+ development of national guidelines for water accounts.		payment to ensure full cost recovery for country water services, calculated as the shortfall between the revenue from regional customers and the upper	
Rural and regional:		revenue bound cost of providing regional services. The <i>Water for Good</i> action plan includes a commitment to 'continue to move potable water use prices for	
+ full cost recovery for all rural surface and groundwater based		SA Water customers towards cost-reflective prices' (DFW 2010).	
 systems + continued movement towards lower-bound pricing as per National Competition Council commitments 			On 27 September 2010, the Treasurer sought advice from the Essential Services Commission of South Australia (ESCOSA) pursuant to section 5(f) of the <i>Essential Services Commission Act 2002</i> on the most appropriate form of economic regulation for non-drinking water, including recycled water, provided to the customer by network infrastructure. SA advised that ESCOSA is due to report its findings in late July 2011.
 achievement of upper-bound pricing for all rural systems, where practicable. 		SA advised that it is currently transitioning to independent economic regulation. ESCOSA's first price determination under the proposed Water Industry Act is expected to be from 1 July 2013, but until then the setting of water prices is under existing legislation. During this transition phase, ESCOSA continues to prepare for its expected future role as the economic regulator of the SA water industry by advising the Treasurer on pricing and other regulatory matters to support the transition. SA's significant rural service providers (that is, irrigation infrastructure operators) are located in the MDB and will therefore be regulated by the Australian Competition and Consumer Commission.	
		66(iii)—Wastewater charges in SA are currently based on property values, subject to a minimum charge, and have no volumetric component. The only exception applies to the 50 largest trade waste customers, who are metered and charged a usage charge based on the content of the discharge. Reform to wastewater charges is not considered a priority in the context of the Water for Good Plan (DFW 2010).	
		66(iv)—The National Guidelines for Residential Customers' Water Accounts were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian and state and territory water ministers (NRMMC 2006).	

NWI actions	NWI clauses	Commentary
	66 continued	66(v)—The <i>Irrigation Act 2009</i> (SA) and the <i>Renmark Irrigation Trust Act 2009</i> (SA) give irrigation trusts the power to impose rates for water supply and drainage in their districts so they can recover the costs of those services. Irrigation trusts set water storage and delivery charges for their districts in consultation with their customers. The four major irrigation trusts currently levy a fixed charge and a usage charge for storage and delivery services. To date, there has been no independent regulation or review of irrigation water storage and delivery charges in SA. Under the <i>Water Act 2007</i> (Cwth), charges payable to irrigation infrastructure operators are required to comply with water charge rules established under that Act. Currently, the ERRR for Central Irrigation Trust is reported to be minus 0.5% (NWC 2011b).
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—Specific charges, levies or fees to meet water planning and management costs are charged via the Natural Resource Management Levy, licensing fees and the Save the River Murray Levy. However, the charges are not clearly linked to water planning and management activities. In May 2010, the SA Government noted that the then Department of Water, Land and Biodiversity Conservation (now the Department for Water) had a project underway to identify the costs of providing water planning and management in SA, to introduce a water planning and management cost-recovery framework, and to set charges in accordance with the framework from 2011–12. This framework is still under development.
Investment in new or refurbished water infrastructure to continue to be assessed as economically and	69	69—Investment decisions by SA Government agencies are guided by the Treasurer's Instructions and the <i>Guidelines for the evaluation of public sector initiatives</i> (DTF 1998).
ecologically sustainable before being approved.		Under the SA Government financial management framework, all projects over \$4 million must be scrutinised by the Public Works Committee of the SA Parliament (NWC 2011d).
		The Productivity Commission, in its <i>Australian urban futures</i> report, noted that 'subsidies provided by the Australian Government are further distorting investment decisions in Adelaide, part of the explanation for the large investment in desalination capacity relative to demand was a grant of \$328 million provided by the Australian Government', and 'Evidence suggests that inefficient investment in supply augmentation has also occurred in other capital cities, such as Adelaide' (PC 2011).
		Major investment projects such as the \$1.83 billion Adelaide desalination plant require licensing under the <i>Environment Protection Act 1993</i> (SA).
Release of unallocated water.	70–72	70–72—The SA Department for Water's policy statement on defining, identifying and releasing unallocated water was endorsed in November 2010. It provides a definition of unallocated water and a process for its identification. It also identifies a preferred process for issuing licences to access unallocated water through market-based mechanisms after establishing the demand for the water. However, under section 147(2) of the <i>Natural Resources Management Act 2004</i> (SA), the Minister may issue licences 'under procedures determined by the Minister as being appropriate in the relevant circumstances'.
Environmental externalities managed through a range of regulatory measures.	73	73(i)—Price instruments such as the NRM Levy and the Save the River Murray Levy are used to fund water planning and management activities that address environmental objectives.
		73(ii) and (iii)—In its <i>Final report: inquiry into the 2010–11 metropolitan and regional potable water and sewerage pricing process</i> , ESCOSA noted that further work should be undertaken in SA to at least identify the relevant externalities (ESCOSA 2010).

NWI actions	NWI clauses	Commentary
 Benchmarking efficient performance + independent, public, annual reporting of performance benchmarking for all 	75–76	75—Benchmarking information and data are provided to the National Water Commission's <i>National performance reports</i> for three urban water service providers run by SA Water and for one rural water service provider, the Central Irrigation Trust.
metropolitan, non-metropolitan and rural water delivery agencies		76—Currently, all of the costs associated with the operating performance and benchmarking systems are paid for by the SA Water Corporation. SA advised that when ESCOSA is formally appointed as SA Water's regulator the charge will form part of the main payment made to ESCOSA ESCOSA will be the regulator
 develop nationally consistent report framework. 		from 1 July 2012.
 Independent pricing regulator: + independent pricing bodies to set and review prices or pricing 	77	77—In line with <i>Water for Good</i> , the SA Government proposes to appoint ESCOSA as the independent economic regulator for water and wastewater services in the state from July 2012.
processes for water storage and delivery and publicly report.		ESCOSA will be responsible for licensing and will have the power to determine prices, and is expected to apply its first pricing determination for SA Water from 1 July 2013.
		Until amended legislation is passed, ESCOSA's involvement in the water industry continues to be by request for advice from the Treasurer, or by the referral of an inquiry to it.
Integrated management of environme	ental water	
Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional	79	79(i.a and e)—The <i>Natural Resources Management Act 2004</i> (SA), provides the statutory framework for environmental water in SA. Regional NRM boards are responsible for developing statutory WAPs that must make environmental provisions. The Act requires the Minister for Environment and Conservation, and in the case of the River Murray, the Minister for the River Murray, to 'adopt'
arrangements to ensure the achievement of the environmental outcomes		the WAPs to give them statutory force. 79(i.b)—SA is party to several intergovernmental agreements that, among other objectives, seek to provide water for environmental outcomes. It has the
+ where it is necessary to recover		following joint arrangements for shared resources across state boundaries:
water to achieve environmental outcomes, to adopt the		+ Agreement on Murray–Daning Basin Reform 2008
principles for determining the most effective and efficient mix		Achieving Environmental Objectives in the Murray–Darling Basin 2004
of water recovery measures.		 + Supplementary Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin 2006
		 Further Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin: Control and Management of Living Murray Assets 2009.
		+ Lake Eyre Basin (Intergovernmental Agreement) Act 2001
		+ 1985 Border Groundwaters Agreement.
		To give effect to these agreements within SA, the <i>Natural Resources Management Act 2004</i> (SA) requires both WAPs and NRM plans to address and be consistent with intergovernmental agreements (s. 75(7)(b)).
		The Act also gives the Minister power to amend plans to achieve consistency with intergovernmental agreements (s. 89(2)).

NWI actions	NWI clauses	Commentary
	79 continued	79(i.c)—SA reports that resources have not historically been managed conjunctively due to the limited understanding of the connectivity between the key surface and groundwater sources. Most WAPs in SA are for groundwater resources. More recent plans are addressing both surface water and groundwater; the level of integrated management is dependent on the level of understanding of the connection between the resources for which management is sought. Both resources are covered in the water allocation plans for Clare, Marne–Saunders and Barossa. A further three plans currently under development (Eastern and Western Mount Lofty Ranges and Baroota) will also adopt this integrated management approach.
		79(i.d)—In SA, the Natural Resources and Management Plan 2006 requires a monitoring and evaluation framework for all water allocation planning and environmental water. Independent auditing of the monitoring and evaluation requirements in water plans and of environmental water does not occur in SA. However, the state produces a number of public reports on the achievement of environmental and other public benefit outcomes under WAPs and environmental watering provisions. Those reporting activities include:
		+ five-yearly WAP reviews
		+ annual water use reporting (for only some WAP areas)
		+ state-of-the-environment reports
		+ regional and state NRM plans.
		79(i.e)—In SA, environmental water takes two forms: planned environmental water, which is water set aside outside of the consumptive pool established within a WAP, and licensed environmental water, which is set within the consumptive pool.
		Only licensed environmental water is tradeable in SA. Licensed environmental water can be traded on a temporary or permanent basis, subject to the provisions in the relevant WAP.
		79(i.f)—SA has identified priority high ecological value aquatic ecosystems (HEVAEs) across the state. Environmental watering requirements under the State Natural Resource Management Plan 2006 for those ecosystems are considered during the development of related WAPs. The WAP is the mechanism for providing specific arrangements for the maintenance of HEVAE values.
		SA has participated in the development of the proposed national HEVAE framework, including trialling the framework in the SA portion of the Lake Eyre Basin. It expects to adopt the national HEVAE framework once it has been finalised.
		79(ii)—SA has adopted a mix of approaches to achieve environmental and other public benefit outcomes in stressed areas through its water planning framework. See NWI clause 43–45 for detail on the water recovery measures employed for the environment.
		SA also committed to recover 35 GL of water for The Living Murray program. In order to meet this water recovery target, a number of potential projects were investigated, including water recovery options from wetland management, recycled water, market based recovery, on-farm redevelopment, Lower Murray rehabilitation, voluntary trusts, and Eastern Mount Lofty Ranges farm storage reduction. These investigations commenced prior to the signing of the NWI and continued until 2007. SA advised that the approaches used have been adjusted as market measures became more viable and infrastructure options, such as wetlands water recovery, were no longer an option due to the long lead times involved.

NWI actions	NWI clauses	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—SA has participated in the development of a range of national water accounting standards and reporting frameworks, including:
		+ the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards.
		 + national performance reporting for urban and rural water service providers (81(ii), (iii)).
		+ online databases and registers for the management of water resources in SA (see NWI clause 59).
Consolidated water accounts:	82–83	82—SA participated with other NWI parties in the development and trial of the
+ develop and implement robust water accounting		Preliminary Australian Water Accounting Standards of the Water Accounting Standards Board (WASB 2010). SA trialled the water accounting standards in the Onkaparinga catchment as part of the Bureau of Meteorology (BoM) pilot National
 identify situations where close interaction between surface water and groundwater exists 		Water Account (BoM 2010). With funding from the National Water Commission, two unpublished water account reports have been prepared for the Barossa Prescribed Water Resource Area and for Eyre Peninsula to further trial the standards.
+ implement systems to integrate		SA is also participating in the preparation of the National Water Account 2010.
the accounting of surface water and groundwater.		83—SA's water accounting systems recognise connectivity between groundwater and surface water systems.
 Environmental water accounting: + develop an environmental water register and annual reporting arrangements 	85	85—In SA, a water accounting system has been developed and used to record annual River Murray environmental water accounting data. The system was designed so that information could be easily and accurately recorded, extracted and managed. The system is currently being revised to ensure that all information that must be reported can be collected and stored.
 apply the environmental water register and annual reporting arrangements. 		Annual reporting of River Murray environmental watering in SA is performed by the MDBA, The Living Murray Initiative and the Commonwealth Environmental Water Holder.
		Outside the MDB, only some sections of rivers below major reservoirs report on environmental water. Other types of environmental water provisions will be reported in disclosure notes as part of the National Water Account for the BoM.
Implement information measures.	86	86—SA has participated with other NWI parties and the BoM in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act 2007</i> (Cwth), the BoM has been mandated to play a national water data and information role.
		SA's Strategic Water Information and Monitoring Plan 2010 provides information on existing monitoring arrangements and aids the coordination and sharing of monitoring information (South Australian Government 2010). Monitoring of surface water and groundwater information is conducted by a diverse range of agencies, and various parties hold different sets of data.
		Multiple agencies are engaged in surface water monitoring, but there is significant sharing and centralisation of that information. The volume of groundwater monitoring information in SA is not as well understood. While basic information, such as well locations, drill dates and purposes, is fully recorded, valuable monitoring information is known to be held by some agencies and private operators and is not currently available to other users (South Australian Government 2010).

NWI actions	NWI clauses	Commentary
Metering and measuring actions: + develop metering and measuring actions	88 Ig	88—SA has participated in the development of national water metering standards and reporting frameworks. It completed and submitted its State Implementation Plan for Non-Urban Water Metering to the Australian Government in January 2009.
 + implement metering and measuring actions. 		The <i>Natural Resources Management Act 2004</i> (SA) generally requires that taking water from prescribed resources is subject to a water licence. Consistent with the SA metering policy, a condition attached to a licence may require that the volume of water taken be measured by a water meter rated by the manufacturer to an accuracy of plus or minus 2%.
		SA is concerned that the benefits of implementing the new national standards and the Meter Assurance Framework are outweighed by the costs to the state and licensed water users. It proposes that it will implement the new national standards only where there is strategic value and where funds are available.
National guidelines on water reporting:	89	89—SA has participated in the development of a range of national reporting requirements for water management.
 + develop national guidelines on water reporting + apply national guidelines on 	develop national guidelines on water reporting apply national guidelines on water reporting.	It has also worked with the Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010).
water reporting.		The BoM has used information supplied by the SA Department for Water in its pilot National Water Account (BoM 2010). It is preparing the National Water Account for publication in mid-2011. The account will contain a detailed subaccount for the Adelaide region and include information supplied by the Department for Water as the lead water agency and from SA Water Corporation.
		89(ii)—the National Water Market System (NWMS) website was launched in late 2010. The objective of the system is to strengthen Australia's water market through the efficient management of improved state and territory water registers and water transactions and greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions. A major element of the NWMS is the development of a common registry system—a standardised national water register that will replace existing water registers in SA.

NWI actions	NWI clauses	Commentary
Urban water reform		
Implementation of demand management measures, including: + implementation and compliance monitoring of WELS, including mandatory labelling and	91	91(i)—The Water Efficiency Labelling and Standards (WELS) Scheme is a joint initiative of the Australian Government and the state and territory governments. The Commonwealth <i>Water Efficiency Labelling and Standards Act 2005</i> provides the legal framework for the scheme. SA enacted complementary legislation in 2006 (the <i>Water Efficiency Labelling and Standards Act 2006</i> (SA)).
minimum standards for agreed appliances	5	91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden
+ develop and implement 'Smart Water Mark' for garden activities		Industry, Australia, and the Water Services Association of Australia. It is a not- for-profit scheme overseen by a steering committee with representation from the Australian Government. state and territory governments, water utilities, the
+ review effectiveness of temporary water restrictions		four governing associations, and the chair of the Technical Expert Panel (an independent panel that assesses applications to the scheme).
and associated public education strategies, and consider extending low-level restrictions to standard practice		91(iii)—SA participated in the National Water Commission's national review of water restrictions (ISF and ACIL 2009). In SA, water conservation, demand management and improved water availability throughout the state have resulted in water restrictions being eased for most of the state from 1 December 2010.
+ implement management responses to water supply		when Water Wise measures came into place. The Eyre Peninsula will be covered by Water Wise measures from 3 April 2011.
and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs.		91(iv)—The SA <i>Water for Good</i> Action Plan includes Action 29, for SA Water to include leak detection in the water auditing of the Business Water Saver Program, and Action 38, for SA Water to continue its program of leak detection and repair in its metropolitan and major country town networks and report annually on progress (DFW 2010).

NV	VI actions	NWI clauses	Commentary
En urb	courage further innovation in ban water use, including:	92	92(i), (ii) and (iii)—SA has participated in national working groups and committees to develop the <i>Australian guidelines for water recycling: managing</i>
+	develop and apply national health and environmental guidelines for water-sensitive		<i>health and environmental risks</i> , which cover recycled water and stormwate use. The <i>Water for Good</i> plan identifies two commitments in relation to water-sensitive urban design:
	urban designs for recycled water and stormwater		+ By 2013, develop and implement the best regulatory approach for SA to mandate water-sensitive urban design, dovetailing with the Plan for
+	develop national guidelines for evaluating options for water-		 + Introduce new targets for water-sensitive urban design by 2010.
	sensitive urban developments in both new urban subdivisions and high-rise		The Department for Water is currently developing a state water-sensitive urban design policy that will set initial targets, detail the government's role in supporting the improved take-up of water-sensitive urban design, provide a pathway for
+	evaluate existing water-sensitive urban icon developments		mandating water-sensitive urban design within the planning system and detail required future research activities that can be delivered through the Goyder
+	review institutional and regulatory models for integrated		Institute for Water Research. The policy is expected to be completed in mid-2011. SA places emphasis on the <i>Australian guidelines for water recycling</i> to guide

urban water cycle planning and

management and develop best

+ review incentives to stimulate

practice guidelines

innovation.

SA places emphasis on the *Australian guidelines for water recycling* to guide assessments of recycled water proposals. It has published information referring applicants for water recycling schemes to the guidelines for design and operational guidance, and articulates the risk management approach that must be followed (DOH 2009).

In addition, SA advised that work to update the state water recycling guidelines to reflect the *Australian guidelines for water recycling* and to include stormwater has progressed in accordance with Action 12 of SA's *Water for Good* plan.

92(iv)—The Department for Water is developing a stormwater strategy that will provide a framework for delivering the various commitments in relation to stormwater in *Water for Good*. Central to the strategy is recognition of the need for a more integrated approach to urban water management. The strategy commits to the development of a blueprint for urban water that will consider options for integrating stormwater and wastewater management and reuse opportunities across metropolitan Adelaide.

The department is also working with the Local Government Association to review and develop new arrangements for the Stormwater Management Authority to give it a more strategic role in stormwater management and infrastructure investment.

92(v)—SA advised that its state water-sensitive urban design policy, which is being developed, will consider economic incentives to assist in stormwater management and promote innovation.

NWI actions	NWI clauses	Commentary
Community partnerships and adjustr	nent	
 Open and timely consultation with all relevant stakeholders in relation to: pathways for returning overallocated systems to sustainable extraction levels periodic review of water plans other significant decisions affecting the security of water access entitlements. 	95	95—SA has statutory consultation requirements as part of the statutory review and subsequent amendment process for WAPs under the <i>Natural Resources</i> <i>Management Act 2004</i> (SA). WAPs are normally reviewed in consultation with the community and stakeholders through questionnaires, focus groups and other means. Amending a WAP has two statutory public consultation stages: one in the development of a concept statement for the draft WAP and the other for the public consultation on the draft WAP. Policy papers are often released for public consultation as part of the development of the draft WAP. Additional non-statutory consultations are also undertaken with specific user or industry groups. Pathways for addressing overallocation and overuse are discussed and worked through as part of the process.
		In addition, the development of higher level water demand and supply plans for all of SA's eight NRM regions will be a statutory requirement under proposed new legislation identified in <i>Water for Good</i> . The Department for Water will lead the development of the plans, with support from a steering committee. SA advised that the mechanisms used to engage with the community vary from region to region, based on local circumstances and needs, and take account of water planning and consultation that has occurred previously. It will therefore be up to each region to develop its own community engagement strategy. See NWL clauses 41–45 for more detail
Provision of accurate and timely	96	96—In SA, information related to water management matters is made available
information to all relevant		to the community through a number of means, including:
stakeholders in relation to the progress of water plan		+ fact sheets
implementation and other issues relevant to the security of water access entitlements.		+ groundwater status reports
		+ reporting on the progress of <i>Water For Good</i>
		 reporting and consultation in during reviews and amendments of regional NRM plans and WAPs
		+ numerous technical and scientific documents (many of which are available on departmental and NRM board websites) on the status and performance of individual water resources.
Address significant adjustment 97 issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.	97	97—The SA Government has invested \$20 million in the Riverland Sustainable Futures Fund to deliver structural changes, investment and employment outcomes in the region (DTED 2010).
		As part of the Sustainable Rural Water Use and Infrastructure Program under <i>Water for the Future</i> , the Australian Government is providing up to \$110 million for the Private Irrigation Infrastructure Program for SA (DSEWPaC 2011b). The program will fund projects that demonstrate high merit in improving the efficiency and environmental benefits of irrigation water use and management in the SA MDB. In exchange for funding, successful applicants will transfer water entitlements to the Commonwealth Environmental Water Holder to use for environmental watering.
		The SA Government is seeking a review and enhancement of the <i>Water for the Future</i> program to ensure that it is applicable to SA's circumstances.

NWI actions	NWI clauses	Commentary
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken. Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.	101	101(i)—Through the implementation of the NWI, SA has identified a number of knowledge, skills and capacity-building priority areas that need to be addressed for the effective implementation of the initiative in SA. The priority areas include groundwater modelling for predictive water allocation, use and climate scenario water allocation planning and management, and on-ground, field-based skills for water resource monitoring and assessment. SA acknowledges that these skill shortages have constrained NWI implementation in the state, but also notes that programs and projects under the NWI have had a significant impact on the underlying skills base of SA's water resource planning and management staff.
		101(ii)—To assist in more effective coordination of the national water knowledge effort, SA has played an important role with other NWI parties in a range of national water groups for developing, coordinating and sharing water policy knowledge and technical skills. The SA Government has also undertaken a number of state-based initiatives, such as establishing the Goyder Institute for Water Research. The institute is a partnership between the state government, CSIRO, Flinders University, the University of Adelaide and the University of South Australia. The objective is to support research and development in sciences associated with urban water, industry development, environmental water and climate change.

Tasmania

NWI actions	NWI clause	Commentary	
Water access entitlements and planning framework			
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework + legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this agreement. 	26	 26(i)—At the commencement of the NWI, Tas. identified no overallocated systems. However, in its 1999 implementation program for the 1994 COAG Water Reform Framework, it identified 16 systems that were potentially stressed and prioritised them for water management planning. Currently, Tas. has six operational water management plans (WMPs) and four draft WMPs. Preparatory work has commenced for two other water plan areas. 26(ii)—Tas. has implemented NWI-consistent legislation. The <i>Water Management Act 1999</i> (Tas.) provides the statutory basis for water access entitlements. 	
Water access entitlements to be defined and implemented.	28–34	28–33—The <i>Water Management Act 1999</i> (Tas.) provides for NWI-consistent water licences. Where a plan is in place, a management framework under which licences operate is provided. The management framework includes provisions such as allocation limits and rules for accessing water on a daily basis through restriction management. Tasmanian water access entitlements are fully unbundled, but a small number of rights are still tied to land on the Lake and Ouse rivers, as provided for by s. 16 of the <i>Electricity Supply Industry Restructuring (Savings and Transitional Provisions) Act 1995</i> (Tas.). Legislation has been introduced to ensure that those water rights are NWI-consistent. Tas. has specific provisions for both entitlement-based and rules-based	
		 environmental water. The taking of groundwater does not require a licence unless specified under a WMP (currently, only the Great Forester WMP has this requirement), or provided for through the appointment of a groundwater area. As yet, no licensing system has been established for the taking of groundwater in Tas. (NWC 2010b). Regulatory controls are in place to ensure that new well works are not undertaken without a permit (Part 7 of the <i>Water Management Act 1999</i> (Tas.)). Well works permits are not granted where works would adversely affect other persons taking water from the water resource or a hydrologically linked water resource. 34—In Tas., mining proposals are assessed through state legislation such as the <i>Water Management Act 1999</i> and the <i>Environmental Management and Pollution Control Act 1994</i>. To date, no circumstances have arisen in Tas. that have required water management arrangements outside the scope of the NWI Agreement. 	

NWI actions	NWI clause	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35(i) and (ii)—Tas. uses the water management planning process to determine environmental water requirements and environmental water provisions for surface water. Environmental commitments are delivered through a range of management provisions, including restriction protocols that are applied to water licences and allocations. Those provisions are intended to provide a flow regime to best meet the objectives of a plan, including its environmental objectives.
		Because most Tasmanian rivers are unregulated, management provisions in plans relate mostly to managing extractions of water from the resource.
		Environmental water has higher security (surety) than all other water entitlements, except for rights to water for domestic purposes, town supplies, consumption by livestock and fire fighting. Taking water for stock and domestic use is restricted by the Water Management Regulations 1999, and town supplies are licensed. Only two-thirds of a town's water allocation is provided at highest surety (surety level 1). The other third is provided at surety level 5, which means that for that part of the allocation environment water has a higher surety than town water.
		Tas. advised that the water taken for human and stock consumption from any individual watercourse generally constitutes a very small proportion of streamflow.
		Water required for groundwater-dependent ecosystems is not assessed or monitored; however, systems are assumed to be highly connected if scientific studies have not been completed.
		35(iii)—Trading of environmental water allocations is possible under the <i>Water Management Act 1999</i> (Tas.), but no environmental water allocations have been issued to date.
Water plans to be prepared along the lines of the characteristics and components at Schedule E based on the following priorities:	39–40	39—Tas. has implemented an NWI-consistent water planning process. Plans are prepared using the <i>Standard operating procedures for the development of statutory water management plans in Tasmania</i> , which were revised in March 2010, and guided by the <i>Generic principles for water management planning</i> .
 plans for systems that are overallocated, fully allocated or approaching full allocation 		Tas.'s WMPs set environmentally sustainable levels of extraction by providing water allocation limits and rules for accessing water on a daily basis. No Tasmanian water resources have been assessed as overallocated; however, two water systems (Lakes Sorell and Crescent and River Clyde) have been assessed as fully allocated.
 plans for systems that are not yet approaching full allocation. 		and are managed through WMPs. The current focus of water planning in Tas. is on preparing water plans in areas where new irrigation schemes are to be built.
		40—Specific performance indicators for WMP objectives are not defined. WMPs clearly state that the performance of each WMP will be assessed on the basis of whether it provides for streamflow conditions that deliver its objectives. WMPs are reviewed in accordance with the requirements of individual plans by the Department of Primary Industries, Parks, Water and Environment (DPIPWE).
		Tas. advised that water plans are now taking into consideration climate change, using the results of the Tasmanian Sustainable Yields and Climate Future for Tasmania projects.
Substantially complete addressing overallocation as per National Competition Council commitments.	41, 43–45	41, 43 and 44—No water system in Tas. is considered to be overallocated; two systems (Lakes Sorell and Crescent and River Clyde) have been assessed as fully allocated. Water plans are in operation in those two catchments.
Substantial progress towards adjusting all overallocated and/or overused systems.		45—Tas. advised that structural adjustment is not a significant issue in the state, so little consultation or monitoring in relation to structural adjustment has occurred.

NWI actions	NWI clause	Commentary
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—Through the <i>Water Management Act 1999</i> (Tas.), Tas. has in place a risk assignment framework up to 2014. It advised that it is working towards implementing updated risk assignment arrangements from 1 January 2015.
Water plans to address Indigenous water issues.	52–54	52–54—Under Tas.'s current arrangements, there are no specific legislative provisions that require Indigenous water access to be dealt with in water planning; nor are there any provisions for the recognition of the possible existence of native title rights to water. No Tasmanian water plan has identified water requirements for Indigenous customary, social or spiritual needs, and none has provided any water specifically to Indigenous people for any purpose.
Implementation of measures to address water interception by	55–57	55(i)—The Water Management Regulations 2009 set limits on the taking of water for specific uses, such as stock and domestic use.
land-use change activities on a priority basis in accordance with water plans.		55–57—Results from the Tasmanian Sustainable Yields project are being used to identify areas where plantation forestry interception may pose a risk to water licences and the achievement of the environmental objectives of WMPs.
		Where the Sustainable Yields results indicate risk, the Water Availability and Forest Landuse Planning Tool is used to assess the level of risk in more detail. The tool allows the change in streamflow due to plantation forest conversion to be modelled at a subcatchment scale, on a daily basis. Based on the level of risk posed, water extracted by plantation forests will be accounted for in WMPs (CSIRO 2009).
		The Water Availability and Forest Landuse Planning Tool has been used in the Ringarooma catchment in the development of the Draft Ringarooma Catchment WMP.
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—The Register of Licences and Water Access Entitlements is managed by DPIPWE. It lists licences to use and trade surface water and take groundwater, along with water allocations and transfers made under the <i>Water Management Act 1999</i> . The register is publicly available, but not online.
+ pathways leading to full implementation		
+ full implementation.		

NWI actions	NWI clause	Commentary
Establish compatible institutional and regulatory arrangements that facilitate trade, including arrangements consistent with principles in Schedule G re	60	60(i) and (iii)—Tas. has implemented NWI-compatible institutional and regulatory arrangements that facilitate intrastate trade. Rules governing transfers of water licences and water allocations are stipulated in the <i>Water Management Act 1999</i> (Tas.), which has been clarified in <i>Water resource policy: guiding principles for water trading in Tasmania.</i>
 institutional barriers to trade: + remove barriers to temporary trade 		All water licences under the <i>Water Management Act 1999</i> (Tas.) are tradeable personal property rights, and entitlements to water that do not require a licence are not tradeable.
 remove barriers to permanent trade up to an annual threshold of 4% 		Trade in Tas. is constrained by the small scale of catchments and their limited connectivity (NWC 2010a). Local trading rules are established within management plans if required.
+ review impact on trade of interim threshold		60(ii)—Firm exchange rates between the trading zones have not been established, and each application is considered on its specific circumstances.
+ full removal of barriers to trade.		60(iv)—Temporary transfers of allocations are permitted under the <i>Water Management Act 1999</i> (Tas.). However, under s. 103 of that Act, temporary trade is restricted in instances where temporary transfers of all or part of a water allocation involve transfers to persons who do not hold a water licence. Tas. advised that this type of trade is not representative of the types of temporary transfers that usually occur in the state.
		Transfers of irrigation rights within irrigation districts are covered under the <i>Irrigation Clauses Act 1973</i> (Tas.). The irrigation rights are separated from the land title and are able to be traded within the irrigation district, subject to the conditions imposed by the management authority.
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+ review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, <i>Rural water</i>
 new approach to sharing delivery capacity and extraction rates among users 		use and the environment: the role of market mechanisms (PC 2006).
+ 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.		
Southern MDB action.	63	This clause is not applicable to Tas.
Best practice water pricing and instit	utional arrang	ements
Complete commitments under the 1994 COAG Water Reform	65	65(i)—Tas. has implemented consumption-based pricing for rural systems.
Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.		rol urban systems, under the <i>water and sewerage industry Act 2008</i> , pficing reforms are being phased in. The first price determination will commence by July 2012. As a transitional measure, regulation of water and sewerage prices is undertaken by the Treasurer through an Interim Price Order.
-		65(ii) and (iii)—See actions associated with NWI clause 66.

NWI actions	NWI clause	Commentary
Metropolitan: + continued movement towards upper-bound pricing	66	66(i), (ii) and (iii)—Information specific to Tasmanian metropolitan areas was not available for this assessment because, until very recently, small local councils providing urban water did not report in the same manner and were not subject to economic regulation.
+ development of pricing policies for recycled water and stormwater		Following the restructuring of the Tasmanian water industry in 2009 into three regional water businesses, the Office of the Tasmanian Economic Regulator now reports cost recovery for the businesses using a 7% rate of return as a
 review and development of pricing policies for trade wastes development of patienel 		benchmark. The three businesses have prepared trade waste pricing policies in accordance with the principles in the <i>Water and Sewerage Industry Act 2008</i> and the Act's Interim Price Order (OTTER 2011).
 development of national guidelines for water accounts. 		Two-part pricing based on consumption is to be implemented state-wide from July 2012 (NWC 2011d).
 + full cost recovery for all rural surface and groundwater based systems 		66(iv)—The National Guidelines for Residential Customers' Water Accounts were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian, state and territory water ministers (NRMMC 2006).
 + continued movement towards lower-bound pricing as per National Competition Council 		66(v)—Rural irrigation schemes are moving to lower-bound pricing, if they are not already there.
commitments + achievement of upper-bound pricing for all rural systems, where practicable.		Where appropriate, water charges in existing Tasmanian irrigation schemes include an asset renewal levy sufficient to maintain the continuing service capacity of the schemes for the foreseeable future. For refurbishments of schemes, annuities are charged closer to the time of investment. For long-lived assets, such as pipelines and dams, no funds are set aside for future capital spends. This approach is consistent with meeting at least lower-bound pricing requirements under the NWI (NWC 2011d).
Consistent approaches to pricing and attributing costs of water planning and management.	67 69	67—Tas. applies specific charges, levies or fees relating to water planning and management costs. The water licence fees payable are related to the costs of water management and planning. They are independently reviewed under the <i>Subordinate Legislation Act 1992</i> (Tas.) to determine whether or not a regulatory impact statement is required in relation to the costs of the proposed fees.
		DPIPWE has reviewed the costs of water planning and management activities under the state's <i>Water Management Act 1999</i> , in line with the NWI Pricing Principles and Tasmanian Government pricing policies. The Minister is considering the findings of the review, which included an analysis of the full costs borne by DPIPWE, the attribution of costs to government and water users in line with the user-pays principle, and the costs currently recouped in water planning and management in Tas.
Investment in new or refurbished water infrastructure to continue to be assessed as economically and		69—There have been no recent major reviews of urban water investments in Tas., although capital investment processes are being developed for all new urban water businesses.
ecologically sustainable before being approved.		In the rural sector, Australian Government funding for new irrigation developments entails a due diligence assessment of the economic, social and environmental impacts. Tas. is undertaking a significant irrigation development initiative, and intensive consultation on related projects is being undertaken.

NWI actions	NWI clause	Commentary
Release of unallocated water.	70–72	70–72—Tasmanian water sources are considered relatively abundant, and applications for water licences are generally accepted. Because water is not scarce, the government does not use market mechanisms to allocate water, although application and annual licence fees apply.
		In new irrigation developments, irrigators purchase an irrigation right for a one-off payment (which is a contribution to the capital costs of the system, although the buyer of a right does not own any of the infrastructure), and the cost of supply is recovered through an annual charge.
Environmental externalities managed through a range of regulatory measures.	73	73—There has been little progress in implementing externality pricing in Tas. Tas. notes that such pricing is not appropriate without fully developed pricing regulatory arrangements. Instead, it uses regulatory mechanisms to address externalities. In irrigation schemes, for example, right holders must have a farm water access plan as a condition of water use.
Benchmarking efficient performance:	75–76	75—Tas. provides benchmarking information to the Commission for inclusion in the <i>National performance report: urban water utilities</i> . The 2009–10 report was
 independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies 		published in 2011. 76—Tas. does not yet report to the Commission on the size and scale of rural (irrigation) service provision.
+ develop nationally consistent report framework.		
Independent pricing regulator:	77	77—Tas. does not currently use an independent body to determine prices for
 independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report. 		As part of a range of industry reforms, Tas. has installed a new regulatory regime for the provision of urban water services, to be enforced by the Office of the Tasmanian Economic Regulator. From 2012, the regulator will be responsible for price and service regulation in the urban water sector. Further details of the regulatory regime, focusing on the regulatory process, are being developed in advance of independent price regulation from July 2012 (NWC 2011d).

NWI actions	NWI clause	Commentary
Integrated management of environmental water		
Recognising the different types of surface water and groundwater systems:	79	79(i.a)—The <i>Water Management Act 1999</i> (Tas.) provides the statutory framework for environmental water in Tas. Those arrangements give DPIPWE responsibility for the delivery of environmental water (NWC 2010b).
+ effective and efficient		79(i.b)—This clause is not applicable to Tas.
management and institutional arrangements to ensure the achievement of the environmental outcomes		79(i.c)—Surface water and groundwater are defined in the Water Management Act, and their connectivity is explicitly recognised. In the absence of data, they are assumed to be highly connected. The consideration of groundwater resources within a WMP is based on the level of risk in relation to demands on
+ where it is necessary to recover		groundwater extraction.
water to achieve environmental outcomes, to adopt the principles for determining the	water to achieve environmental outcomes, to adopt the principles for determining the most effective and efficient mix of water recovery measures.	79(i.d)—The Water Management Act requires that WMPs be reviewed in their entirety by DPIPWE at least once during each period of five years following the adoption of the WMP.
of water recovery measures.		79(i.e)—Environmental water in Tas. is provided for in WMPs as planned environmental water, which is not tradeable in the temporary market.
		79(i.f)—In Tas., high ecological value freshwater ecosystems are those considered especially representative of their type while also demonstrating high degrees of naturalness.
		Tas. employs the Conservation of Freshwater Ecosystems Values assessment to determine environmental values and identify conservation management priorities for those values in the development of WMPs. This provides information on the water needs of high value ecosystem assets.
		The Conservation of Freshwater Ecosystems Values assessment is also used by DPIPWE in determining areas of interest for environmental flow studies, dam assessment reports and natural value assessments.
		Tas. stated that this framework for managing high conservation value assets is in line with the draft national high ecological value aquatic ecosystem framework.
		79(ii)—Tas. does not identify any overallocation in the state and so does not employ any measures for water recovery.

NWI actions	NWI clause	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—Tas. has participated in the development of the Preliminary Australian Water Accounting Standards in conjunction with the Water Accounting Standards Board, but the standards have not yet been adopted in Tas.
Consolidated water accounts:	82–83	82-83-Tas. does not currently prepare water accounts.
+ Develop and implement robust water accounting		
 Identify situations where close interaction between surface water and groundwater exists 		
+ Implement systems to integrate the accounting of surface water and groundwater.		
Environmental water accounting:	85	85(i)—Tas. does not have a specific environmental water register. The Water
 develop an environmental water register and annual reporting arrangements 		Information System of Tasmania (WIST), managed by DPIPWE, provides a register of licences, water allocations and transfers made under the <i>Water Management Act 1999</i> (DPIW 2011). The register is publicly available but not online. However, some limited details of water access entitlements can be
 apply the environmental water register and annual reporting arrangements. 		viewed. Where a water access entitlement issued under Part 6 of the Water Management Act is for an environmental purpose, it would be entered on the WIST register. To date, none has been issued for such a purpose.
		85(ii)—There are a range of reporting requirements for environmental water in Tas., but none takes the form of a consolidated annual environmental water account.
		WMPs include various monitoring requirements that mainly focus on river levels and streamflow. Additional ecological monitoring occurs as resources permit. No reporting is required to be publicly available.
Implement information measures.	86	86—Tas. has participated with other NWI parties and the BoM in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act 2007</i> (Cwth), the BoM has been mandated to play a national water data and information role.
		Tas. has invested in improved knowledge of water resources through a range of other projects relevant to state-wide and local level information.
Metering and measuring actions:	88	88—Tas. has participated in the development of the national water metering
+ develop metering and measuring actions		standards and reporting framework. It has prepared a draft non-urban metering implementation plan, which is currently being considered by the Tasmanian Government. Water meters are being rolled out to all remaining unmetered
 + implement metering and measuring actions. 		urban areas, particularly in southern Tas.

NWI actions	NWI clause	Commentary
National guidelines on water reporting:	89	89—Tas. has participated in the development of a range of national reporting requirements for water management.
+ develop national guidelines on water reporting		It provides data and information for the production of the <i>National performance</i> <i>reports</i> for urban water utilities, the <i>Australian water markets reports</i> (clause 89(ii)) and the <i>Environmental water management report</i> series
 apply national guidelines on water reporting. 		(clause 89(iii)), and is working with other NWI parties on compliance and reporting arrangements for water metering (clause 89(i)).
		Tas. has also worked with the BoM Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). The BoM has used Tasmanian information in its pilot National Water Account (BoM 2010).
		89(ii)—The National Water Market System (NWMS) was launched in late 2010. The objective of the NWMS is to strengthen Australia's water markets through the efficient management of improved state and territory water registers and water transactions and greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions.
		A major element of the NWMS is the development of a common registry system—a standardised national water register that will replace existing water registers in NSW, WA, SA, Tas., the NT and the ACT. The existing Vic. and Qld water registers have recently been upgraded and will be further enhanced as part of the project.
Urban water reform		
Implementation of demand management measures, including:	91	91(i)—The Water Efficiency Labelling and Standards (WELS) Scheme is a joint initiative of the Australian Government and the state and territory governments.
+ implementation and compliance monitoring of WELS, including mandatory labelling and minimum standards for agreed appliances		The Commonwealth <i>Water Efficiency Labelling and Standards Act 2005</i> provides the legal framework for the scheme. The states and territories have also enacted or agreed to enact complementary legislation to achieve national coverage for WELS. Tas. passed the <i>Water Efficiency Labelling and Standards Act 2005</i> (Tas.) to complement the national legislation.
+ develop and implement 'Smart Water Mark' for garden activities		91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry, Australia, and the Water Services Association of Australia. It is a
 review effectiveness of temporary water restrictions and associated public education strategies, and consider 		not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities, the four governing associations, and the chair of the Technical Expert Panel (an independent panel that assesses applications to the scheme).
to standard practice		91(iii)—Tas. participated in the Commission's national review of water restrictions.
 implement management responses to water supply and discharge system losses, 		There are now three regional water corporations responsible for the management of water and wastewater services, including the enforcement of water restrictions (Southern Water, Cradle Mountain Water and Ben Lomond Water).
including leakage, excess pressure, overflows and other maintenance needs.		91(iv)—Observed reductions in residential consumption during the 2000s were largely due to a combination of restrictions, conservation campaigns and investment in technical water-use efficiency. Increases in the volumetric price for water, including through inclining block tariffs, also played a role in influencing demand (NWC 2011d).

NWI actions	NWI clause	Commentary
Encourage further innovation in urban water use, including:	92	92(i) and (ii)—Tas. has participated in national working groups and committees to develop the <i>Australian guidelines for water recycling: managing health and environmental risks</i> , which address water guality guidelines for recycled water
 develop and apply national health and environmental 		and stormwater use.
guidelines for water-sensitive urban designs for recycled water and stormwater		No work has been undertaken in Tas. to develop an entitlement system for alternative water sources, such as stormwater.
 develop national guidelines for evaluating options for water-sensitive urban developments in both new urban subdivisions and high-rise 		
+ evaluate existing water-sensitive urban icon developments		
 review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines 		
+ review incentives to stimulate innovation.		
Community partnerships and adjustr	ment	
Open and timely consultation with all relevant stakeholders in relation to:	95	95—WMPs are developed with stakeholder consultation, as stipulated in the <i>Water Management Act 1999</i> (Tas.). Tas. advises that WMPs are reviewed in
 pathways for returning overallocated systems to sustainable extraction levels 		accordance with the requirements of individual WMPs.
+ periodic review of water plans		
 other significant decisions affecting the security of water access entitlements. 		
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—Tas. prepares annual reports on the effectiveness of WMPs in meeting identified objectives. Stakeholders are consulted as part of that process.
Address significant adjustment issues affecting water access entitlement holders and	97	97—Tas. advised that little consultation or monitoring in relation to structural adjustment has occurred because structural adjustment is not a significant issue in Tas.
communities that may arise from reductions in water availability as a result of implementing the NWI.		It also advised that it is undertaking a significant irrigation development initiative that involves intensive consultations about related projects.

NWI actions	NWI clause	Commentary
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken. Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any	101	101—Tas. has invested in a number of science areas to assist its implementation of the NWI. It has developed the Farm Dam Assessment Tool and subsequently updated and refined the Conservation of Freshwater Ecosystem Values database and the state's 69 surface water models. Tas. has also developed the Strategic Water Information Monitoring Plan and has made significant investments to upgrade and extend the state's surface water and groundwater monitoring. Tas. advised that there have been instances since 2005 where it has been difficult to find appropriately experienced and skilled applicants for available.
yaps are autresseu.		positions.
		101(ii)—Tas. advised that it has undertaken work on land-use change and interception and on climate change, and has released this work publicly.

Victoria

NWI actions	NWI clause	Commentary	
Water access entitlements and planning framework			
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework + legislative and administrative regimes amended to incorporate the elements of the entitlements and allocation framework in this 	26	 26(i)—At the commencement of the NWI, Vic. identified water management plans for 10 river systems to complete its commitments on overallocated systems under the 1994 COAG Water Reform Framework (COAG 1994, Victorian Government 2006). During the implementation of the NWI, Vic. commenced a new water planning approach to focus on high-level regional sustainable water strategies (SWSs), and planning boundaries have subsequently been altered. Despite the new approach, progress against Vic.'s commitments under the 1994 framework has not been clearly demonstrated and plans have not been developed for the 10 river systems. Vic. advised that SWSs are a legislative requirement under the <i>Water Act 1989</i> (Vic.) and form part of the state's 15-year water planning cycle. SWSs are designed to perform an overarching, broadscale strategic planning (or direction participate of the planning broadscale strategic planning (or direction participate of the planning broadscale strategic planning (or direction participate) and planning the update whether a planning the provide whether a planning the strategic planning (or direction participate) and planning the state of planning the pla	
agreement.		setting) role, under which other planning mechanisms such as streamflow and groundwater management plans and regional river health strategies are guided. Vic. has advised that only two of its four proposed SWSs have been completed. Currently, only six of the 10 overallocated or stressed systems identified under the 1994 COAG Water Reform Framework are covered by completed SWSs. The Commission does not consider that the Vic. SWSs contain the level of detailed management action necessary to address the systems previously identified as overallocated or stressed.	
	In addition to the SWSs, Vic. develops management plans for declared water supply protection areas (WSPAs). A WSPA is declared for highly stressed or utilised unregulated streamflow systems and groundwater areas. There are six streamflow management plans and eight groundwater management plans in place. Currently, 19 declared WSPAs are without a water management plan, and several plans are in draft form. Vic. is revising the management arrangements for WSPAs and in many cases is developing local management rules instead of a water management plan, or replacing existing water management plans with local management rules. It should be noted that the <i>Water Act 1989</i> (Vic.) still requires all WSPAs to have plans.		
		26(ii)—Vic. has implemented NWI-consistent legislation. The Water <i>Act 1989</i> (Vic.) provides the statutory basis for water access entitlements (NWC 2009).	

NWI actions	NWI clause	Commentary
Water access entitlements to be defined and implemented.	28–34	28–33—In Vic., the <i>Water Act 1989</i> (Vic.) provides the statutory basis for NWI-consistent water access entitlements. Water access entitlements are defined through bulk entitlements issued to the water businesses and Minister for the Environment and are implemented through statements of obligations from the Minister for Water.
		All water in Vic. is covered by an entitlement framework that is NWI consistent. This includes source bulk entitlements in regulated surface water systems, streamflow management plans or sustainable diversion limits in unregulated surface water systems, groundwater management plans or permissible consumptive volumes in groundwater systems, and the Environmental Water Reserve. Vic. has a specific provision for both entitlement and rules-based environmental water.
		By the end of September 2010, modified qualifications remained in the Murray, Broken, Goulburn, Campaspe, Loddon and Melbourne water supply systems and the Campaspe and Deutgam WSPAs. Many of the qualifications were no longer affecting access to water entitlements due to the increase in water availability during 2010 (e.g. Melbourne, Goulburn and Broken). In the Loddon and Campaspe systems, qualifications increased the flexibility of environmental water managers to release water in ways that benefited the environment following long-term drought. At the end of September 2010, the arrangements for Melbourne, Murray, Goulburn and Broken were under review to avoid unnecessary continuation of qualifications, which were subsequently revoked during October 2010.
		34—The mining, petroleum and gas industries require water access entitlements to access water in Vic. In fully allocated systems, extractive industries would need to purchase entitlements from existing users. Potential impacts on other users are assessed as part of the application process for transfers of entitlements.
		The impacts of water use by the mining and gas industries are being explored as part of the water planning process for the draft Gippsland Region and draft Western Region SWSs.

NWI actions	NWI clause	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35(i) and (ii)—In Vic., statutory environmental water entitlements have the same legal security as any other bulk water entitlement. Section 4A of the <i>Water Act 1989</i> (Vic.) defines the Environmental Water Reserve. The Environmental Water Reserve comprises environmental entitlements, rules-based environmental flows through obligations on consumptive entitlements, and 'above cap' water (water left over after limits on diversion have been reached) and unregulated flows that cannot be kept in storage.
		In groundwater and unregulated surface water systems, the arrangements necessary to meet broad environmental and other public benefit needs are identified in streamflow management plans and groundwater management plans. For those areas not covered by management plans, local management rules administered by the water businesses are in place, but do not have area-specific environmental or other public benefit outcomes.
		In Vic., the <i>Water Amendment (Victorian Environmental Water Holder)</i> <i>Act 2010</i> (Vic.) establishes the Victorian Environmental Water Holder as a body corporate responsible for managing the state's environmental entitlements (environmental holdings), but not the entire Environmental Water Reserve (i.e. not passing flows or above-cap water), as per section 33DD of the Act. The Victorian Environmental Water Holder also provides for the role of waterway manager for environmental water in the state, and can make further provisions as to rights and entitlements under the Act and otherwise provide for matters under the Act.
		In Vic., water for the environment and other public benefit outcomes can be redirected to priority water needs under the <i>Water Act 1989</i> (Vic.), such as critical human needs, stock and domestic and industrial needs, if the Minister for Water declares a water shortage and 'qualifies water entitlement rights' under the Act. Also, in the Vic. portion of the MDB, as in other MDB states, environmental water is less secure at times of extremely low water availability. The 2008 Agreement on Murray–Darling Basin Reform (Cwth et al. 2008) states that critical human water needs are the highest priority water use for communities dependent on the water of the MDB. Consequently, during periods of extremely low water availability when there is an extreme risk of failure to supply water for critical human needs in the next 12 months, Tier 3 water sharing is triggered and the ministerial council must intervene to ensure the supply of conveyance water and the delivery of water for critical human needs. In those conditions, no priority would be given to environmental water.
		Under the proposed Schedule H of the Murray–Darling Basin Agreement, a conveyance reserve would ensure that there is enough conveyance water in any year to deliver states' critical human water needs as the first priority, then the following year's conveyance reserve, followed by state allocations in the consumptive pool and then the environment.

NWI actions

NWI clause Commentary

39-40

Water plans to be prepared along the lines of the characteristics and components at Schedule E based on the following priorities:

- plans for systems that are overallocated, fully allocated or approaching full allocation
- plans for systems that are not yet approaching full allocation.

39—Vic. has implemented a water planning process that is generally NWI consistent. SWSs plan for long-term water security across Vic. and provide guidance on the development of management plans for declared WSPAs. Under the *Water Act 1989* (Vic.), a WSPA is declared for the protection of groundwater and unregulated surface water resources, and once it is declared a water management plan must be developed. The SWSs build on the requirements of the *Water Act 1989* and specify that management plans for highly stressed or utilised systems are to be developed if:

- + there is a need to amend licence volumes or conditions
- + permanent or ongoing restrictions on licensed extraction are required to protect consumptive licences, domestic and stock use, or the environment
- + the overall licensed volume needs to be reduced, as per the SWSs.

To date, six streamflow management plans have been developed for the Yarra catchment only and eight groundwater management plans have been developed across the state. Currently, there are 19 declared WSPAs without a management plan in place. Vic. is revising the management arrangements for WSPAs and in many cases is developing local management rules instead of a water management plan, or replacing existing water management plans with local management rules. The *Water Act 1989* (Vic) still requires all WSPAs to have a plan.

40(i) and (iii)—Vic. has a range of approaches for monitoring and reporting on the performance of the water plans, including the following:

- The Victorian Water Accounts provide an annual summary of water availability, allocation and use across the state at the bulk supply level. The accounts document water availability and provide information on water taken for consumptive use and water set aside for environmental purposes from the Vic. water entitlement and allocation framework. The accounts are publicly available on the website of the Department of Sustainability and Environment (DSE).
- For streamflow management plans, the relevant water authorities undertake annual compliance reporting on the implementation of the plans (covering compliance with entitlements), and monitoring of streamflows at specific sites.
- + For bulk and environmental entitlements, the relevant water authorities undertake annual compliance reporting on the amount of water returned to waterways, storage inflows, volumes in storage and passing flows. Compliance or noncompliance is reported in the relevant authority's annual report.
- + For groundwater management plans, urban groundwater licence holders are required under the *Water Act 1989* to report to their licensing corporations against their licence conditions. This requires reporting on the groundwater level, extraction volumes, salinity, and the surface water and riverine environment connected to the groundwater resource. For all other groundwater entitlements, there is no monitoring and reporting on the implementation of a groundwater management plan, but the metered use for each groundwater management unit is reported publicly on the DSE's Groundwater Online website. Rural water corporations, which are responsible for implementing groundwater management plans, are also required under section 32C(2) of the *Water Act 1989* to provide the Minister for Water and catchment management authorities (CMAs) with a report on the administration and enforcement of an approved management plan. This annual report is reviewed by the DSE.

NWI actions	NWI clause	Commentary
	39–40 continued	40(ii)—Under the <i>Water Act 1989</i> (Vic.), a 15-year review cycle occurs for all of Vic.'s water resources. For bulk entitlements, all water businesses produce annual reports that include compliance with environmental flow provisions, if applicable. Changes can occur at any time in response to a successful request to the Water Minister by an entitlement holder or by the Environment Minister, in response to extreme drought or other reasons as prescribed in the Water Act. Streamflow and groundwater management plans can also be changed at any time in accordance with section 32G of the Water Act. The SWSs do not include provisions to change rules in response to monitoring and new knowledge; however, the implementation of SWSs is reviewed annually to accelerate or decelerate the actions in the strategies. Changes to SWSs can occur in response to the SWS review every seven to 10 years. SWSs do not direct changes to be made to bulk entitlements.
Substantially complete addressing	41, 43–45	41—See NWI clause 26(i) for detail on progress.
overallocation as per National Competition Council commitments. Substantial progress towards adjusting all overallocated and/or overused systems.		43—Vic. has advised that it does not explicitly identify water systems as being overallocated or overused. Instead, it manages the needs of the environment through its water planning framework. A review of Vic.'s SWSs has identified examples of management actions for overallocated or stressed systems. The Central Region SWS states that 'some groundwater management areas are already over-allocated. In these cases water supply protection areas are declared according to provisions in the <i>Water Act 1989</i> and management plans are developed to reduce over-use in these areas.' There are 14 water systems declared as WSPAs in the Central Region (Victorian Government 2006b). Also, the Northern Region SWS states that 'in highly stressed systems, the water sharing arrangements or the total licensed volume committed from the resource may need to be revised. In these cases, a WSPA will be declared in accordance with section 32 of the <i>Water Act 1989</i> and a management plan prepared which may change licence conditions prior to the renewal of the licence.' There are currently five declared WSPAs in this region (Victorian Government 2009).
		44—Vic. has advised that it has implemented a number of water recovery projects that have delivered both high- and low-reliability entitlements to the environment. Currently, deliveries total about 402 GL in an average year over the long term (DSE 2011a). Vic. has also advised that this figure will increase over the next four years by an average of around 380 GL/year.
		Vic. has also advised that an additional 263 GL has been recovered through the Water for Rivers Program; however, that figure also includes water recovered through actions of the NSW and the Australian governments (Joint Government Enterprise Ltd 2011).
		Vic. has not reported specifically on its progress towards achieving all of its past commitments to return overallocated and overused systems to sustainable levels of extraction.
		45—See actions associated with clause 97 for more detail.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—Vic. has adopted an alternative risk assignment framework to that provided in the NWI, as per clause 51 of the NWI. The approach was developed as part of the Vic. Government's 2004 <i>Our water, our future</i> White Paper process in consultation with stakeholders. Relevant amendments to the <i>Water Act 1989</i> (Vic.) have been made.

NWI actions	NWI clause	Commentary
Water plans to address Indigenous water issues.	52–54	52—In Vic., the <i>Water Act 1989</i> (Vic.) requires that Indigenous water issues be addressed. This requirement is implemented through the water planning process. In the development of SWSs, Indigenous water values and their water requirements are identified as part of the plan consultation process. For completed SWSs, specific studies have been undertaken to identify Indigenous water values and the water requirements to maintain those values. While no cultural flows have been identified in those SWSs, the Indigenous water values have been recognised. For water management plans, the Minister appoints a consultative committee of stakeholder representatives. The committee is required to consult with the community at large, including Indigenous groups. CMAs incorporate Indigenous values into the development of regional river health strategies.
		River red gum boards of management of traditional owners are currently being set up. The jointly managed boards for the Barmah National Park and Nyah–Vinifera Park were set up in response to the Victorian Environmental Assessment Council's river red gum forests investigation. The boards will provide advice on the management of the parks, including water management.
		Vic. has advised that it has a range of policies and legislation aimed at progressing Indigenous involvement in water issues, including the following:
		+ The <i>Traditional Owner Settlement Act 2010</i> (Vic.) provides that agreements under the Act can include handing back parks and reserves of significance to the traditional owner group. The parks and reserves are to be jointly managed with the state and increase access to and the sustainable use of natural resources, including water. This legislation has enabled the establishment of traditional owner management boards, which advise on the management of the parks, including water management. A recent example is the establishment of the river red gum boards of management of traditional owners, which jointly manage the river red gum forests of the Barmah National Park and Nyah–Vinifera Park.
		+ Section 8 (Rights) of the <i>Water Act 1989</i> (Vic.) has recently been amended to include rights to water for ceremonial and spiritual uses.
		53—In Vic., native title rights to water are recognised in section 8 of the <i>Water Act 1989.</i>
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with water plans.	55–57	55–57—In Vic., the water planning framework identifies and takes into account interception activities.
		Farm dams for irrigation or commercial use require a licence, but those for stock and domestic purposes do not. Farm dams are regulated via the <i>Water (Irrigation Farm Dams) Act 2002</i> (Vic.), and registration of all new and altered stock and domestic dams in rural residential areas is now a requirement.
		Vic. has no specific policy for addressing interception by plantation forestry. However, it assesses the hydrological impact of forestry plantation developments on salinity, greenhouse gas emissions and other environmental benefits and costs. This is also stated in the Northern Region SWS, which states that interception activities, such as plantations, are a possible threat to water resources. Vic. has advised that the draft Western Region and Gippsland Region SWSs set out community and stakeholder consultation options for managing the water impacts of land-use change activities, including coal mining. The draft Gippsland SWS also considers the impact of offshore oil and gas extraction on coastal aquifers. Vic. has advised that the finalised SWSs for those regions, which are due for release in late 2011, will incorporate policy responses that address NWI clause 57.
		Vic. has further advised that it is currently using an evapotranspiration estimation method to assess unaccounted water use through interception.
NWI actions	NWI clause	Commentary
---	------------	---
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule F:	59	59—The Victorian Water Register is a public register of all water-related entitlements in regulated systems in Vic. The register records ownership and other information on water shares and also records allocations against shares, trade and usage. The register information is available online (NWC 2010a).
 pathways leading to full implementation full implementation 		The Victorian Water Register is managed by the Vic. Office of Water (in DSE) and shared between the Office of Water, rural water authorities and the Victorian Water Registrar, who has legal responsibility for the register (DSE 2011c).
Establish compatible institutional	60	60(i), (ii), (iii)—Vic. has implemented NWI-compatible institutional and regulatory arrangements that facilitate intrastate and interstate trade
that facilitate trade, including arrangements consistent with principles in Schedule G re institutional barriers to trade:		60(iv)—The Vic. Government legislated in September 2009 to remove the 10% limit on the volume of Vic. water entitlements that could be owned without association with land (NWC 2010a).
+ remove barriers to temporary trade		In June 2009, an agreement was reached between the Australian Government and the Vic. Government to phase out the 4% limit on trade out of irrigation areas. Since 30 June 2009, the Vic. Government has progressively gazetted
 remove barriers to permanent trade up to an annual threshold of 4% 		orders granting exemptions to the 4% rule in systems across northern Vic. (NWC 2010a). The exemptions relate to circumstances in which the proposed transfer is part of the Australian Government's environmental water huybacks
 review impact on trade of interim threshold 		or other Australian Government irrigation initiatives, with the aim of removing the limit entirely by 2014. However, the 4% rule continues to constrain trades to parties other than the Australian Government for environmental water purposes
+ full removal of barriers to trade.		In the unregulated systems, water use licences cannot be traded because they are attached to land and remain so, even if the water share is traded. Groundwater and unregulated licences are not seen as candidates for unbundling due to the very local nature of those entitlements.
		Trading rules exist to limit trade out of an irrigation district in response to hydrological constraints to avoid detrimental impacts on third parties, the environment, or both (NWC 2010a).
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by the 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+ review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, Rural water
 new approach to sharing delivery capacity and extraction rates among users 		use and the environment: the role of market mechanisms (PC 2006).
+ 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.		

NWI actions	NWI clause	Commentary
Relevant parties (Commonwealth, NSW, Vic. and SA) agree to:	63	63(i)—The MDB states have collaborated on interstate water trading issues such as exchange rate trading and tagged trade. The tagged trade method
 take necessary steps to enable the use of exchange rates and/ or tagging for interstate trade 		has been adopted to facilitate interstate entitlement trading. In Vic., tagged trading has so far been limited, while interstate allocation trading has increased significantly. Approaches to improve tagged trading are currently being investigated by the MDB states and the COAG Water Reform Committee.
 reduce barriers to trade in southern MDB and establish an interim limit on permanent trade 		Tagged interstate entitlement trade is possible in all trading zones in northern Vic., with the exception of the Broken River, Ovens and King trading zones.
out of water irrigation areas of 4% per annum		63(ii)(b)—From 1 July 2009, the Vic. Government progressively gazetted orders granting exemptions to the 4% rule in systems across northern Vic. The exemptions relate to circumstances in which the proposed transfer is part of the Australian
 + NSW make legislative changes to remove barriers and permit increased trade up to the interim 		Government's environmental water buybacks or other Australian Government irrigation initiatives, with the aim of removing the limit entirely by 2014.
limit		On 16 September 2009, the Vic. Government legislated to remove the 10% limit on ownership of entitlements by non-water users.
remove barriers and permit increased trade up to the interim limit		Water rights to regulated river water sources have been unbundled into access entitlements, use licences and delivery shares. In the unbundled unregulated systems, water use licences cannot be traded because they are attached to land
 review actions to assess whether relevant parties have removed barriers to achieve 		Trading rules also exist to limit trade out of an irrigation district in response to hydrological constraints (NWC 2010a).
 interim limit + study into mechanisms necessary to enable interstate trade 		63(iii), (iv), (v), (vi) and (vii)—The Commission has coordinated a number of reviews and evaluations of the effectiveness of the Australian water market. For example, clause 63(vi) is specifically addressed by the Commission's 2007 and 2010 <i>Impacts of trade</i> reports. Clause 63(vii) is considered to have been satisfied by the 2009 biennial assessment.
 review outcome of actions by NSW NWC monitor impacts of interstate trade 		63(iii)—The Commonwealth Water Charge (Termination Fees) Rules 2009 were developed to help minimise barriers to water entitlement trading in the MDB while maintaining the financial viability of irrigation infrastructure operators. The rules
 review the impact on trade under the interim threshold. 		commenced on 23 June 2009. Most provisions did not come into full effect until 1 September 2010.

NWI actions	NWI clause	Commentary	
Best practice water pricing and institutional arrangements			
Complete commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.	65	65—Vic. is compliant with the NWI Pricing Principles agreed by COAG in 2010 as they apply to water storage and delivery pricing (NWC 2011d).	
Metropolitan:	66	66—The Essential Services Commission (ESC), Vic.'s independent economic	
+ continued movement towards upper-bound pricing		regulator, reviewed and revised the pricing principles applying to recycled water. The principles specify the conditions under which businesses may deviate from full cost recovery for services (for example, where the service is required to meet	
 development of pricing policies for recycled water and stormwater 		government obligations) and require that businesses transparently report on such deviations and their approach to dealing with resulting revenue shortfalls.	
 review and development of pricing policies for trade wastes development of patienal 		A review of Vic.'s trade waste framework (including components relating to pricing) was completed in 2010, and new regulatory arrangements are currently being implemented to enable the ESC to regulate trade waste (including dispute resolution) by 1 January 2012 (NWC 2011d).	
guidelines for water accounts.		66(iv)—The National Guidelines for Residential Customers' Water Accounts were	
Rural and regional:		endorsed at the 11th meeting of the NRMMC and released on 24 November	
+ full cost recovery for all rural surface and groundwater based systems		2006 by the Australian, state and territory water ministers (NRIVINC 2006).	
 continued movement towards lower-bound pricing as per National Competition Council commitments 			
 achievement of upper-bound pricing for all rural systems, where practicable. 			
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—Vic. maintains that the NWI Pricing Principles, as they relate to water planning and management, should not preclude jurisdictions from recovering the cost of activities undertaken to directly manage land-based impacts on water quality and quantity. Vic. has obtained agreement from the Natural Resource Management Steering Committee of COAG that this issue will be dealt with as part of the planned review of the Pricing Principles (previously set for December 2010) (NWC 2011d).	
Investment in new or refurbished water infrastructure to continue to be assessed as economically and	69	69—The ESC (Vic.'s independent economic regulator) assesses proposed capital expenditures of Vic. water businesses for efficiency and prudence when determining the revenue requirements of those businesses (NWC 2011d).	
ecologically sustainable before being approved.		Major investment decisions about the water infrastructure network are made within the context of guidelines set out by the Vic. Department of Treasury and Finance under its lifecycle guidance materials and under the <i>Water Act 1989</i> (Vic.).	
		A recent Vic. Auditor-General report raised concerns about the lack of rigour applied to evaluating recent water infrastructure investments in the state (i.e. water-use efficiency programs) (Victorian Auditor-General 2010).	

NWI actions	NWI clause	Commentary
Release of unallocated water.	70–72	70–72—Under the <i>Water Act 1989</i> (Vic.), the Minister may grant new water shares, subject to the requirements of the Act.
		Vic. is employing alternative ways of meeting water demands in highly developed systems. During 2006–07, Southern Rural Water undertook works to automate the main southern and main eastern channels, generating approximately 2733 ML of water savings. The savings will be auctioned as high and low reliability water shares by Southern Rural Water in four auctions from 2010 to 2014. The first two auctions were held in June 2010 and May 2011; the third is scheduled for May 2012. Proceeds from the sales will cover the costs of water-saving projects already undertaken and provide further entitlements in the district (NWC 2011d).
Environmental externalities.	73	73—Vic. has continued to manage environmental externalities through a range of regulatory measures. Accounts for water and environmental services include an environmental contribution, effective for urban customers from 1 October 2004 and effective for rural customers on 1 July 2005. The environmental contribution is forwarded to the Vic. Government and is used to fund environmental initiatives. The charges are not considered transparent; nor are they independently reviewed (NWC 2011a).
		The Minister for Water, under s. 193 of the <i>Water Industry Act 1994</i> (Vic.), levies the environmental contribution on water supply authorities (both rural and urban) based on a percentage of revenue. The authorities pass costs on to customers through water charges, which are regulated by the ESC (NWC 2011d).
Benchmarking efficient performance	75–76	75–76—Vic. provides benchmarking information to the Commission for
 independent, public, annual reporting of performance 		water service providers.
benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies		76—Vic. has advised that that the ESC recovers all its annual operating costs through licence fees paid by the water utilities. The fees include Vic.'s share of costs for the production of the <i>National performance reports</i> . The cost of
 develop nationally consistent report framework. 		performance data audits is borne by the water utilities.
Independent pricing regulator	77	77-The ESC is the economic regulator in Vic. and determines prices for all
 independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report. 		metropolitan, regional and rural water services (NWC 2011d).

NWI actions	NWI clause	Commentary
Integrated management of environm	nental water	
 Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional arrangements to ensure the achievement of the environmental outcomes 	79	79(i) a)—In Vic., section 33DD of the <i>Water (Resources Management) Act 2005</i> (Vic.) establishes the Environmental Water Reserve, and the <i>Water Amendment (Victorian Environmental Water Holder) Act 2010</i> (Vic.) establishes the Victorian Environmental Water Holder as a body corporate responsible for managing the state's environmental water holdings. Vic.'s CMAs and Melbourne Water are responsible for local planning and the delivery of environmental water holdings. They also have a role in planning for the broader Environmental Water Reserve.
 where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the 		 Water Minister on their relevant obligations. 79(i) b)—Vic. has established management and institutional arrangements to ensure the achievement of environmental and other public benefit outcomes for
most effective and efficient mix of water recovery measures.		resources shared with other jurisdictions, including: + the Agreement on Murray-Darling Basin Reform 2008
		 + the Water (Commonwealth Powers) Act 2008 (Vic.), which refers Vic. state powers to the Australian Government in order to implement the MDB- focused Water Act 2007 (Cwth)
		+ the Snowy Water Inquiry Outcomes Implementation Deed, the Snowy Water Licence, the Snowy Scheme Long Term Arrangements Deed and the Snowy Bilateral Deed.
		 the Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin 2004
		 the Supplementary Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin 2006
		 the Further Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin: Control and Management of Living Murray Assets 2009.
		+ the 1985 Border Groundwaters Agreement.
		79(i) c)—Surface water and groundwater are defined in the <i>Water Act 1989</i> (Vic.) and their connectivity is explicitly recognised. That Act provides for an integrated expressed to the management of surface water and groundwater

integrated approach to the management of surface water and groundwater. Under that Act, a management plan may relate to groundwater resources, surface water resources, or both. Connectivity must be taken into account in the assessment of individual licence applications.

NWI actions	NWI clause	Commentary
	79 continued	79(i) d)—In Vic., there are a number of requirements to report on the achievement of environmental and other public benefit outcomes, including the following:
		+ <i>Environmental watering in Victoria</i> , an annual report by the DSE, details the outcomes of environmental watering programs across the state that use environmental water from Vic. water entitlements, The Living Murray, the Commonwealth Environmental Water Holder and donated water. CMAs undertake the monitoring for this report.
		+ The Victorian Environmental Flows Monitoring and Assessment Program (VEFMAP) provides a method for CMAs to monitor and report on environmental flow outcomes for eight major regulated river systems in Vic. Public reporting of the VEFMAP is not mandatory; however, some CMAs publish their VEFMAP assessments.
		+ For unregulated systems, streamflow is monitored under streamflow management plans, which are required to be reviewed against their objectives at a frequency of not less than five years. However, the plans do not monitor stream health, and they state that they 'will not attempt to demonstrate any environmental improvements from implementation of environmental flows.' Some plans have been in place since 2003, but no review has yet been made public.
		See NWI clauses 40(i) and (iii) for more detail.
		79(i) e)—Under the <i>Water Act 1989</i> (Vic.), environmental water held as an entitlement can be traded on the temporary water market if it is not required to achieve environmental or other public benefit outcomes. Rules-based environmental water cannot be traded.
		79(i) f)—Vic. has participated in the development of the draft national high ecological value aquatic ecosystems (HEVAE) framework and has adopted the framework's approach. In Vic., the management arrangements necessary to sustain HEVAEs are implemented through water planning. HEVAEs have been added as a specific category under the Victorian Framework for Healthy Rivers, Estuaries and Wetlands. Identified HEVAEs are also included in priority setting processes of the CMA regional river health strategies.
		79(ii)—Vic. has adopted a mix of water recovery measures to achieve modified environmental and other public benefit outcomes in surface water systems that are fully utilised. The measures include specific initiatives (The Living Murray), efficiency gains through improved infrastructure (Northern Victoria Irrigation Renewal Project and Wimmera Mallee Pipeline), water buybacks and the management of existing entitlements.
		Vic. is not employing water recovery measures in any groundwater system, but has advised that groundwater systems have limits placed on allocation through a range of processes, including qualifications specified in groundwater management plans, water shortage declarations or allocation determinations by water authorities as part of licence conditions.

NWI actions	NWI clause	Commentary
Water resource accounting		
Benchmarking of accounting systems.	81	81—Vic. has participated in the development of a range of national water accounting standards and reporting frameworks, including:
		+ the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards
		 national performance reporting on urban and rural water service providers (81(ii), (iii))
		+ a number of online databases and registers for the management of water resources in Vic. (see NWI clause 59 for more detail (81(i), (iv))).
Consolidated water accounts:	82–83	82—Vic. has trialled the Preliminary Australian Water Accounting Standards of the Water Accounting Standards Board to produce water accounts for the Melbourne region. It will review and if necessary refine the system once it has considered the exposure draft of the Australian Water Accounting Standard
+ develop and implement robust water accounting		
 identify situations where close interaction between surface water and groundwater exists 		83—The Victorian Water Register records entitlements, water shares and bulk entitlements for environmental purposes. The register can readily allow for trading
+ implement systems to integrate the accounting of surface water and groundwater.		between groundwater and surface water systems where trading is permitted by a management plan. The register has a 'trading rules engine', which can allow trade between the relevant trading zones while recognising exchange rates.
Environmental water accounting:	85	85(i)—Environmental water in Vic. is held in the Environmental Water Reserve,
+ develop an environmental water		Comprising:
arrangements		 environmental enumerics, which are recorded in the victorian water negister obligations on consumptive entitlements, including the passing flows that
+ apply the environmental water		water corporations or licensed diverters are obliged to provide
register and annual reporting arrangements.		 above-cap water, which includes water that is left over after limits on diversion have been reached and unregulated flows that cannot be kept in storage (NWC 2010b).
		85(ii)—The DSE reports annually on the environmental watering program in the Victorian Water Accounts, which include water set aside through entitlements, passing flow requirements, streamflow management plans, groundwater management plans, and water leaving the MDB. The DSE also produces an annual report, <i>Environmental watering in Victoria</i> , which details outcomes of environmental watering programs across the state. Melbourne Water produces annual reports for its six streamflow management plans, and all water businesses produce annual reports that include compliance with environmental flow provisions if applicable (NWC 2010b).
		The Victorian Environmental Water Holder was established on 1 July 2011 and has the mandate to make decisions on the best use of environmental water entitlements. It is required to report on when, where, how and why environmental water has been used.
		Vic. has provided data and information for the production of the Australian environmental water management report.
Implement information measures.	86	86—Vic. has participated with other NWI parties and the BoM in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act 2007</i> (Cwth), the BoM has been mandated to play a national water data and information role.

NWI actions	NWI clause	Commentary
 Metering and measuring actions: + develop metering and measuring actions + implement metering and measuring actions. 	: 88 ring	88—In May 2010, the Minister approved the Victorian Implementation Plan for Non-urban Water Metering in line with the national framework requirements. The plan identified the responsibilities of agencies and the dates by which the actions are required, including the development of action plans by water businesses to describe how the implementation of the national framework will occur at the business level.
		Vic. is staging the implementation of its plan to provide time for the water businesses and the metering industry to adjust to the new requirements. All new meters are installed to satisfy the new standards, and improvements to operation, maintenance and reporting are to commence in the next water planning period in 2013–14.
		Vic. has advised that it has 49 700 metered extraction sites across the state and is managing an extensive non-urban water meter modernisation program in which an estimated 18 924 meters will be upgraded and a further 7523 meters will be installed.
National guidelines on water reporting: + develop national guidelines on water reporting + apply national guidelines on	89	89—Vic. has participated in the development of a range of national reporting requirements for water management. It provides data and information for the production of the <i>Australian water markets reports</i> (clause 89(ii)) and the <i>Australian environmental water management report</i> series (clause 89(iii)), and is working with other NWI parties on compliance and reporting arrangements for water metering (clause 89(i)).
water reporting.		Vic. has also worked with the BoM Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). The BoM has used Vic. information in its pilot National Water Account (BoM 2010).
	89(ii)—The National Water Market System (NWMS) was launched in late 2010. The objective of the NWMS is to strengthen Australia's water market through the efficient management of improved state and territory water registers and water transactions and greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions.	
		A major element of the NWMS is the development of a common registry system—a standardised national water register that will replace existing water registers in NSW, WA, SA, Tas., the NT and the ACT. The existing Vic. and Qld water registers have recently been upgraded and will be further enhanced as part of the project.
		See also the discussion on water accounting under NWI clause 82.

NWI actions	NWI clause	Commentary
Urban water reform		
 Implementation of demand management measures, including: + implementation and compliance monitoring of WELS, including mandatory labelling and 	91	91(i)—The Water Efficiency Labelling and Standards (WELS) Scheme is a joint initiative of the Australian Government and the state and territory governments. The Commonwealth <i>Water Efficiency Labelling and Standards Act 2005</i> provides the legal framework for the scheme. Vic. enacted complementary legislation in 2005 (the <i>Water Efficiency Labelling and Standards (Victoria) Act 2005</i>).
 minimum standards for agreed appliances develop and implement 'Smart Water Mark' for garden activities review effectiveness of temporary water restrictions and associated public education strategies, and consider extending low-level restrictions to standard practice implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. 		 91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry, Australia, and the Water Services Association of Australia. It is a not-for-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities, the four governing associations, and the chair of the Technical Expert Panel (an independent panel that assesses applications to the scheme). 91(iii)—Vic. participated in the production of the Commission's national review of water restrictions. Water restrictions are managed by Vic.'s urban water corporations and are applied across the state based on the Uniform Drought Water Restriction Guidelines. Observed reductions in residential consumption during the 2000s were largely due to a combination of restrictions, conservation campaigns and investments in technical water-use efficiency, such as leak detection. Increases in the volumetric price for water, including through inclining block tariffs, also played a role in influencing demand (NWC 2011d). 91(iv)—Observed reductions in residential consumption during the 2000s were largely due to a combination of restrictions campaigns and investment in technical water-use efficiency. However, increases in the volumetric price for water, increases in the volumetric price for water increases in the volum
 Encourage further innovation in urban water use, including: + develop and apply national health and environmental guidelines for water-sensitive urban designs for recycled water and stormwater + develop national guidelines for evaluating options for water- sensitive urban developments in both new urban subdivisions and 	92	 92(i), (ii), (iii)—Vic. has participated in national working groups and committees to develop the <i>Australian guidelines for water recycling: managing health and environmental risks.</i> The EPA Victoria has released <i>Guidelines for environmental management: use of reclaimed water</i> and <i>Guidelines for environmental management: dual pipe water recycling schemes</i> (EPA Victoria 2003, 2005). The Department of Human Services has also released the <i>Guide for the completion of a recycled water quality management plan.</i> Water-sensitive urban design guidelines have been prepared by the city of Yarra (City of Yarra 2007). 92(iv)—Vic. has reviewed institutional and regulatory models to meet the challenges of providing integrated urban water cycle planning and management and developing best practice guidelines. The Victorian Competition and Efficiency Commission completed an inquiry into the reform of the Melbourne metropolitan.
 high-rise + evaluate existing water-sensitive urban icon developments + review institutional and regulatory models for integrated urban water cycle planning and management and develop best practice guidelines + review incentives to stimulate incountion 		retail water sector in 2008 (VCEC 2008). The report made a number of recommendations for the reform of the sector, including that the Vic. Government develop an access regime for water and wastewater infrastructure services. The ESC undertook an inquiry into the access regimes for water and sewerage infrastructure services, which was completed in September 2009 (ESC 2009). 92(v)—Vic. has implemented a range of incentive and rebate schemes targeted at the household, business, industry and city and town levels to reduce urban water consumption. The programs include financial rebates for the installation of more water-efficient devices, funding programs for the cities and towns to develop more sustainable more supply and delivery. and programs to assist

NWI actions	NWI clause	Commentary
Community partnerships and adjustn	nent	
Open and timely consultation with all relevant stakeholders in relation to:	95	95(i)—Vic. consults stakeholders widely as part of the development of the SWSs, which deal with recovery of water.
 + pathways for returning overallocated systems to sustainable extraction levels + periodic review of water plans + other significant decisions affecting the security of water access entitlements. 		Streamflow management plans and groundwater management plans are developed for WSPAs declared by the Minister to reduce overuse in those areas (Victorian Government 2006). The Minister appoints a consultative committee of stakeholder representatives to develop the plans. The committee must consult the community, including Indigenous communities, during development. In WSPAs where local management rules are being implemented, stakeholder consultation is not required to the same extent as for water management plans; for example, rules are not developed through stakeholder representative groups and do not require public consultation.
		95(ii)—Community consultation is required under the <i>Water Act 1989</i> (Vic.) during periodic reviews of SWSs, long-term resource assessments and management plans for WSPAs.
		95(iii)—Vic. has advised that the <i>Water Act 1989</i> requires a process of public notification and consultation as part of any action to make or amend a bulk entitlement, or as a result of a long-term resource assessment that results in any action to rebalance the shares of water for consumption and the environment.
Provision of accurate and timely 96 information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96(i)— SWSs contain implementation plans and project updates, and annual reviews are made available to the public on the DSE's website. The updates and reviews provide information on the progress of the implementation of the SWSs.
		96(ii)—The DSE also publishes online monthly water reports that provide the latest information on rainfall, streamflow, storage and groundwater levels, allocations, restrictions, the Environmental Water Reserve and seasonal outlooks.
Address significant adjustment	97	97—Vic. has addressed adjustment issues in a number of water systems:
issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.		 + Structural adjustment is addressed in the Northern Region SWS to help communities in irrigation districts adjust to variations in future water availability as a result of drought, the transfer of water from consumptive use to the environment and, potentially, climate change.
		 Investment in infrastructure for water efficiency under the Northern Victorian Irrigation Renewal Project is designed to increase certainty for irrigators.
		 The Future Farming strategy developed by the Department of Primary Industries in 2008 provides direct support to the farming sector.

NWI actions	NWI clause	Commentary
Knowledge and capacity building		
Identify the key science priorities to support implementation of the NWI and where this work is being undertaken.	101	101(i)—The Smart Water Fund is part of the Vic. water industry's response to water scarcity and climate change. The fund is focused on finding and supporting innovative solutions to current and future water-related challenges. The DSE is one of five funding partners in this initiative (Victorian Government 2010).
Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.		Water businesses, such as Goulburn–Murray Water Corporation, have identified priorities for research and development, including the future of irrigation, surface water – groundwater interaction, ensuring healthy environments, developing people and capabilities, and the potential for investing in mini-hydro systems.
		Vic. is developing the Victorian Strategy for Healthy Rivers, Estuaries and Wetlands, due in mid-2011, which updates the Victorian River Health Strategy. It will highlight the priorities for research in this area. In particular, it will provide an outline for using research and new information within a coordinated network of agencies in water quality planning and implementation (DSE 2011b)
		101(ii)—Vic. has not developed proposals to more effectively coordinate the national water knowledge effort, although it has participated in this process through its involvement in the COAG Water Reform Committee.

Western Australia

NWI actions	NWI clause	Commentary		
Water access entitlements and planning framework				
 Implementation of the framework: + substantial completion of plans to address any existing overallocation for all river systems and groundwater resources in accordance with commitments under the 1994 COAG Water Reform Framework 	26	26(i)—In its 2007 NWI Implementation Plan, WA identified 24 areas for management under water allocation plans (WAPs). Twelve of the areas included some management units identified as overallocated, which required WAPs to be completed as part of WA's commitments under the 1994 COAG Water Reform Framework (COAG 1994).		
		WAPs include a recovery strategy for overallocated management units within plan areas. Management units that are close to full allocation or overallocated are identified for closer management and, where appropriate, entitlement reductions.		
regimes amended to incorporate the elements of the entitlements and allocation framework in this		WA has developed a water planning framework that guides water management in the state, in line with the overarching legislation—the <i>Rights in Water and</i> <i>Irrigation Act 1914</i> (WA).		
agreement.		Twenty-six plans have been developed to date, covering all but four of the areas identified as overallocated in the state's NWI Implementation Plan. Use is capped in those areas.		
		WA reported that the Department of Water (DOW) develops WAPs on a priority basis. DOW has developed WAPs for all high-priority management areas (highly allocated and overallocated areas). WAPs are not appropriate for some areas of the state, such as for isolated and fractured rock aquifers where a reliable yield cannot be determined or for areas where use is very low. In those areas, DOW manages the impacts of water allocations using the water licences. WAPs are not developed for unproclaimed areas.		
		There are six groundwater areas and four surface areas where a WAP is needed, but that are yet to be covered by a plan. WA considers that the remaining areas are low risk, and has reported that they are managed through licences without a need for a plan.		
		26(ii)—WA has not implemented NWI-compliant legislation to provide the statutory basis for water access entitlements. Currently, the right to take (and store) water is licensed under the Rights in Water and Irrigation Act.		
Water access entitlements to be defined and implemented.	28–34	28–33—In WA, WAPs define the consumptive pool through allocation limits and impact management rules. The associated entitlements have a statutory basis and are unbundled from land, but are not perpetual. The licence components managing the impacts of abstraction, works and allocations are not unbundled.		
		34—WA addresses water use by the minerals and petroleum sectors through water licences, WAPs and water supply planning (where the industry is a major user of scheme water). All mining is within the licensing framework. For large water users, DOW uses the water licences, including operating strategies, to assess and manage potential impacts on other water users and the environment. The department has released the Pilbara water in mining guideline to guide how water is managed in the Pilbara mining industry (DOW 2009b). WA advised that it is now developing guidelines that will be applicable state wide. Major mining projects may be facilitated under state agreements, which are contracts between the state government and proponents of major resources projects ratified by an Act of the state parliament. They can override any other state legislation.		

NWI actions	NWI clause	Commentary
Water to meet environmental and other public benefit outcomes identified in water plans to be defined, provided and managed.	35	35—In WA, the <i>Rights in Water and Irrigation Act 1914</i> (WA) provides for the identification and management of water for environmental and other public benefit outcomes. Through water allocation planning, DOW sets the water resource objectives to achieve environmental outcomes in accordance with Statewide Policy No. 5: Environmental Water Provisions Policy for Western Australia, and then defines the management arrangements to achieve those objectives (WRC 2000). The resource objectives also take into account consumptive use outcomes and the capacity to manage risk to the environment through licensing or other means. In most cases, water for environmental outcomes is retained in situ and objectives are met by limiting the amount of water for consumptive use. Water for environmental outcomes has the same level of reliability as a water licence. In some groundwater areas, such as where drying climate is a significant factor, environmental outcomes are reconsidered in the light of critical human water needs, which can affect their security.
 Water plans to be prepared along the lines of the characteristics and components at Schedule E, based on the following priorities: + plans for systems that are overallocated, fully allocated or approaching full allocation + plans for systems that are not yet approaching full allocation. 	39–40	 39—WA has implemented a water planning process that is consistent with Schedule E of the NWI as far as is possible within existing legislation. Because water systems across WA vary, management arrangements to achieve objectives are tailored to the system. Water planning includes stakeholder consultation; the application of the best available scientific knowledge; adequate opportunity for consumptive use, environmental, cultural and other public benefit issues to be identified and considered in an open and transparent way; reference to broader regional natural resource management planning; and consideration of, and synchronisation with, cross-jurisdictional water planning. WA prioritises the development of its WAPs and uses a risk-based approach to determine the level of planning that it undertakes in an area. Prioritisation is based on resource status (level of abstraction/pressure); external commitments (reform, ministerial, regional water plans); reviews of existing water plans with DOW commitments (set in the plans); plans already started; and new strategic or government priorities. Where the intensity of the water planning effort is low (where less than 30% of the resource is allocated), the department sets allocation limits and manages take through water licences. 40—WA reported that annual evaluation reports on water plans are released publicly to show performance against the objectives of the water plans. However, only two have been released to date, for the Upper Collie WAP and for the Carnarvon Artesian Basin Water Management Plan (DOW 2009a, 2010b). Technical reports, such as hydrological assessments and environmental water

NWI actions	NWI clause	Commentary
Substantially complete addressing	41, 43–45	41—See clause 26(i) for details on progress.
overallocation as per National Competition Council commitments.		43–44—Through water planning, WA assesses its water resources for overallocation and overuse and then, if necessary, implements recovery
Substantial progress towards adjusting all overallocated and/or overused systems.		pathways so as to achieve environmental and other public benefit outcomes. Sustainable levels of extraction are determined in all WAPs and set as allocation limits. To recover overallocated and/or overused systems, the relevant WAPs contain recovery strategies that set out the recovery mechanisms. WA reported that it also uses compliance and enforcement actions in situations where overuse is identified, and that the Minister has a broad set of instruments to address overallocation and overuse through water planning, including the purchase of licences; the ability to vary, amend, add or remove any condition on a licence; the power to cancel or suspend a licence; or, at their total discretion, the ability to decide not to renew a water licence.
		Implementation of those measures is undertaken in areas with a WAP; however, there is currently no reporting of the achievement of sustainable levels of extraction.
		WA reported that there are a number of additional areas that are now considered overallocated as a result of reduced water availability due to climate. There are cases where the set water allocation limits were suitable for the average climate, but in the past decade rainfall has decreased markedly in the south-west of WA and the available water has decreased. Water allocation limits are being reset through allocation planning to take climate (and improved management) into account and to maintain reliable supplies for the existing level of use. In some cases, this means that parts of some systems that were previously not overallocated are now overallocated, even though the level of use has not changed.
		Consequently, there are some systems that include management units that are overallocated. The recovery approach for those areas is identified in the WAPs and is implemented by regional licensing officers. In order of increasing impact, the general approach is to:
		1. cap the level of use
		2. manage licences to reduce the risk of overallocation and recover entitlements
		reduce water use by reducing entitlements (or by reducing shares of entitlement) as the effects of climate change become more evident.
		45—See NWI clause 97 for more detail.
Risk assignment framework to be implemented immediately for all changes in allocation not provided for in overallocation pathways in water plans.	46–50	46–50—The strategic policy on risk assignment was finalised in July 2009 and will guide the implementation of risk assignment should the enabling legislation be enacted. See NWI clause 26(ii) for more detail on WA's legislation.

NWI actions	NWI clause	Commentary
Water plans to address Indigenous water issues.	52–54	52–54—Water allocation planning in WA provides for Indigenous access to water resources; specifically, it provides for non-consumptive cultural uses. WA advised that in situ water for Indigenous values is accounted for in WAPs. The values are identified through consultation and using reports generated from previous consultation activities.
		Indigenous knowledge is a consideration in the development of water management plans, and WA reported that it is also used in making appropriate water allocations for the environment.
		DOW has established the Indigenous Affairs Advisory Committee, which provides views on water planning and cultural awareness training. Under the <i>Rights in Water and Irrigation Act 1914</i> (WA) there is no express recognition of cultural heritage matters or native title issues; however, Indigenous representation is sought for local water resource management committees.
Implementation of measures to address water interception by land-use change activities on a priority basis in accordance with water plans.	55–57	55–57—DOW considers interception activities during allocation planning. Where the interception is significant, the potential or actual water take is included when setting the consumptive pool (the allocation limit) to avoid potential overallocation. Types of interception and how DOW manages them include the following:
		+ <i>On-stream farm dams:</i> In proclaimed areas, dams for commercial purposes are licensed. In unproclaimed areas, dams are mapped and the potential interception is estimated. The potential interception from dams for stock and domestic purposes is also estimated.
		+ <i>Domestic garden bores:</i> Interception from shallow groundwater can be significant, particularly in urban areas. Garden bores are not licensed, but the water use is estimated and accounted for in all plans. DOW reports that it has recently completed a project to improve estimates of urban garden bore use.
		+ <i>Plantation forestry:</i> Where interception is significant, DOW accounts for its water take. In other areas, plantations are mapped and potential water take is considered. WA cannot license plantations under existing legislation, but DOW advises shires where water availability is limited and plantations may affect other water users and the environment.
Water markets and trading		
Adoption of publicly accessible, compatible systems for registering water access entitlements and trades consistent with Schedule E	59	59—WA has a water resource licensing system that records water licences and details of transfers. The system is managed by DOW and the information is publicly available but not online (NWC 2010b).
 + pathways leading to full implementation 		At the national level, WA provides its water market and trading data and information to the National Water Market System, which is the online national water trade register (Australian Government 2010).
 full implementation. 		

NWI actions	NWI clause	Commentary
Establish compatible institutional and regulatory arrangements that facilitate trade, including arrangements consistent with principles in Schedule G re	60	60—Non-NWI-consistent legislation separating water rights from land title inhibits efficient and effective water trade in WA. Water licences in WA can only be held by persons who own or have legal access to land. Therefore, water can only be transferred to persons who have legal access to land within the same water management unit.
Insulutional partiers to trade: + remove barriers to temporary trade		Water trading currently takes place in WA and is increasing as water resources reach full allocation. Under the <i>Rights in Water and Irrigation Act 1914</i> (WA), the holder of a water licence may apply to transfer to another person all or part of their licensed entitlement to take water. This Act is cumbersome, as transfer applications require ministerial approval (delegated to DOW) as for the issue of a new licence. The Minister's approval is also required for a licence holder to enter
 remove barriers to permanent trade up to an annual threshold of 4% 		
+ review impact on trade of interim		into an agreement to allow another person to operate under the licence.
+ full removal of barriers to trade		There are no further regulatory or administrative barriers to water trade in WA.
Complete the following studies and consider implementation of any recommendations:	61	61(i) and 61(ii) were satisfied by 2006 <i>National Water Initiative water trading study</i> prepared by PricewaterhouseCoopers for the Department of the Prime Minister and Cabinet (PWC 2006).
+ review of water products		61(iii) was satisfied by the 2006 Productivity Commission report, Rural water
 new approach to sharing delivery capacity and extraction rates among users 		use and the environment: the role of market mechanisms (PC 2006).
+ 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.		
Southern MDB trade actions.	63	This clause is not applicable to WA.
Best practice water pricing and institution	tutional arrang	ements
Complete commitments under the 1994 COAG Water Reform Framework to bring into effect pricing policies for water storage and delivery in rural and urban systems.	65	65—WA has completed commitments under the 1994 COAG Water Reform Framework to bring into effect consumption-based pricing and full cost recovery of water storage and delivery services for both rural and urban systems.

NWI actions	NWI clause	Commentary
Metropolitan: + continued movement towards	66	66(i)—Pricing in metropolitan areas is substantially compliant with upper-bound pricing (NWC 2011d). Customers in the metropolitan area are currently paying prices that reflect the long-run marginal cost of supply. An Economic Regulation Authority (ERA) inquiry recommended price increases to reflect the sharply increasing cost of supply. The WA Government accepted the recommendation and implemented the tariffs recommended by the ERA for 2010–11. In WA, the ERA makes pricing recommendations to the state government for a three-year regulatory period after holding an inquiry. The ERA completed its Inquiry into the Tariffs of the Water Corporation, Aqwest and Busselton Water in 2009 (ERA 2009b).
 upper-bound pricing development of pricing policies for recycled water and stormwater 		
+ review and development of pricing policies for trade wastes		
+ development of national guidelines for water accounts.		the WA utilities reported a positive economic real rate of return (NWC 2011c).
Rural and regional:		Water in Western Australia are not supported at this time (ERA 2009b). While the
 full cost recovery for all rural surface and groundwater based systems 		principles recommended by the ERA could efficiently allocate the resource, there is a risk that they could also impede recycled water projects in WA. Net direct pricing removes the financial incentive for wastewater service providers to seek
 + continued movement towards lower-bound pricing as per National Competition Council commitments 		recycled water projects, and also removes the flexibility to negotiate on other matters essential to the projects' success. Recycled water in WA is priced in accordance with the NWI Pricing Principles. In July 2010, the WA Government responded to the ERA's Inquiry into Pricing of Recycled Water in Western Australi The government's response is available from the Department of Water's website
 achievement of upper-bound pricing for all rural systems, 		66(iii)—WA reported that it is not currently planning to develop pricing principles for trade waste.
where practicable.		66(iv)–66(iv)—The National Guidelines for Residential Customers' Water Accounts were endorsed at the 11th meeting of the NRMMC and released on 24 November 2006 by the Australian, state and territory water ministers (NRMMC 2006).
		66(v)(a)—WA reported that, following the 2006 ERA Inquiry on Country Water and Wastewater Pricing in Western Australia, the government is phasing in reforms to country town water prices. Water-use prices for commercial and high-volume residential customers are transitioning to match the costs of individual schemes, up to a state-wide cap. In rural WA, the four irrigation cooperatives pay the Water Corporation for bulk water; the prices are lower bound and based on renewals. For regional towns and rural water service providers, the Water Corporation receives a community service obligation payment so that its bulk water revenue is at upper bound on forward-looking capital expenditure. A review of the effectiveness of the current community service obligation arrangements is currently suspended, but WA reported that it is expected to continue during 2011.
		66(v)(b)—Irrigation cooperatives currently comply with lower-bound pricing for capital expenditure. Bulk water supply agreements with the Water Corporation provide for a return on assets from current and future capital expenditure.
Consistent approaches to pricing and attributing costs of water planning and management.	67	67—In WA, there are no specific charges, levies or fees to meet water planning and management costs. An ERA inquiry into water resource management and planning charges is now completed, and the WA Government is developing a position and response to the recommendations made by the ERA (ERA 2011).

NWI actions	NWI clause	Commentary
Investment in new or refurbished water infrastructure to continue to be assessed as economically and ecologically sustainable before	69	69—The ERA examines the capital expenditure of the Water Corporation as part of three-yearly tariff inquiries. The 2009 tariff inquiry analysed the corporation's capital expenditure and concluded that its processes for capital expenditure were appropriate (ERA 2009b).
being approved.		Significant capital expenditure proposals are reviewed by the Department of Treasury and Finance and are subject to sign-off by the Economic and Expenditure Reform Committee.
		Environmental assessment guidelines are issued by the Environmental Protection Authority (EPA) to provide advice to proponents and the public generally on the procedures and minimum environmental requirements that the EPA expects to be met in environmental impact assessments. Environmental assessment guidelines are not statutory documents (EPA 2011).
Release of unallocated water.	70–72	70–71—DOW has identified the establishment of market-based mechanisms to release additional water for allocation and support enhanced water trading as one of 10 top priorities over the next five years.
		72—DOW has examined options for the use of market-based mechanisms for the release of new water allocations. In most cases, it appears that further regulations will need to be drafted to create the legal power to charge for new water releases.
		Some of the irrigation cooperatives use market-based mechanisms to distribute water entitlements to their members. In November 2010, Harvey Water auctioned 5.3 GL of water to its members after acquiring the water through a one-year trade with the Water Corporation (Loney 2011).
Environmental externalities managed through a range of regulatory measures.	73	73—In WA, the licensing of take from rivers and groundwater is the main method for minimising the negative environmental externalities of using the water. Similarly, pollution licensing and environmental approvals for treatment facilities are the main means of minimising the negative environmental externalities of wastewater treatment.
		The inclusion of environmental externalities in pricing has been examined by the ERA in two inquiries. The Inquiry into Recycled Water Pricing in Western Australia recommended that externalities be considered in the pricing of recycled water projects on a case-by-case basis (ERA 2009a). That recommendation was supported by the government. The Inquiry into the Tariffs of the Water Corporation, Aqwest and Busselton Water investigated whether an externality premium was warranted in relation to the abstraction of groundwater for Perth's water supply, but ERA's final report did not make any recommendation on this matter (ERA 2009b).
Benchmarking efficient performance:	75	75 and 76—Benchmarking information and data are provided to the Commission's <i>National performance reports</i> for urban and rural utilities.
 independent, public, annual reporting of performance benchmarking for all metropolitan, non-metropolitan and rural water delivery agencies 		
+ develop nationally consistent report framework.		
Independent pricing regulator:	77	77—In WA, the ERA reviews and recommends prices but does not have a
 independent pricing bodies to set and review prices or pricing processes for water storage and delivery and publicly report. 		mandate to set water and wastewater charges or an ongoing role in monitoring compliance with government pricing decisions. Prices are set by the government (NWC 2011d).

NWI actions	NWI clause	Commentary	
Integrated management of environmental water			
 Recognising the different types of surface water and groundwater systems: + effective and efficient management and institutional arrangements to ensure 	79	79(i) a)—In WA, the statutory framework for environmental water is provided by the <i>Rights in Water and Irrigation Act 1914</i> (WA), Statewide Policy No. 5: Environmental Water Provisions for Western Australia (WRC 2000), the <i>Environmental Protection Act 1985</i> (WA) and the <i>Waterways Conservation Act 1976</i> (WA). Those arrangements make the Minister for Water responsible for the delivery of environmental water and DOW the agency responsible for its management.	
 the achievement of the environmental outcomes + where it is necessary to recover water to achieve environmental outcomes, to adopt the principles for determining the most effective and efficient mix 		Management mechanisms to achieve water regimes that meet environmental water objectives at a geographical scale are established in WAPs. WAPs define the amount of water that can be taken for consumptive use after in situ environmental water needs are met. Management mechanisms to achieve water regimes that meet environmental water objectives at point scale are established through water licence assessments, and management mechanisms are integrated into the licence assessment and reporting process.	
of water recovery measures.		79(i)b—Through its water allocation planning and licensing processes, DOW has established the following arrangements for the shared resources in the Ord system:	
		+ an environmental flow regime in the lower Ord River	
		+ set (sustainable) limits on the water entitlements to be granted from Lake Kununurra and the lower Ord River	
		+ strictly limited further regulation of the Dunham River tributary to maintain the remaining natural variability of wet season flows in the lower Ord River	
		+ operating rules for the Ord River and Kununurra Diversion dams.	
		79(i) c)—In WA, most of the current WAPs have separately addressed surface water and groundwater due to the geographical extent that the WAPs cover and the complexity of resources within the water plan areas. However, where significant or ecologically important connections between systems exist, DOW treats the systems as integrated systems when making management decisions and rules in WAPs. Surface water – groundwater connectivity is recognised through water planning policies and process. Also, groundwater-to-groundwater connectivity between different aquifers is often a significant consideration in establishing appropriate allocation limits and monitoring impacts. All groundwater WAPs treat connected aquifers as integrated systems.	
		79(i) d)—WA reported that annual evaluation reports are released publicly for water plans to show performance against the objectives of the WAPs. However, only two have been released to date, for the Upper Collie WAP and for the Carnarvon Artesian Basin Water Management Plan (DOW 2009b, 2010a).	

79(i) e)—In WA, environmental water held by the government is rules based and cannot be traded on the water market.

Technical reports, such as hydrological assessments and environmental water

assessments to support future planning, are also prepared.

NWI actions	NWI clause	Commentary
	79 continued	79(i) f)—WA has not yet adopted the proposed national framework for identifying high ecological value aquatic ecosystems (HEVAEs), but has worked with other NWI parties on its development and trial. The framework was tested in the Walpole Nornalup system and it is proposed to implement it in a number of other surface water management areas.
		WA has not undertaken a systematic state-wide survey to identify HEVAEs, but relies on the development of WAPs to identify them and take into account their water requirements. It uses existing data to identify ecological values of local, regional, national and international significance and then assesses the potential impacts on them from water extraction when developing a WAP. DOW's Environmental Water Provisions Policy also requires such assets to be maintained at a low level of risk (WRC 2000).
		79(ii)—WA reported that in most systems water is reserved for the environment through allocation regimes that aim to retain environmental water in situ by managing to a sustainable allocation limit. Therefore, it is not currently necessary for the Minister for Water, as the state's environmental water holder, to use trading to improve environmental outcomes.
Water resource accounting		
Benchmarking of accounting systems.	81	81—WA has participated in the development of a range of national water accounting standards and reporting frameworks, including:
		 the Water Accounting Conceptual Framework, general purpose water accounting reports and the Preliminary Australian Water Accounting Standards (WASB 2010).
		+ national performance reporting for urban and rural water service providers (clause 81(ii), (iii).
		+ a number of online databases and registers for the management of water resources in WA (clauses 81(i), (iv)).
		See NWI clause 59 for more detail.
Consolidated water accounts:	82–83	82—WA has worked with other NWI parties on the development of the Preliminary
+ develop and implement robust water accounting		Australian Water Accounting Standards of the Water Accounting Standards Board and has used them to produce water account reports for the Lower Gascoyne and the Gnangara Mound in the Methods Pilot 2007–08 (WASB 2010). DOW is
 identify situations where close interaction between surface water and groundwater exists 		currently preparing consolidated water accounts for the Gnangara groundwater areas and the Ord River for 2009–10. It is DOW's intention that all water accounts it prepares will comply with the National Water Accounting Standards.
 implement systems to integrate the accounting of surface water and groundwater. 		83—In WA, water accounting systems recognise connectivity between groundwater and surface water systems.

NWI actions	NWI clause	Commentary
 Environmental water accounting: 85 + develop an environmental water register and annual reporting arrangements + apply the environmental water register and annual reporting 	85	85(i)—WA has not developed an environmental water register. It reported that registers for environmental water are not as relevant in WA because the environmental water system is rules-based rather than entitlements-based. Situations in which water is delivered to an environment as a specified volume are uncommon. There are limited situations where the delivery of environmental water is defined as a regime (as in the Ord WAP) or through conditions on a higher risk licence should a threshold be reached.
arrangements.		85(ii)—There is specific reporting on the performance of environmental water rules where they have been set as criteria by the Minister for Environment through an environmental impact assessment.
		The general purpose water accounts that apply the Preliminary Australian Water Accounting Standards serve a multitude of uses, including environmental water accounting. Past general purpose water accounts for Carnarvon and the Gnangara Mound have had extensive environmental reporting components in the contextual statements and in the notes to the accounts (BoM 2010). They have applied the standard principles for environmental water accounting. The intention is to provide annual reporting on compliance with environmental water provisions for priority water management systems.
Implement information measures.	86	86—WA has participated with other NWI parties and the Bureau of Meteorology (BoM) in the development of national water accounting standards and reporting frameworks that facilitate the implementation of a nationally coordinated approach to data collection and storage. Under the <i>Water Act 2007</i> (Cwth), the BoM has been mandated to play a national water data and information role.
 Metering and measuring actions: + develop metering and measuring actions + implement metering and 	88	88—WA has participated in the development of national water metering standards and reporting frameworks. The state's metering implementation plan was finalised in December 2008 and submitted to the Australian Government in early 2009. To date, there has been no official response from the Australian Government to the associated \$99 million funding submission.
measuring actions.		Across WA, licensing policy requires that privately owned meters be fitted to draw points associated with licences with annual water entitlements of 500 000 kilolitres and over. Lower thresholds may apply in priority areas, such as the Carnarvon system.
		DOW's metering program has installed 1267 state-owned water meters on privately owned licensed draw points across the Gnangara Mound. The program was established as an outcome of the State Water Strategy, in response to the urgent need to obtain sound information on current water use across the mound (Western Australian Government 2003). The program satisfied commitments made under the NWI to meter licensed water use.

NWI actions	NWI clause	Commentary
National guidelines on water reporting: + develop national guidelines on water reporting	89	89—WA has participated in the development of a range of national reporting requirements for water management. It is working with other NWI parties on compliance and reporting arrangements for water metering (89(i)), and provides data and information for the production of the <i>Australian water markets reports</i> (89(ii)) and the <i>Australian environmental water management</i> report series (89(ii)).
 apply national guidelines on water reporting. 		WA has also worked with the BoM Water Accounting Standards Board to develop the exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports (WASB 2010). The BoM has used WA information in its pilot National Water Account (BoM 2010).
		89(ii)—The National Water Market System (NWMS) was launched in late 2010. The objective of the NWMS is to strengthen Australia's water market through the efficient management of improved state and territory water registers and water transactions and greater availability of market information. The NWMS will provide market information and assist with the recording of water entitlements and the management of transactions (Australian Government 2010).
		A major element of the NWMS is the development of a common registry system—a standardised national water register that will replace existing water registers in NSW, WA, SA, Tas., the NT and the ACT.
		See also the discussion about water accounting under NWI clause 82.
Urban water reform		
 Implementation of demand management measures, including: + implementation and compliance monitoring of WELS, including mandatory labelling and minimum standards for agreed appliances + develop and implement 'Smart Water Mark' for garden activities + review effectiveness of temporary water restrictions 	91	 91 (i)—The Water Efficiency Labelling and Standards (WELS) Scheme is a joint initiative of the Australian Government and the state and territory governments. The Commonwealth <i>Water Efficiency Labelling and Standards Act 2005</i> provides the legal framework for the scheme. WA enacted complementary legislation in 2006 (the <i>Water Efficiency Labelling and Standards Act 2006</i>). 91(ii)—The Smart Approved WaterMark was established by four associations: the Australian Water Association, Irrigation Australia, the Nursery and Garden Industry, Australia, and the Water Services Association of Australia. It is a notfor-profit scheme overseen by a steering committee with representation from the Australian Government, state and territory governments, water utilities, the four governing associations, and the chair of the Technical Expert Panel (an independent nanel that assesses anninations to the scheme)
 temporary water restrictions and associated public education strategies, and consider extending low-level restrictions to standard practice + implement management responses to water supply and discharge system losses, including leakage, excess pressure, overflows and other maintenance needs. 		independent panel that assesses applications to the scheme). 91 (iii)—WA participated in the Commission's national review of water restrictions. Restrictions are in place throughout WA. They prescribe how water can be used outside, including by allocated watering days for lawns and gardens and the restriction of water use for outdoor cleaning purposes. Water restrictions are now in regulations. Storage levels for the integrated water supply system need to be above 50% before the WA Government will consider easing the current restrictions. The WA Water Corporation has a water loss reduction program, with the objective of reducing per capita water use from 2007–08 levels of 147 kilolitres a year to 125 kilolitres a year by 2030. Observed reductions in residential consumption during the 2000s were largely due to a combination of restrictions, conservation campaigns and investments in technical water-use efficiency. Increases in the volumetric price for water also played a role in influencing demand. 91(iv)—Service providers prepare asset management plans for their EBA
		licences. The plans identify system losses, including leakages, pressure, flow and maintenance activities. WA reported that service providers have their own maintenance programs in place, undertake regular monitoring and implement

leak detection procedures.

NWI actions	NWI clause	Commentary
Encourage further innovation in urban water use, including:	92	92(i), (ii) and (iii)—WA has participated in national working groups and committees to develop the <i>Australian guidelines for water recycling: managing health and</i>
 develop and apply national health and environmental guidelines for water-sensitive urban designs for recycled water 		environmental risks, which address quality guidelines for recycled water and stormwater use. It applied those guidelines through the <i>Better urban water management manual</i> (WAPC 2008). WA also participated in the Commission's national review of water restrictions (ISF and ACIL 2009).
 and stormwater + develop national guidelines for evaluating options for water- sensitive urban developments in both new urban subdivisions and 		New WAter Ways is a partnership between the WA departments of Water and Planning, the Western Australian Local Government Association, the Water Corporation and the Urban Development Institute of Australia. The program is a communication and capacity-building vehicle for the promotion of water-sensitive urban design, integrated water cycle management and water-sensitive cities in WA.
 high-rise + evaluate existing water-sensitive urban icon developments - review institutional and 		New WAter Ways will deliver an adaptive and responsive upskilling program in water-sensitive urban design for state and local government engineers, planners and the development industry. This WA initiative has strong linkages to local government and industry, which enhances the integrated water cycle management knowledge
regulatory models for integrated urban water cycle planning and		base and facilitates on-ground outcomes. The program will incorporate learning from innovative urban water-sensitive projects to share among the network through a series of interactive events, awareness building and support (New WAter Ways 2011).
management and develop best practice guidelines		92(iv)—State Planning Policy 2.9 was updated in 2006 to require and support integrated land and water planning for total urban water cycle management
 review incentives to stimulate innovation. 		(WAPC 2006). This was followed by the <i>Better urban water management manual</i> in 2008 to provide guidance on the implementation of best management practice (WAPC 2008). WA advised that State Planning Policy 2.9 is currently undergoing a further review. The <i>Better urban water management manual</i> and water-sensitive urban design are both now recognised by industry and stakeholders.
		WA reported that DOW always considers recharge changes caused by urbanisation in water allocation planning, and uses water accounting to set aside some water for domestic bores (a form of localised stormwater recycling).
		92(v)—WA advised that it is providing incentives to stimulate change in recognition of the need to encourage the community to trade and not to rely on unsustainable releases of water by:
		 regularly reviewing WAPs, reducing allocation limits and encouraging changes in usage
		 not recouping efficiency gains through water licences (water saved will be used through trading or the expansion of existing operations)
		+ DOW sponsorship of international water recycling and efficiency conferences and courses for water professionals, in partnership with Murdoch University and Curtin University
		+ implementing the Water Efficiency Labelling and Standards (WELS) Scheme in WA
		+ creating the Non-drinking Water Approvals Framework to support the take-up of recycling projects
		+ developing the Waterwise Community Toolkit to promote alternative water sources in local communities
		+ establishing the Waterwise Council program, which encourages improved water

+ establishing the New WAter Ways, a responsive upskilling program in water-sensitive urban design for state and local government engineers, planners and the development industry.

use management at the corporate, community and local government levels

NWI actions	NWI clause	Commentary
Community partnerships and adjustn	nent	
Open and timely consultation with all relevant stakeholders in relation to:	95	95(i)—In WA, water planning provides for stakeholder involvement throughout the preparation, implementation and review of WAPs. This includes consultation on the development of water recovery pathways.
 pathways for returning overallocated systems to sustainable extraction levels 		95(ii)—The documents and plans released as part of a WAP process are available on DOW's website and from the department's regional offices throughout the state.
 + periodic review of water plans + other significant decisions affecting the security of water access entitlements. 		A web page is developed for each WAP at the start of the planning process. As the WAP is developed and released, DOW publishes updates, brochures and documents on the web page (including the outputs of stakeholder involvement in each of the planning stages). DOW advised that it also notifies licence holders and stakeholders in the water plan area when a plan is begun, when workshops are held, and when the plan is released for public comment.
		DOW works with stakeholders such as water users, industry and other government agencies to implement WAPs and ensure that they remain valid into the future. Reporting is used to inform stakeholders of the status of water resources in the local area and the performance of the WAP in managing those resources.
		95(iii)—WA advised that DOW has developed a number of strategies to promote consultation with stakeholders on water issues, including:
		+ a local government program to better link land and water management planning in areas experiencing high development pressure
		+ workshops and seminars on land and water management
		+ a speaker series, seminars, guidelines, the New WAter Ways program and liaison with local governments to promote water-sensitive urban design
		+ promotion of up-to-date research and information sharing on DOW's website.
		+ work with established water advisory groups
		 direct consultations on significant and controversial licence applications, which may involve holding public meetings, placing advertisements and calling for public submissions.
Provision of accurate and timely information to all relevant stakeholders in relation to the progress of water plan implementation and other issues relevant to the security of water access entitlements.	96	96—In WA, every WAP commits to completing a regular evaluation to assess the effectiveness of the water plan against its objectives. The outcome is a WAP evaluation, which WA advised will be produced as a report card-style evaluation statement. To date, only two water plan evaluations have been released, for the Upper Collie WAP and for the Carnarvon Artesian Basin Water Management Plan (DOW 2009a, 2010b).

NWI actions	NWI clause	Commentary
Address significant adjustment issues affecting water access entitlement holders and communities that may arise from reductions in water availability as a result of implementing the NWI.	97	97—WA advised that adjustment issues that may arise from reductions in water availability as a result of NWI implementation are expected to be limited until new water resources management legislation is implemented. Should NWI-consistent legislation be enacted (see NWI clause 26(ii)), the need for significant buybacks or reductions in entitlements due to government policy changes is not expected to be significant in the near future, and water trading is not currently expected to occur on a scale likely to have any significant negative effect on local economies.
		While the establishment of special government programs for monitoring or managing adjustment as a result of the NWI is not considered justified at this stage, WA reported that it will respond to any need for government action on structural adjustment if it arises, and that the merits of any case for intervention and the design of any measures will be rigorously screened through a consistent framework to ensure that they do not impede the reforms.
Knowledge and capacity building		
Identify the key knowledge and capacity building priorities to support implementation of the NWI and where this work is being undertaken. Implement any necessary measures to ensure the research effort is well coordinated and publicised, and any gaps are addressed.	101	101(i)—DOW has taken a number of steps to address key knowledge and capacity building priorities needed to support the implementation of the NWI. It has developed its Strategic Workforce Plan for the Water Business 2009–2011, which incorporates a range of workforce strategies to overcome shortfalls in skills and disciplines and produce experienced and skilled water managers able to respond to DOW's evolving requirements. The strategies identified in the workforce plan are consistent with the WA Workforce Development Plan developed by the Department of Training and Workforce Development.
		DOW has also worked with the Australian Government's <i>Water for the Future</i> initiative to fill knowledge gaps, including by:
		+ investigating priority water resources
		+ investigating state groundwater resources
		+ understanding water-dependent ecosystems in rivers and estuaries.
		101(iii)—WA advised that DOW undertakes science and research and collects and analyses water information to ensure a sound understanding of the resources being managed. This information is used to inform planning. DOW publishes and undertakes extensive stakeholder consultation on key planning documents, including for WAPs, regional water plans and water source protection plans.
		In July 2010 DOW published the <i>Stormwater science plan for better urban water</i> <i>management</i> (DOW 2010a). The science plan outlines a way forward to address the knowledge gaps currently hindering the adoption of better stormwater management practices in WA. It was developed as part of a partnership between DOW, the Water Corporation and CSIRO. The plan has identified pathways to improve implementation and the coordination of the science required to advance urban water management. A key long-term objective is to develop an independent coordinating group to guide strategic investment in urban water science, and to foster collaboration among stakeholders.

Appendix B references

ACCC (Australian Competition and Consumer Commission) 2010, Water Trading Rules: final advice, ACCC, Canberra, www.accc.gov.au/content/item. phtml?itemId=950331&nodeld=250865357ae6932908a436c8deb931e2&fn=Water%20trading%20rules%20-%20final%20advice.pdf.

ACCC (Australian Competition and Consumer Commission) 2011, Water market rules and water charge rules, ACCC, Melbourne, www.accc.gov.au/content/index.phtml/itemld/943347 (accessed 23 April 2011).

Armstrong I and Gellatly C 2008, Report of the Independent Inquiry into Secure and Sustainable Urban Water Supply and Sewerage Services for Non-Metropolitan NSW, Department of Water and Energy, Sydney.

Australian Government 2010, National water market: strengthening Australia's water market by increasing the transparency of market information, Australian Government, Canberra, www.nationalwatermarket.gov.au/ (accessed 17 July 2010)

BASIX (Building And Sustainability Index) 2011, 2005–2008 single dwelling outcomes: BASIX Ongoing Monitoring Program, BASIX Performance Reports, Department of Planning, Sydney, www.basix.nsw.gov.au/docs/monitoring/2005-2008/05_08_BASIX_outcomes.pdf.

BoM (Bureau of Meteorology) 2010, Pilot National Water Account 2009, Commonwealth of Australia, Melbourne.

CIE (Centre for International Economics) 2010, Cost effectiveness analysis: 2010 Sydney Metropolitan Water Plan, NSW Office of Water, Sydney, www.waterforlife.nsw.gov.au/__data/assets/pdf_file/0005/16997/CIE_final_report_26_May_2010.pdf.

City of Yarra 2007, Water Sensitive Urban Design Guidelines: City of Yarra WSUD implementation report, City of Yarra, Melbourne.

COAG (Council of Australian Governments) 1994, COAG Water Reform Framework, COAG and Environment Australia, Marine and Water Division, Canberra.

DECCW (Department of Environment, Climate Change and Water) 2010, New South Wales Natural Resources Monitoring, Evaluation and Reporting Strategy 2010–2015, DECCW, Sydney, www.environment.nsw.gov.au/resources/soc/10977nrmmerstrat1015.pdf.

DECCW (Department of Environment, Climate Change and Water) 2011, Environmental water use in New South Wales: annual report 2009–10, DECCW, Sydney, www.environment.nsw.gov.au/resources/water/environmentalwater/10942envtalwaterar0910.pdf.

DERM (Department of Environment and Resource Management) 2005, *Queensland Metering Water Extractions Policy*, DERM, Brisbane, *www.derm.qld.gov.au/water/use/pdf/metering_policy_jun05_a.pdf*.

DERM (Department of Environment and Resource Management) 2010, *Queensland State Implementation Plan for Non-Urban Water Metering*, DERM, Brisbane, *www.derm.qld.gov.au/water/use/pdf/plan_for_nonurban_water_metering.pdf*.

DERM (Department of Environment and Resource Management) 2011a, Annual report for water resource plans, DERM, Brisbane, 4 March 2011, www.derm.qld.gov.au/wrp/annual_reports.html (accessed 5 July 2011).

DERM (Department of Environment and Resource Management) 2011b, *Rural water use efficiency (RWUE)*, DERM, Brisbane, 14 September 2010, *www.derm.qld.gov.au/rwue/index.html* (accessed 19 April 2011).

DERM (Department of Environment and Resource Management) 2011c, *Water Allocations Register*, DERM, Brisbane, 16 November 2010, *www.derm.qld.gov.au/water/trading/register.html* (accessed 7 June 2011).

DEWHA (Department of the Environment, Water, Heritage and the Arts) 2009, A framework for determining Commonwealth environmental watering actions, DEWHA, Canberra, www.environment.gov.au/water/publications/action/pubs/cehw-framework.pdf.

DFW (Department for Water) 2010, Water for Good: a plan to ensure our water future to 2050, DFW, Adelaide, www.waterforgood.sa.gov.au/wp-content/uploads/2009/06/complete-water-for-good-plan.pdf.

DFW (Department for Water) 2011, *Water allocation planning*, DFW, Adelaide, *www.waterforgood.sa.gov.au/water-planning/water-allocation-planning/* (accessed 31 May 2011).

DLWBC-DPI (Department of Land, Water, and Biodiversity Conservation and Department of Primary Industries) 2009, Managing the Water Resource Impacts of Plantation Forests: A Statewide policy framework, DLWBC and DPI, Adelaide, www.waterforgood.sa.gov.au/wp-content/uploads/2010/11/wr_policy_framework.pdf.

DOH (Department of Health) 2009, Recycled water systems: information guide for applicants, DOH, Adelaide, www.health.sa.gov.au/pehs/PDF-files/0903-Recycled-Water-Application-Guide.pdf.

DOW (Department of Water) 2009a, Evaluation statement for 2009: Carnarvon Artesian Basin water management plan, DOW, Perth.

DOW (Department of Water) 2009b, *Pilbara water in mining guidelines*, Water resource allocation planning series, no. 34, DOW, Perth, *www.water.wa.gov.au/PublicationStore/first/83044.pdf.*

DOW (Department of Water) 2010a, Towards a water sensitive city: overview of the stormwater science plan for better urban water management, DOW, Perth, www.water.wa.gov.au/PublicationStore/first/95909.pdf.

DOW (Department of Water) 2010b, Collie Basin Groundwater Assessment: state of the basin, DOW, Perth.

DPIW (Department of Primary Industries and Water) 2011, Water Information System of Tasmania, DPIW, Hobart, http://water.dpiw.tas.gov.au/wist/ui (accessed 6 June 2011).

DSE (Department of Sustainability and Environment) 2011a, *Environmental watering in Victoria 2009/10*, DSE, Melbourne, *www.water.vic.gov.au/resources/news_items/news_items_folder/promoted_to_home/?a=80848*.

DSE (Department of Sustainability and Environment) 2011b, *Government response: inland waters*, DSE, Melbourne, 3 May 2011, *www.dse.vic.gov.au/about-dse/publications/state-of-the-environment-report-victoria-2008-the-government-response/inland-waters* (accessed 20 April 2011).

DSE (Department of Sustainability and Environment) 2011c, Trading rules and maps, DSE, Melbourne, http://waterregister.vic.gov.au/ (accessed 21 April 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2010, *National Water Initiative Pricing Principles*, prepared by the Steering Group on Water Charges, DSEWPaC, Canberra, www.environment.gov.au/water/publications/action/pubs/nwi-pricing-principles.pdf.

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011a, *Water and wastewater services in remote (including Indigenous) communities*, DSEWPaC, Canberra, 1 June 2011, *www.environment.gov.au/water/policy-programs/cities-towns/remote.html* (accessed 5 July 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011b, *Private Irrigation Infrastructure Program for South Australia*, DSEWPaC, Canberra, 27 July 2011, *www.environment.gov.au/water/policy-programs/srwui/piip-sa/index.html* (accessed 27 July 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011c, *Sustainable rural water use and infrastructure*, DSEWPaC, Canberra, 23 May 2011, *www.environment.gov.au/water/policy-programs/srwui/index.html* (accessed 23 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011d, National Urban Water and Desalination Plan, DSEWPaC, Canberra, 10 May 2011, www.environment.gov.au/water/policy-programs/urban-water-desalination/index.html (accessed 23 June 2011).

DSEWPaC (Department of Sustainability, Environment, Water, Population and Communities) 2011e, *National Water Security Plan for Cities and Towns*, DSEWPaC, Canberra, 16 December 2010, *www.environment.gov.au/water/policy-programs/cities-towns/index.html* (accessed 22 April 2011).

DTED (Department of Trade and Economic Development) 2010, *Riverland Sustainable Futures Fund: grant funding guidelines and assessment criteria*, DTED, Adelaide, *www.southaustralia.biz/library/RSFF%20guidelines.pdf*.

DWE (Department of Water and Energy) 2009, *Liquid Trade Waste Regulation Guidelines: April 2009*, DWE, Sydney, *www.water.nsw.gov.au/.../town_planning_water_utilities_liquid_trade_waste%20_guidelines.pdf.aspx.*

DWE (Department of Water and Environment) 2007, Best-Practice Management of Water Supply and Sewerage Guidelines, DWE, Sydney.

Environment ACT 2004, *Strategy for sustainable water resource management in the ACT April 2004: Think water, act water,* vol. 1, Environment ACT, Canberra, *www.thinkwater.act.gov.au/documents/Vol1screen_000.pdf.*

EPA (Environmental Protection Agency) 2011, Environmental assessment guidelines, EPA, Perth, www.epa.wa.gov.au/Policies_guidelines/EAGs/Pages/default.aspx?cat=Environmental%20Assessment%20Guidelines&url=Policies_guidelines/EAGs (accessed 23 April 2011).

EPA Victoria (Environmental Protection Authority Victoria) 2003, *Guidelines for environmental management: use of reclaimed water*, no. 464.2, EPA Victoria, Melbourne, *http://epanote2.epa.vic.gov.au/EPA/publications.nst/2f1c2625731746aa4a256ce90001cbb5/64c2a15969d75e184a2569a* 00025de63/\$FILE/464.2.pdf.

EPA Victoria (Environmental Protection Authority Victoria) 2005, *Guidelines for environmental management: dual pipe water recycling schemes health and environmental risk management*, no. 1015, EPA Victoria, Melbourne, *http://epanote2.epa.vic.gov.au/EPA/publications.nsf/2f1c2625731746aa4a256ce90001cbb5/d20acdacef3d03bfca257067001c13d0/\$FILE/1015.pdf*.

ERA (Economic Regulation Authority) 2009a, Final report: Inquiry into Pricing of Recycled Water in Western Australia, ERA, Perth, www.erawa.com.au/ cproot/7359/2/20090306%20Final%20Report%20-%20Inquiry%20into%20Pricing%20of%20Recycled%20Water%20in%20Western%20Australia.PDF.

ERA (Economic Regulation Authority) 2009b, *Final report: Inquiry into the Tariffs of the Water Corporation, Aqwest and Busselton Water*, ERA, Perth, *www.erawa.com.au/cproot/7912/2/20090916%20Final%20Report%20-%20Inquiry%20into%20Tariffs%20of%20the%20Water%20Corporation,%20* Aqwest%20and%20Busselton%20Water.pdf.

ERA (Economic Regulation Authority) 2011, *Final report: Inquiry into Water Resource Management and Planning Charges*, ERA, Perth, *www.erawa.com.au/cproot/9476/2/20110329%20D62487%20Final%20Report%20-%20Inquiry%20into%20Water%20Resource%20* Management%20and%20Planning%20Charges.PDF.

ESC (Essential Services Commission) 2009, Inquiry into an access regime for water and sewerage infrastructure services: Final report, volume 1: findings and recommendations, September, ESC, Melbourne, www.esc.vic.gov.au/NR/rdonlyres/2D5B932D-AC50-47B8-8C93-DD0D6B1533B0/0/RPTAccessregimeinquiryvolumel20090928.pdf. ESCOSA (Essential Services Commission of South Australia) 2010, Final report: Inquiry into the 2010–11 Metropolitan and Regional Potable Water and Sewerage Pricing Process, ESCOSA, Adelaide.

Frontier Economics 2011, *Efficient water resource pricing in Australia: an assessment of administered scarcity pricing in urban areas,* Waterlines report, no. 44, National Water Commission, Canberra, *www.nwc.gov.au/resources/documents/44_Scarcity.pdf*.

ICRC (Independent Competition and Regulatory Commission) 2008, *Final report and price determination April 2008:* water and wastewater price review, report 1 of 2008, ICRC, Canberra, www.icrc.act.gov.au/ data/assets/pdf file/0005/106916/Water and Wastewater Price Review Final Report 1of2008.pdf.

IPART (Independent Pricing and Regulatory Tribunal) 2010a, Water Administration Ministerial Corporation: Water—Draft Determination October 2010, IPART, Sydney, www.ipart.nsw.gov.au/files/Draft%20Determination%20-%20Water%20Administration%20Ministerial%20Corporation%20-%20 October%202010-%20Website%20Document.PDF.

IPART (Independent Pricing and Regulatory Tribunal) 2010b, *Submission on Productivity Commission issues paper 'Australia's urban water sector'*, vol. 58, Productivity Commission, Melbourne, *www.pc.gov.au/_data/assets/pdf_file/0019/104158/sub058.pdf*.

ISF and ACIL (Institute for Sustainable Futures and ACIL Tasman) 2009, *NWI parties review of water restrictions: volume one, review and analysis,* University of Technology Sydney, Sydney, *www.nwc.gov.au/resources/documents/Water_restrictions_Volume_1.pdf.*

Joint Government Enterprise Ltd 2011, Water for rivers, Joint Government Enterprise, Albury, www.waterforrivers.org.au/ (accessed 29 June 2011).

Loney G 2011, 'Harvey dam water will be auctioned to farmers', *The West Australian*, 11 January 2011, *http://au.news.yahoo.com/thewest/a/-/wa/8623822/harvey-dam-water-will-be-auctioned-to-farmers/.*

New WAter Ways 2011, Enabling excellence in integrated water cycle management, New WAter Ways, Perth, www.newwaterways.org.au/ (accessed 22 April 2011).

NOW (New South Wales Office of Water) 2010b, Submission to review of prices for the Water Administration Ministerial Corporation: NSW Office of Water: response to IPART's draft determination, Independent Pricing and Regulatory Tribunal, Sydney, www.ipart.nsw.gov.au/files/Submission%20-%20 Review%20of%20Prices%20for%20the%20Water%20Administration%20Ministerial%20Corporation%20-%20NSW%20Office%20of%20Water%20 -%20David%20Harriss%20-%2029%20November%202010%20-%20Website%20Document.PDF.

NOW (New South Wales Office of Water) 2011a, Achieving Sustainable Groundwater Entitlements program, NOW, Sydney, 12 January 2011, www.water.nsw.gov.au/Water-management/Water-sharing-plans/Plans-commenced/plans_commenced_adjust/default.aspx (accessed 6 June 2011).

NOW (New South Wales Office of Water) 2011b, Integrated Monitoring of Environmental Flows (IMEF) program, NOW, Sydney, 26 May 2010, www.water.nsw.gov.au/default.aspx?ArticleID=169#imef (accessed 21 April 2011).

NOW (NSW Office of Water) 2010a, 2008–09 NSW water supply and sewerage: benchmarking report, NOW, Sydney.

NOW (NSW Office of Water) 2011, Achieving Sustainable Groundwater Entitlements Program, NOW, Sydney, www.water.nsw.gov.au/Water-management/Water-sharing-plans/Plans-commenced/plans_commenced_adjust/default.aspx (accessed 12 July 2011).

NRMMC (Natural Resources Management Ministerial Council) 2006, *National Guidelines for Residential Customers' Water Accounts*, Commonwealth of Australia, Canberra, *www.ephc.gov.au/sites/default/files/WQ_AGWR_GL__WaterRecyclingGuidelines_Residential_Final_200611.pdf*.

NSW Government (New South Wales Government) 2010, *Submission on Productivity Commission Issues Paper: Australia's Urban Water Sector*, vol. 65, Productivity Commission, Melbourne, *www.pc.gov.au/__data/assets/pdf_file/0003/109893/subdr146.pdf*.

NWC (National Water Commission) 2009, Australian water reform 2009: second biennial assessment of progress in implementation of the National Water Initiative, NWC, Canberra, www.nwc.gov.au/resources/documents/2009_BA_complete_report.pdf.

NWC (National Water Commission) 2010a, Australian water markets report 2009–2010, NWC, Canberra, www.nwc.gov.au/resources/documents/AWMR_2009-103.pdf.

NWC (National Water Commission) 2010b, Australian environmental water management report 2010, NWC, Canberra, www.nwc.gov.au/resources/documents/803-NWC_AustEnvironmentalWaterManagementReport_web.pdf.

NWC (National Water Commission) 2010c, National performance report 2008–2009: urban water utilities, NWC, Canberra, www.nwc.gov.au/www/html/2765-national-performance-report-2008-09---urban-water-utilities.asp?intSiteID=1.

NWC (National Water Commission) 2011a, Urban water in Australia: future directions, NWC, Canberra, www.nwc.gov.au/resources/documents/Future_directions.pdf.

NWC (National Water Commission) 2011b, National performance report 2009–2010: rural water service providers, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_2008-09_Urban_Part_A2.pdf; www.nwc.gov.au/resources/documents/National_Performance_Report_URBAN_2008-09_-_PART_B_-_WEB_FINAL3.pdf.

NWC (National Water Commission) 2011c, National performance report 2009–2010: urban water utilities, NWC, Canberra, www.nwc.gov.au/resources/documents/NPR_urban.pdf; www.nwc.gov.au/resources/documents/Urban_NPR_2009-10_Part_B.pdf.

NWC (National Water Commission) 2011d, *Review of pricing reform in the Australian water sector*, NWC, Canberra, *www.nwc.gov.au/resources/documents/review_of_pricing_reform.pdf.*

OEH (Office of Environment and Heritage) 2011a, *Hunter River Salinity Trading Scheme*, OEH, Sydney, 26 February 2011, *www.environment.nsw.gov.au/licensing/hrsts/index.htm* (accessed 21 April 2011).

OEH (Office of Environment and Heritage) 2011b, *Load-based licensing*, OEH, Sydney, 26 February 2011, *www.environment.nsw.gov.au/licensing/lbl/index.htm* (accessed 21 April 2011).

OEH (Office of Environment and Heritage) 2011c, *Water recovery programs*, OEH, Sydney, 28 June 2011, *www.environment.nsw.gov.au/environmentalwater/waterrecoveryprograms.htm* (accessed 5 July 2011).

OEH (Office of Environment and Heritage) 2011d, Water recovery programs: water purchase, OEH, Sydney, 18 May 2011, www.environment.nsw.gov.au/environmentalwater/waterpurchase.htm (accessed 3 June 2011).

Office of Water 2011, *Using and saving water*, Department of Sustainability and Environment, Melbourne, 6 May 2011, *www.water.vic.gov.au/saving* (accessed 29 June 2011).

OTTER (Office of the Tasmanian Economic Regulator) 2011, *Tasmanian water and sewerage state of the industry report 2009–10*, OTTER, Hobart, *www.gpoc.tas.gov.au/domino/otter.nsf/LookupFiles/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf/\$file/11949_Tasmanian_Water_and_Sewerage_State_of_the_Industry_Report_2009-10_110415. pdf.*

PC (Productivity Commission) 2006, *Productivity Commission research report: rural water use and the environment—the role of market mechanisms*, Productivity Commission, Canberra, *www.pc.gov.au/___data/assets/pdf_file/0004/14818/waterstudy.pdf*.

PC (Productivity Commission) 2011, Australia's urban water sector, Productivity Commission: draft report, April 2011, Productivity Commission, Canberra, www.pc.gov.au/__data/assets/pdf_file/0006/107745/urban-water-draft.pdf.

PWC (PricewaterhouseCoopers) 2006, National Water Initiative: water trading study, Department of the Prime Minister and Cabinet, Canberra, www.environment.gov.au/water/publications/action/pubs/nwi-wts-full-report.pdf.

Queensland Government 2000, *Guidelines for financial and economic evaluation of new water infrastructure in Queensland*, Queensland Treasury, Brisbane, *www.treasury.qld.gov.au/office/knowledge/docs/water-infrastructure/new-water-infrastructure.pdf*.

South Australian Government 2010, *Strategic Water Information and Monitoring Plan, South Australia 2010*, prepared by the Strategic Water Information Coordinator, August 2010, Office of the Chief Information Officer, South Australian Government, Adelaide, *www.bom.gov.au/water/regulations/fundingProgram/document/swimps/sa/sa_swimp_2010.pdf*.

Tjandraatmadja G, Cook S, Sharma A, Diaper C, Grant A, Toifl M, Barron O, Burn S and Gregory A 2009, *ICON Water Sensitive Developments*, report prepared for the Joint Steering Committee for Water Sensitive Cities in regard to NWI clause 92(iii), CSIRO Water for a Healthy Country National Research Flagship, Canberra, *www.nwc.gov.au/resources/documents/CSIRO_lcons_Report.pdf*.

Victorian Auditor-General 2010, Restricting environmental flows during water shortages, Victorian Auditor-General's Office, Melbourne, http://download.audit.vic.gov.au/files/20100710_Water_report.pdf.

Victorian Government 2006, Victorian Government National Water Initiative (NWI) Implementation Plan, Victorian Government, Melbourne.

Victorian Government 2009, Northern Region Sustainable Water Strategy, Department of Sustainability and Environment, Melbourne.

Victorian Government 2010, *Smart Water Fund: Strategic Plan 2010–11: a new era for the Smart Water Fund*, City West Water, South East Water, Yarra Valley Water, Melbourne Water Corporation, Department of Sustainability and Environment, Melbourne, *www.smartwater.com.au/about/Documents/SWF_StrategicPlan_FinalJan2011_web.pdf*.

WAPC (Western Australian Planning Commission) 2006, 'State Planning Policy 2.9: Water Resources', *Government Gazette, WA*, Special Gazette no. 227, WAPC, Perth.

WAPC (Western Australian Planning Commission) 2008, Better urban water management, WAPC, Perth.

WASB (Water Accounting Standards Board) 2010, *Exposure draft of Australian Water Accounting Standard 1: Preparation and presentation of general purpose water accounting reports*, Commonwealth of Australia, Canberra.

Western Australian Government 2003, Securing our water future: a state water strategy for Western Australia—a summary document, Western Australian Government, Perth, www.water.wa.gov.au/PublicationStore/first/82417.pdf.

WRC (Water and Rivers Commission) 2000, Environmental water provisions policy for Western Australia, Statewide Policy no. 5, WRC, www. water.wa.gov.au/PublicationStore/first/11676.pdf.



Appendices

Appendix C: Consultations for this review

Consultations with NWI parties

Meetings with and submissions from NWI parties

On 30 June 2010, NWI parties were advised that the Commission had begun the 2011 biennial assessment and invited to meet with the Commission to discuss the parameters of the assessment and the input required from each of the parties. Meeting dates and representative agencies are set out in Table C.1.

Table C.1: Meetings with state and territory agencies

Organisation	Date
Western Australian Department of Water	13 July 2010
Queensland Department of Environment and Resource Management	26 July 2010
Victorian Department of Sustainability and Environment	28 July 2010
Tasmanian Department of Primary Industries, Parks, Water and Environment	2 August 2010
Australian Government Department of Sustainability, Environment, Water, Population and Communities	3 August 2010
New South Wales Office of Water	4 August 2010
Northern Territory Department of Natural Resources, Environment, the Arts and Sport	9 August 2010
South Australian Department for Water	11 August 2010
Western Australia Department of Water	12 August 2010
ACT Department of Environment	18 August 2010

On 13 September 2010 we provided detailed requests for information to be provided by 30 November 2010. All of the parties provided a response to our request.

Meetings with water agency directors-general

The Commission met with the directors-general of the state and territory water agencies and the Secretary of the Department of Sustainability, Environment, Water, Population and Communities or their representatives on 11 February and 4 May 2011. These meetings provided an opportunity for participants to discuss water reform progress and consider strategic issues faced by all parties in implementing the NWI.

Comments on draft documents

On 25 April 2011, the Commission provided each of the NWI parties with an initial draft of the 2011 biennial assessment. Comments were sought by 23 May 2011. Comments were received from the ACT Government; the Australian Government Department of Sustainability, Environment, Water, Population and Communities; the New South Wales Office of Water, the Northern Territory Department of Natural Resources, Environment, the Arts and Sport; the South Australian Department for Water; the Tasmanian Department of Primary Industries, Parks, Water and Environment; and the Western Australian Department of Water.

On 15 June 2011, the Commission provided each of the NWI parties with a near-final draft of the 2011 biennial assessment. Comments were sought by 29 June 2011. Comments were received from the ACT Government; the New South Wales Office of Water; the Northern Territory Department of Natural Resources, Environment, the Arts and Sport; the Queensland Department of Environment and Resource Management; the South Australian Department for Water; the Tasmanian Department of Primary Industries, Parks, Water and Environment; the Victorian Department of Sustainability and Environment; the Western Australian Department of Water; the Australian Competition and Consumer Commission; the Bureau of Meteorology; the Department of Climate Change and Energy Efficiency; Geoscience Australia; the Murray–Darling Basin Authority; the Department of the Prime Minister and Cabinet; and the Australian Government Department of Sustainability, Environment, Water, Population and Communities.

Public and stakeholder consultations

Public submissions

The Commission invited public submissions to the 2011 biennial assessment in September 2010 and issued a discussion paper to assist submitters in preparing responses. We received submissions from 44 individuals and organisations, listed in Table C.7. All submissions received have been published on the Commission's website.

Table C.7: Submissions received

Name and/or organisation	Location/jurisdiction
ABARES	Canberra, ACT
Alexander J Pearson	Kawana, Queensland
Amy-Rose West	Coolum Beach, Queensland
Australian Water Association	St Leonards, NSW
Bundaberg Regional Irrigators Group	Bundaberg, Queensland
Department of Health	Melbourne, Victoria
Dr Andre Taylor	Port Macquarie, NSW
East End Mine Action Group	
Engineers Australia	Barton, ACT
Environment Victoria	
eWater CRC	
Fenner School of Environment and Society	
First Peoples' Water Engagement Council	
G Lloyd-Smith	Wantirna South, Victoria
Graeme Missen and Robin McLiesh	Wooragee, Victoria
Hamstead Consulting	Blaxland, NSW
Inland Rivers Network and Nature Conservation Council	Newtown, NSW
Irrigation Australia	
John Forsell	
Kim Hann	
Local Government Association of NSW	
Minerals Council of Australia	
Murray–Darling Basin Authority	
National Association of Forest Industries	
National Farmers' Federation	
National Program for Sustainable Irrigation	Narrabri, NSW
PurplePipe	
Queensland Farmers' Federation	
RJ Koerner (RJK)	Coolum Beach, Queensland
SA Water	

Table C.7 continued

Name and/or organisation	Location/jurisdiction
Sarah Moles	
Smart Approved Watermark	
Southern Cross Water and Infrastructure Corporation	
Southern Water	Glenorchy, Tasmania
State Water	Sydney, NSW
SunWater	Brisbane, Queensland
Water Quality Research Australia	
Water Accounting Standards Board Office	
Water Action Coalition	
Water Services Association of Australia	
Water Corporation	
Watercare Services Limited	Perth, Western Australia
Western Murray Irrigation Limited	
Western Australian Farmers Federation	
WWF	Brisbane, Queensland

Institutional governance workshops

The Commission and the Australia and New Zealand School of Government co-hosted a workshop to explore the role of institutional arrangements in water reform on 13 May 2010.

A second workshop, held on 17 February 2011, explored in more detail options for targeted institutional reform to improve the delivery of water reform objectives. It also discussed the nature of intergovernmental agreements and the characteristics and capabilities of the institutions implementing water reform.

Participants at both workshops included current and past water sector leaders, senior officials, academics, researchers, community representatives and representatives of peak non-government organisations.

Stakeholder forum

A stakeholder forum was held on 16 March 2011 to seek input on the emerging findings of the assessment. Participants are listed in Table C.4.

Table C.4: Stakeholder forum

Name	Organisation
Professor Ian Acworth	University of NSW
Mr Joe Adamksi	Barwon Water
Ms Michele Akeroyd	Water Quality Research Australia
Mr Scott Barber	State Water NSW
Dr Andy Barnicoat	Geoscience Australia
Mr Trevor Le Breton	Irrigation Australia Ltd
Ms Louise Burge	Southern Riverina Irrigators
Mr Stephen Carroll	Australian Bankers' Association
Ms Amanda Chadwick	Independent Pricing and Regulatory Tribunal
Ms Fiona Chandler	International Water Centre
Ms Michele Chiasson	Chamber of Minerals and Energy of Western Australia
Mr Barry Croke	Northern Victoria Irrigators
Mr Joseph Caruana	State Water NSW
Mr Steve Dilley	Water Resources, Western Australian Farmers Federation
Mr Graham Dooley	Blue Sky Water Partners Pty Ltd
Mr Phil Duncan	First Peoples' Water Engagement Council
Mr Tim Goesch	Australian Bureau of Agricultural and Resource Economics and Sciences
Professor Quentin Grafton	Australian National University
Mr Sean Hoobin	World Wildlife Fund Australia
Professor Gary Jones	eWater CRC
Mr Grant Johnson	National Association of Forest Industries
Ms Deb Kerr	National Farmers' Federation
Professor John Langford	Uniwater
Ms Anwen Lovett	Rural Industries Research and Development Corporation
Mr Gavin Matthew	Australian Plantation Products and Paper Industry Council
Mr Chris McCombe	Minerals Council of Australia
Mr Peter Melville	Horticulture Australia Limited
Ms Louise Minty	Bureau of Meteorology
Mr Tom Mollenkopf	Australian Water Association
Mr Michael Murray	Cotton Australia Ltd
Mr Danny O'Brien	National Irrigators' Council
Mr Ian Perkins	Lawlab
Mr Scott Keyworth	Water for a Healthy Country, CSIRO

Table C.4 continued

Name	Organisation
Dr John Radcliffe	Australian Academy of Technological Science and Engineering
Mr Tom Rooney	Waterfind
Mr Mike Smith	Bundaberg Regional Irrigation Group
Mr Peter Sutherland	GHD Australia
Mr Chris Bennett	Murrumbidgee Irrigation
Mr Jim Turley	Vegetables WA
Mr Tom Vanderbyl	SunWater
Ms Ruth Wade	Ricegrowers' Association of Australia
Dr John Williams	Natural Resources Commission
Mr Ross Young	Water Services Association of Australia
Professor Mike Young	The Environment Institute, the University of Adelaide
Ms Juliet LeFeuvre	Environment Victoria
Mr Stuart Peevor	SA Water Corporation

Consultancies commissioned to inform this assessment

Table C.8: Consultancies commissioned

Consultant	Description of work
Alluvium Consulting	Evaluation of the National Water Initiative and its influence on natural water systems
Hamstead Consulting	Water planning: review of progress towards NWI commitments
Hyder Consulting	Assessment of impacts of the NWI on communities Transaction costs in water trading—2011
Inovact	The adaptive capacity and resilience of Australia's water management regime: impact of the NWI
Inovact	Developing the productivity and efficiency of water use: assessment of the impact of the NWI
Marsden Jacob Associates	Assessment of the economic, environmental and social impacts of the implementation of the NWI on regional, rural and urban communities



Appendices
Appendix D: RSMG model description

Economic modelling was undertaken to inform a consultancy by Inovact to assist the Commission's productivity and efficiency assessment. The modelling was designed to estimate the allocative efficiency benefits of the NWI by simulating model scenarios with and without NWI policy changes that influence the scope and nature of water trading in the Murray–Darling Basin.

The model (RSMG) is named for its developer, the Risk and Sustainable Management Group at the School of Economics, University of Queensland. Further details on the model can be accessed from *www.uq.edu.au/rsmg/docs/RSMG_MDB_Model_Documentation_010610.docx.*

Simulation of NWI policy impacts

The RSMG model has two principal ways of modelling changes to water management, such as establishing a diversion limit (a cap) or allowing water trading. The model incorporates a medium-term analysis timeframe (approximately 5–10 years); key factors of production are assumed to be mobile. A wide set of technology choices provide greater flexibility in land use as water availability declines. However, in this analysis, the model was used to conduct simulations also involving changes between years to gain insights into the adaptability of enterprises to changes in water availability with and without water trading:

- + Option 1: Determine the regional impact of a cap. Here the water allocation under the cap is used within the specified catchment. This equates to intraregional water trading (there is no water trading across catchments). The model is simulated to represent water flows down the Murray–Darling Basin flow network (sequential runs).
- + Option 2: Optimise allocations of the available water for irrigation for the national benefit, allowing full trade within and across regions where trade is physically feasible (global run).

Under Option 2, the water is used within the specified trading region (a set of catchments, or the southern Murray–Darling Basin, including state borders), but the solution is globally optimised so that the impacts of interregional trade can be estimated.

Overview of the model and core assumptions

The RSMG water allocation model is a regional programming model developed to simulate water allocations for irrigated agriculture within the Murray–Darling Basin. For 19 regions in the basin, the model optimally allocates an amount of water among enterprises according to relative profitability. The impacts of water availability on production are quantified as changes in the gross value of irrigated agricultural production (GVIAP) for a set of commodities. The GVIAP reflects changes in areas and yields resulting from water reallocations, as prices are assumed to be fixed. Other outputs from the model are farm profit, land use and water use.

The RSMG model takes the enterprise level as the primary point of analysis. The model includes all catchments of the Murray–Darling Basin, and the economic impacts of water-using activities are progressively aggregated from the firm level to the basin level. In this way, the RSMG model allows the key elements of the NWI to be examined by an assessment of micro-economic reform outcomes at the firm level, aggregated progressively to the state and the national level, taking the basin as an example.

The RSMG model broadly reflects existing biophysical conditions in each of the regions. The model's 19 regions are broadly consistent with the CSIRO sustainable yield regions. Two additional entities account for urban water use in Adelaide and residual flows to the sea. The regions and entities are sequentially linked in the model to mimic the natural flow patterns of the Murray–Darling Basin river system.

Water availability in the model includes both surface water and groundwater. However, assumed reductions in water availability in the simulations reflect only the reductions in surface runoff. Groundwater availability over the medium term is incorporated in the specified diversion limits for each state of nature (dry, normal and wet) with regard to water availability. For these simulations, flow variability is accounted by region and state of nature.

The regions are linked by endogenously determined flows of salt and water, but for these simulations the salt module was switched off. Water flows into and out of a region were modelled as being equal to inflows (net of evaporation and seepage), less extractions, net of return flows. Maximum extraction rates for each region were specified via the cap.

The irrigated agricultural enterprises modelled were horticulture (citrus, stone fruit, grapes, fruit and vegetables); a number of broadacre systems, including dairy, beef, sheep, wheat, rice—wheat (on a rotational system), cotton, grain legumes and sorghum; and a generic dryland enterprise. The dryland option accounts for any shifts from irrigation to dryland production. That is, if returns to irrigated agriculture decline, or irrigation is constrained by reductions in water availability due to, say, water trading, land may be transferred from irrigated to dryland agriculture.

While the model accounts for all irrigable land within each region, it does not specifically identify individual irrigation schemes within regions. Within each region, water and land are allocated so as to maximise net returns subject to the cap and other constraints, such as available land in a catchment.

The RSMG model assumes uniform water charges across the basin. This is in contrast with the existing situation, which includes a range of water charging arrangements, even within regions. This allows the benefits of water trading to be better reflected, as the price of water is the key driver of water use.

In general, if agricultural commodity output falls, then any resultant price increases may offset reductions in farm income. Such changes were not considered in this assessment. A key assumption made in this analysis was constant commodity prices. That assumption means that production impacts in response to reduced surface water availability were considered in isolation from any price changes for agricultural commodities.

The modelling assumed annual allocations of water under the cap, and therefore water management policies within a season (such as storage releases) were not explicitly considered. Although the model parameters represented all available seasonal conditions for most regions, modelling estimates for some regions may not fully correspond to available estimates from other sources. However, disparities have been minimised through model calibrations.

Two sets of model simulations were conducted for the range of water availability across the three states of nature: normal, dry and wet seasons. This approach provided greater detail about performance by modelling irrigators' response to risks associated with seasonal conditions:

- + The first set, the baseline, developed a modelled irrigated land use that used water within the diversion pattern that existed in 2000–01 (the most relevant year for the baseline, as it was a Census year).
- + The second set, the NWI scenario, represented an alternative irrigated land use that used water within the diversion cap based on historical experience over the period from 2001–02 to 2008–09, and was based on data available from the Australian Bureau of Statistics.

All model runs were produced under both the sequential (SEQ) and global or common property (CP) modes of the RSMG model to estimate the impacts with and without NWI policy.

The baseline solution

In these simulations, the estimated variables were assessed for each of the normal, dry and wet seasonal conditions as well as the 'state-contingent' average that represents the medium-term average, including a mix of the three different states of nature, using probabilities based on the observed historical pattern (normal 50%; dry 20%; wet 30%). The summary results from the baseline run are presented in Table D.1.

State	Description	Normal	Dry	Wet	State-contingent
Qld	Area irrigated ('000 ha)	177.4	10.2	177.4	74.5
	Water use (GL)	905.3	69.2	919.2	742.3
	Surplus (\$m)	198.2	55.9	281.0	194.6
	Gross value (\$m)	1 801.6	792.7	1 854.5	1 615.7
NSW	Area irrigated ('000 ha)	961.0	626.2	1 463.7	0.0
	Water use (GL)	6 672.4	4 489.2	10 002.3	7 234.7
	Surplus (\$m)	1 416.7	519.4	1 850.6	1 367.4
	Gross value (\$m)	4 828.4	2 424.3	5 065.4	4 418.6
Vic.	Area irrigated ('000 ha)	438.6	438.6	438.6	0.0
	Water use (GL)	3 530.8	3 530.8	4 237.0	3 742.7
	Surplus (\$m)	350.5	-31.3	1 109.7	501.9
	Gross value (\$m)	525.3	471.0	630.6	546.0

Table D.1: Summary—Baseline scenario representing pre-NWI basin land and water use, sequential solution

Table D.1 continued

State	Description	Normal	Dry	Wet	State-contingent
SA	Area irrigated ('000 ha)	73.6	73.6	73.6	0.0
	Water use (GL)	522.6	522.6	627.2	554.0
	Surplus (\$m)	334.2	243.4	510.0	368.8
	Gross value (\$m)	99.5	89.1	119.4	103.4
Total Murray–Darling	Area irrigated ('000 ha)	1 650.7	1 148.6	2 153.4	74.5
Basin	Water use (GL)	11 631.1	8 611.9	15 785.6	12 273.6
	Surplus (\$m)	2 299.6	787.4	3 751.3	2 432.7
	Gross value (\$m)	7 254.7	3 777.0	7 669.9	6 683.7

Source: RSMG model simulations.

Table D.2: Baseline irrigated area, by catchment and state ('000 ha)

Baseline	Normal	Dry	Wet	State-contingent
Condamine	74.5	3.6	74.5	74.5
Border Rivers Qld	46.6	6.6	46.6	46.6
Warrego Paroo	11.8	0.0	11.8	11.8
Namoi	126.5	0.6	126.5	126.5
Central West	126.4	7.7	129.5	129.5
Maranoa Balonne	44.6	0.0	44.6	44.6
Border Rivers Gwydir	91.0	0.7	212.3	212.3
Western	52.4	52.4	52.4	52.4
Lachlan	67.6	67.6	67.6	67.6
Murrumbidgee	282.6	282.6	457.8	457.8
North East	21.2	21.2	21.2	21.2
Murray 1	8.0	8.0	8.0	8.0
Goulburn Broken	211.3	211.3	211.3	211.3
Murray 2	108.6	108.6	228.4	228.4
North Central	179.3	179.3	179.3	179.3
Murray 3	84.4	84.4	167.6	167.6
Mallee	26.8	26.8	26.8	26.8
Lower Murray Darling	13.5	13.5	13.5	13.5
SA Murray–Darling Basin	73.6	73.6	73.6	73.6
Total	1 650.7	1 148.5	2 153.3	2 153.3

Source: RSMG model simulations.

Table D.3: Baseline water use, by catchment (GL)

Baseline	Normal	Dry	Wet	State-contingent
Condamine	377.5	23.1	382.1	308.0
Border Rivers Qld	246.3	46.1	255.5	209.0
Warrego Paroo	58.8	0.0	58.8	47.0
Namoi	708.7	3.9	709.5	568.0
Central West	807.9	59.8	843.5	669.0
Maranoa Balonne	222.8	0.0	222.8	178.3
Border Rivers Gwydir	636.3	4.4	1 656.6	816.0
Western	191.8	200.3	205.8	197.7
Lachlan	564.2	498.9	677.0	585.0
Murrumbidgee	2 206.0	2 164.5	3 330.4	2 535.0
North East	155.3	155.3	186.4	164.7
Murray 1	66.0	66.0	79.2	70.0
Goulburn Broken	1 744.3	1 744.3	2 093.2	1 849.0
Murray 2	768.1	768.1	1 341.0	940.0
North Central	1 430.2	1 430.2	1 716.2	1 516.0
Murray 3	595.8	595.8	1 006.4	719.0
Mallee	200.9	200.9	241.1	213.0
Lower Murray Darling	127.4	127.4	152.8	135.0
SA Murray–Darling Basin	522.6	522.6	627.2	554.0
Total	11 631.1	8 611.9	15 785.6	12 273.6

Source: RSMG model simulations.

The irrigated area, water use and GVIAP for the baseline are presented by catchment in tables D.2, D.3, D.4 and D.5. These results for the sequential solution runs assume that water available in each catchment is used within the specified cap, consistent with the economic returns available from using that water. Hence, the runs represent a situation of unimpeded water trade within a catchment but no trade between catchments. The results indicate that the returns for irrigation are greater under the state-contingent specification in catchments where there is greater flexibility to respond to changes in seasonal conditions (state-allocable technological options).

Table D.4: Baseline gross value of irrigated production, by catchment (\$m)

Baseline	Normal	Dry	Wet	State-contingent
Condamine	515.8	257.1	542.1	472.0
Border Rivers Qld	590.1	412.5	664.9	577.1
Warrego Paroo	64.6	23.1	64.9	56.4
Namoi	916.6	280.2	919.2	790.1
Central West	838.3	392.2	877.3	760.8
Maranoa Balonne	241.8	87.6	241.8	210.9
Border Rivers Gwydir	793.8	413.1	1 166.8	829.6
Western	79.7	91.6	83.6	83.2

Table D.4 continued

Baseline	Normal	Dry	Wet	State-contingent
Lachlan	393.8	280.5	482.4	397.7
Murrumbidgee	1 589.0	1 108.4	2 032.2	1 625.8
North East	154.0	138.6	203.7	165.8
Murray 1	48.4	40.1	58.1	49.7
Goulburn Broken	939.5	840.0	1 305.0	1 029.2
Murray 2	423.8	248.6	578.9	435.3
North Central	638.9	566.7	912.5	706.5
Murray 3	309.5	176.1	422.5	316.7
Mallee	477.5	380.0	573.2	486.7
Lower Murray Darling	260.8	233.9	312.9	271.1
SA Murray–Darling Basin	845.2	759.7	1 025.1	882.1
Total	10 120.9	6 729.9	12 467.2	10 146.6

Source: RSMG model simulations.

Table D.5: Baseline net value of irrigated production, by catchment and state (\$m)

Baseline	Normal	Dry	Wet	State-contingent
Condamine	89.7	29.4	108.3	83.2
Border Rivers Qld	53.6	-1.7	123.4	63.5
Warrego Paroo	12.4	5.9	11.3	10.8
Maranoa Balonne	319.5	92.9	309.3	271.2
Namoi	171.3	111.8	186.8	164.1
Central West	42.4	22.3	38.0	37.1
Border Rivers Gwydir	189.8	103.5	141.6	158.1
Western	19.8	28.4	22.3	22.2
Lachlan	107.0	44.6	167.0	112.5
Murrumbidgee	380.9	96.8	640.9	402.1
Murray 1	31.1	10.7	80.0	41.7
North East	16.3	6.4	25.6	17.1
Goulburn Broken	131.7	-19.8	484.9	207.3
Murray 2	92.5	6.1	148.0	91.9
North Central	60.0	-54.3	323.6	116.2
Murray 3	60.4	-4.0	100.1	59.4
Mallee	127.7	32.1	221.1	136.6
Lower Murray Darling	59.1	32.9	109.0	68.8
SA Murray–Darling Basin	334.2	243.4	510.0	368.8
Total Murray–Darling Basin	2 299.6	787.4	3 751.3	2 432.7

Source: RSMG model simulations.

The global solution

In Table D.6, the key model parameters are reported for the global solution in which the model simulates the optimal allocation of water in each catchment to allow for the best use of available water to attain the maximum economic output consistent with available resources and economic conditions. The comparison in Table D.7 indicates the level of economic gains that may be achievable with fully unimpeded water trading between catchments across the Murray–Darling Basin. This represents the upper level of possible gains under the full implementation of NWI objectives for water trading.

State	Description	Normal	Dry	Wet	State-contingent
Qld	Area irrigated ('000 ha)	245.8	10.2	245.8	84.3
	Water use (GL)	1 247.5	69.2	1 261.3	1 016.0
	Surplus (\$m)	267.4	90.1	343.3	254.7
	Gross value (\$m)	2 012.7	869.9	2 065.0	1 799.8
NSW	Area irrigated ('000 ha)	1 038.1	626.3	1 209.4	1 209.4
	Water use (GL)	7 890.8	5 238.8	9 872.3	7 954.9
	Surplus (\$m)	1 547.8	519.7	2 055.7	1 494.5
	Gross value (\$m)	5 328.49	2 613.25	5 564.02	4 856.10
Vic.	Area irrigated ('000 ha)	439.3	439.3	439.3	439.3
	Water use (GL)	3 494.6	3 494.6	4 193.5	3 704.2
	Surplus (\$m)	476.1	121.0	1 253.1	638.2
	Gross value (\$m)	523.34	471.00	628.00	544.27
SA	Area irrigated ('000 ha)	58.6	58.6	58.6	58.6
	Water use (GL)	387.6	387.6	465.2	410.9
	Surplus (\$m)	326.4	243.2	487.6	358.2
	Gross value (\$m)	98.97	89.07	118.76	102.93
Total Murray–Darling	Area irrigated ('000 ha)	1 781.8	1 134.4	1 953.2	1 791.6
Basin	Water use (GL)	13 020.5	9 190.3	15 792.3	13 086.0
	Surplus (\$m)	2 617.7	974.1	4 139.8	2 745.6
	Gross value (\$m)	7 963.49	4 043.22	8 375.82	7 303.13

Table D.D. Suthind v—Dasenne scenario representino pre-ivwi bashi tahu ahu water use, ulobal sututo	Table D.6: Summarv-	Baseline scenario representine	g pre-NWI basin land and wa	ter use, global solution
---	---------------------	--------------------------------	-----------------------------	--------------------------

Source: RSMG model simulations.

The key observation from the above analysis is that a clear benefit of water trading is in allowing flexibility for reallocating irrigation water during seasons of low availability (denoted 'dry' in the simulations).

Under the current arrangements, the distribution of water licences predominantly reflects licences issued progressively as development was occurring, at a time when there were restrictions on the movement of resources across borders. A freer trade allowing water to be matched to economically superior uses could be expected to lead to a reallocation of land uses, including a possible reduction in irrigated production (Table D.7). Those changes are expected to occur in all states except for Queensland, where there is opportunity for an expansion in irrigated area following more efficient water use within the cap.

State	Description	Normal	Dry	Wet	State-contingent
Qld	Area irrigated ('000 ha)	68.4	0.0	68.4	9.8
	Water use (GL)	342.2	0.0	342.2	273.7
	Surplus (\$m)	69.2	34.2	62.3	60.1
	Gross value (\$m)	211.1	77.2	210.5	184.1
NSW	Area irrigated ('000 ha)	77.0	0.2	-254.3	-254.3
	Water use (GL)	1218.5	749.6	-130.0	720.2
	Surplus (\$m)	131.1	0.3	205.1	127.1
	Gross value (\$m)	500.1	189.0	498.7	437.5
Vic.	Area irrigated ('000 ha)	0.7	0.7	0.7	0.7
	Water use (GL)	-36.2	-36.2	-43.5	-38.4
	Surplus (\$m)	125.6	152.3	143.4	136.3
	Gross value (\$m)	-1.96	0.00	-2.55	-1.75
SA	Area irrigated ('000 ha)	-15.0	-15.0	-15.0	-15.0
	Water use (GL)	-135.0	-135.0	-162.0	-143.1
	Surplus (\$m)	-7.7	-0.2	-22.4	-10.6
	Gross value (\$m)	-0.49	0.00	-0.64	-0.44
Total Murray–Darling	Area irrigated ('000 ha)	131.1	-14.2	-200.2	-258.8
Basin	Water use (GL)	1389.4	578.4	6.7	812.4
	Surplus (\$m)	318.1	186.7	388.4	312.9
	Gross value (\$m)	708.8	266.2	706.0	619.4

Table D.7: Difference in key model attributes between the sequential and global runs—potential gains with fully unimpeded water trade

Source: RSMG Model simulations

Such reductions are already occurring in a number of catchments where water licence holders are taking advantage of water trading to realise the value of their assets; for example, areas such as North Central (Loddon–Campaspe), Murrumbidgee (Lowbidgee and Coleambally) and the Goulburn–Broken catchments.

Under the assumption of no changes in commodity prices, the net economic benefit from water trading in the basin would be around \$300 million per year. These estimates are likely to be overstated, as the RSMG analysis assumes optimal allocations under best available technological options. ABARE analysis, following an econometric analysis, estimated that in 2007–08 under the partial restrictions on trade applicable at that time the benefit of water trade to South Australia was around \$31 million (Mallawaarachchi and Foster 2009).

Moreover, the model simulations indicate that, under the assumptions of technology and land availability reflected in available data, water use over the medium term may increase in New South Wales and Queensland broadacre industries to take advantage of more flexible farming systems that can provide productivity benefits, particularly over wet and normal seasons. This also illustrates the need to further reduce restrictions on trade to allow for medium-term equilibrium in land use, reflecting economic rather than political realities.

The general insight gained from this analysis is that water trading across catchments is an efficient way to allocate existing limited water allocations in times of low water availability. Under the conditions assumed in RSMG model simulations, the benefits of trade could be around \$300 million across the Murray–Darling Basin.



Appendices

Appendix E: Murray–Darling Basin trade, market and charge rules

Basin Plan water trading rules

The Basin Plan is to include rules for the trading of tradeable water rights (water access rights, irrigation rights and water delivery rights). Under the *Water Act 2007*, the ACCC advises the MDBA on water trading rules, which can cover the terms and processes for trading, the imposition or removal of restrictions on trading and the taking or use of water under particular circumstances, information to enable trading and reporting on trading.

The Basin Plan trading rules will apply across the Murray–Darling Basin. Other trading rules at a more local level will continue to exist, but they will need to be consistent with the higher level rules in the Basin Plan. Interim and transitional water resource plans, which may include water trading rules, prevail over the Basin Plan to the extent of any inconsistency.

The ACCC handed down its final advice on the water trading rules in March 2010 (ACCC 2010b). It proposes the development of Basin Plan trading rules on many trading matters, and recommends other actions where it considers that a Basin Plan rule is not possible or appropriate.

Water Market Rules 2009

Subsection 97(1) of the Water Act provides that the Minister may make water market rules that prohibit irrigation infrastructure operators (IIOs) from unreasonably delaying or preventing the transformation of an irrigation right held by an irrigator against an infrastructure operator into a statutory water access entitlement. The Water Market Rules 2009 commenced on 23 June 2009 and came into full effect, following a transitional period, on 1 January 2010. The purpose of the rules is to free up the trade of water access rights within the Murray–Darling Basin by ensuring that the policies or administrative requirements of IIOs do not form barriers to trade.

Some IIOs hold a statutory water access entitlement, which entitles the infrastructure operator to take specified amounts of water from a designated water source. The members of these IIOs hold irrigation rights against the operator, which entitle them to receive a share of the water under the IIO's statutory water access entitlement. Irrigation rights are not statutory water access rights or water delivery rights.

Irrigation rights can be converted into separate statutory water access entitlements through a process of transformation (which results in a corresponding reduction in the share component of the IIO's statutory water access entitlement). Following the completion of transformation, the ownership of the water access entitlement is held directly by the irrigator (or another party) and can be traded freely (subject to any restrictions imposed by state law). However, irrigators must first seek the approval of an IIO, as an owner of the statutory water access entitlement, in order to transform the share of the water held under their irrigation rights against the infrastructure operator. In the past, IIOs were in a position to constrain trade of water out of their districts by withholding their approval.

The Water Market Rules 2009 remove barriers to the trade of water by prohibiting conduct by IIOs that prevents or unreasonably delays the transformation of irrigators' irrigation rights or trading by irrigators of the transformed water access entitlements.

Water Charge (Termination Fees) Rules 2009

The Water Charge (Termination Fees) Rules 2009 place a maximum limit on the termination fees an IIO can charge, and aim to ensure that there is a reasonable balance between providing investment certainty for operators and flexibility for irrigators.

In the past, it was common for IIOs to charge an exit fee when water entitlement was permanently traded out of an irrigation scheme. The fee was designed to recover the unavoidable ongoing fixed costs of maintaining irrigation infrastructure, which continue to accrue after the 'departure' of a water entitlement. The exit fees were charged even when an irrigator retained their water delivery right. In April 2007, a protocol on access, exit and termination fees was agreed by jurisdictional governments under the Murray–Darling Basin Agreement. The protocol stated that no exit fees should be levied and that termination fees should be a multiple of 15 times the annual fixed access fee (or shadow access fee) if a water delivery entitlement holder elected to terminate delivery rights. The ACCC considered this to be a relatively high termination fee, providing the operator with 25 to 39 years of infrastructure access fees. These high and compulsory exit fees created market distortions by reducing the quantity of water traded and, by insulating the operator from the financial effects of water trade, dampening the signal to operators that network rationalisation is required. The Water Charge (Termination Fees) Rules 2009, which came into full effect on 1 September 2009, introduce a number of important requirements for IIOs designed to overcome those problems. First, an operator cannot charge an 'exit fee' when an irrigator chooses to trade entitlement out of the scheme. The rules allow operators to impose a 'termination fee' primarily in circumstances in which an irrigator wishes to terminate their right of access to the operator's irrigation network. The rules generally cap the termination fee at 10 times the annual fixed infrastructure access fee.

Water Charge (Planning and Management Information) Rules 2010

The Water Act provides the Minister for Water with the power to make water charge rules that relate to regulated water charges, including charges for water planning and management activities. The Water Charge (Planning and Management Information) Rules 2010 came into effect on 30 June 2011 following a transitional period.

The rules require persons determining charges for water planning and management activities to publish information about those charges, including the amounts and the process applied to determine them. Historically, government water management agencies in the Murray–Darling Basin have imposed different types of charges to recover the costs of water planning and management. The charges have varied in their structure (fixed/variable) and been determined using a range of different methods.

The rules have direct relevance for water markets operating in the Murray–Darling Basin, as they will generally require publication of information about fees and charges imposed by government to recover the costs of administering water trading, including transaction fees for processing trade applications, assessments and approvals.

Water Charge (Infrastructure) Rules 2010

The Water Charge (Infrastructure) Rules 2010 were made by the Minister on 21 December 2010. The rules regulate charges for infrastructure services provided by rural water infrastructure operators in the Murray–Darling Basin.

The rules adopt a three-tiered approach to regulation, which recognises that different levels of regulation are appropriate for different operators. The Tier 1 requirements, some elements of which apply to all operators, came into full effect on 12 April 2011 after a three-month transitional period. They require operators to provide their customers with a schedule of regulated charges that will apply to them.

The Tier 2 requirements apply to medium-sized infrastructure operators that are not owned by members and to large member-owned operators and require them to develop, consult on and provide to their customers a network service plan. The plan must include options for infrastructure-related expenditure and investment and anticipated regulated charges over five years. Network service plans must be in place by 1 July 2012.

Tier 3 operators (large infrastructure operators not owned by members) are required to have their regulated charges approved or determined by the ACCC or an accredited regulator. Prices set under the Tier 3 requirements come into effect from July 2013, as relevant state price approval and determination processes conclude.

Water infrastructure pricing principles for price approvals and determinations made under the Water Charge (Infrastructure) Rules were released on 5 July 2011 by the ACCC.

The rules provide for price approvals and determinations of certain rural water infrastructure operators in the Murray–Darling Basin by either the ACCC, or a state agency accredited by the ACCC. These price approvals and determinations will apply to charges for many non-urban water services provided by State Water, Goulburn–Murray Water and Lower Murray Water. Other operators may be conditionally covered by the rules.

The principles outline the ACCC's approach to making price approvals and determinations under the rules. The ACCC is proposing that, as a term and condition of accreditation, state agencies will also be required to apply the principles.

In developing these principles, the ACCC issued draft pricing principles for public consultation. Five submissions were received in response. The ACCC has considered the matters raised during consultation in preparing the version of the pricing principles released.

The ACCC monitors compliance with the water market and water charge rules and has released guides on the rules to assist entities to comply.