

A Water allocations — progress towards meeting CoAG obligations

Arising from the 1994 CoAG water reform agreement, each state and territory established a program in 1999 for implementing water allocations for priority river systems and groundwater resources. Governments committed to substantially complete their 1999 programs by 2005 (including allocations for stressed and overallocated rivers by 2001). In the 2004 National Water Initiative, signatory governments¹ committed to substantially complete allocation arrangements (including appropriate allocations to the environment) by 2005 for all stressed and overallocated river systems and groundwater resources covered by their 1999 programs. Signatory governments also committed to preparing water plans by the end of 2007 for other systems that are overallocated, fully allocated or approaching full allocation and plans by the end of 2009 for systems that are not yet fully allocated. This appendix outlines the 1999 implementation program for each state and territory and provides an overview of each jurisdiction's progress towards completing its program.

New South Wales

In 2001 New South Wales advised that it would develop 39 water sharing plans covering 51 water systems: 7 regulated rivers; 32 stressed unregulated subcatchments; and 12 stressed aquifers (NCC 2001b). These plans were originally scheduled for completion in 2002-03.

New South Wales has gazetted 36 plans, of which 31 commenced on 1 July 2004. The other five gazetted plans are scheduled to commence on 1 July 2005. New South Wales is progressing the remaining three plans and developing 'macro plans' for the rivers and groundwater sources not covered by the 39 water sharing plans.

¹ The governments of Western Australia and Tasmania have not signed the Intergovernmental Agreement on a National Water Initiative.

Rivers and streams

Regulated river catchments

Regulated rivers in New South Wales account for about 80 per cent of water use in the state and include the major river systems listed in table A.1. New South Wales has environmental flow requirements in place for all of its regulated rivers. It has completed water sharing plans for seven of its regulated rivers.

Table A.1: Progress towards completing the 1999 implementation program, New South Wales regulated river catchments, August 2004

<i>Regulated river catchment</i>	<i>Plan status</i>
Barwon–Darling ^a	In 2001 New South Wales stated that it would commence a plan after it had addressed issues with the Murray–Darling Basin Commission cap.
Barwon–MacIntyre	Environmental flow provisions subject to inter-government negotiation.
Bega	
Belubula	
Border Rivers	Environmental requirements developed through the Border Rivers Commission.
Gwydir	The Gwydir regulated river plan was gazetted in February 2003. It was amended in 2004.
Hunter	The Hunter regulated river plan was gazetted in July 2004.
Lachlan	The Lachlan regulated river plan was gazetted in February 2003. It was amended in 2004.
Macquarie Cudgegong	The Macquarie and Cudgegong regulated river plan was gazetted in February 2003. It was amended in 2004.
Murray	The Murray regulated river plan was gazetted in February 2003. It was amended in 2004.
Murrumbidgee	The Murrumbidgee regulated river plan was gazetted in February 2003. It was amended in 2004.
Namoi	The Namoi regulated river plan gazetted February 2003. It was amended in 2004.
Peel	

^a The Barwon–Darling River is not a regulated river, but is significantly influenced by tributary regulation.

Sources: NCC 1999, 2001b; DIPNR website (<http://www.dipnr.nsw.gov.au/water/sharing/>)

High stressed unregulated river catchments

Table A.2: Progress towards completing the 1999 implementation program, New South Wales unregulated river catchments, August 2004

<i>Catchment</i>	<i>Plan status</i>
Barwon region	
Glen Innes	
Inverell	
Lower Peel	
Myall Creek	
Phillips Quirindi Mooki	The Phillips Creek, Mooki River, Quirindi Creek and Warrah Creek water sources plan was gazetted in February 2003. It was amended in 2004.
Tenterfield Creek ^a	The Tenterfield Creek plan was gazetted in February 2003. It was amended in 2004.
Upper Horton	The Rocky Creek, Cobbadah, upper Horton and lower Horton plan was gazetted in February 2003. It was amended in 2004.
Warialda Creek	
Central West region	
Bell River	
Burrangong Creek	
Castlereagh above Binnaway	The Castlereagh River above Binnaway plan was gazetted in February 2003. It was amended in 2004.
Crowther Creek	
Goonigal Creek	
Lachlan River above Reid's Flat	
Lawsons Creek	
Mandagery Creek	The Mandagery Creek plan was gazetted in February 2003. It was amended in 2004.
Molong Creek and Tributaries	
Queen Charlottes Vale Creek/Evan Plains Creek	
Summerhill Creek	
Unregulated lower Macquarie system	
Hunter region	
Black	
Bylong	
Dart	
Goulburn & Residual	
Halls	
Hunter Residual	
Jilliby Jilliby	The Jilliby Jilliby Creek plan was gazetted in February 2003. It was amended in 2004.

(continued)

Table A.2 continued

<i>Catchment</i>	<i>Plan status</i>
Hunter region (<i>continued</i>)	
Ourimbah ^a	The Ourimbah Creek plan was gazetted in February 2003. It was amended in 2004.
Pages	
Wollombi	
Wybong	The Wybong Creek plan was gazetted in February 2003. It was amended in 2004.
Murray region	
Billabong	The Upper Billabong plan was gazetted in February 2003. It was amended in 2004.
Murrumbidgee region	
Murrumbidgee II	The Adelong Creek and Tarcutta Creek plans were gazetted in February 2003. These plans were amended in 2004.
Yass Upper	
North Coast region	
Acacia Creek	
Alstonville Area	
Apsley River	The Apsley River plan was gazetted in February 2003. It was amended in 2004.
Boambee creek	
Bonville Creek	
Cobaki Creek	
Coffs Harbour Creek	
Blicks River ^a	
Bucca Bucca Creek ^a	
Commissioners Waters	The Commissioners Waters plan was gazetted in February 2003. It was amended in 2004.
Coopers Creek ^a	The Coopers Creek plan was gazetted in February 2003. It was amended in 2004.
Duroby Creek	
Gara River	
Hickeys Creek	
Korora Basin	
Kyogle Area	
Malpas Dam	
Missabotti Creek	
Myrtle Creek	
Peacock Creek	
Sheens Creek	
South Creek – South Arm	
Terania Creek	
Toorumbée ^a	The Toorumbée Creek plan was gazetted in December 2002. It was amended in 2004.

(continued)

Table A.2 continued

<i>Catchment</i>	<i>Plan status</i>
North Coast region (<i>continued</i>)	
Tuckean Area	
Tyagarah Creek	
Upper Brunswick River	The upper Brunswick River plan was gazetted in February 2003. It was amended in 2004.
Upper Duck Creek	
Upper, mid and lower Orara River ^a	In progress.
Upper Nymboida River ^a	
Wilson River	
Woolgoolga Creek	
Sydney south coast region	
Bombala River	
Bungonia	
Candelo Creek	
Capertree River	
Cattai Creek	
Coolumbooka River	
Currumbene Creek	
Dignams Creek	
Flat Rock Creek	
Kangaroo River	The Kangaroo River plan was gazetted in February 2003. It was amended 2004.
Lake Burragorang	
Lower Coxs River	
Lower Shoalhaven River	
Maclaughlin River	
Mid Coxs River	
Monkey Creek	
Narira Creek	
Nepean River	
South Creek	
Wandella Creek ^a	The Wandella Creek plan was gazetted in February 2003. It was amended in 2004.
Upper Coxs River	
Upper Murrumbidgee River	
Upper Nepean River	
Upper Wollondilly	
Wingecarribee River	
Wolumla Creek	
Yalwal Creek	

^a These systems were not listed on New South Wales original 1999 implementation program.

Sources: NCC 1999, 2001b; DIPNR website (<http://www.dipnr.nsw.gov.au/water/sharing/>)

Groundwater

High risk aquifers

Table A.3: Progress towards completing the 1999 implementation program, New South Wales high risk aquifers, August 2004

<i>Aquifers</i>	<i>Plan status</i>
Alstonville Basalt (GWMA 804)	The Alstonville Basalt Plateau groundwater source plan was gazetted in February 2003. It was amended in 2004.
Araluen alluvium	
Bellinger Coastal Sands	
Belubula River (GWMA 021)	
Billabong Creek Alluvium (GWMA 014)	
Border Rivers Alluvium (GWMA 022)	
Botany Sandbeds (GWMA 018)	
Cudgegong Valley (GWMA 010)	
Dubbo (within GWMA 009)	
Goulburn River Alluvium	
Great Artesian Basin (GWMA 601)	
– Main	
– Intake Beds	In progress.
Hastings River Alluvium	
Hunter River alluvium (Regulated river reaches)	
Karuah/Myall Alluvium	
Kingdom Ponds Alluvium	
Lower Gwydir Alluvium (GWMA 003)	The lower Gwydir groundwater source plan was gazetted in February 2003.
Lower Macquarie (GWMA 016)	The lower Macquarie groundwater source plan was gazetted in February 2003.
Lower Murray Alluvium (GWMA 016)	In progress.
Lower Murrumbidgee Alluvium (GWMA 002)	The lower Murrumbidgee groundwater source plan was gazetted in February 2003. Operation of the plan is deferred until July 2005.
Macleay Alluvium	
Macleay Coastal Sands	
Mangrove Mountain / Kulnura Fractured Rock Aquifer	The Kulnura Mangrove Mountain groundwater source plan was gazetted in February 2003. It was amended in 2004.
Maroota Alluvium and Sandstone	
Molong Limestone	
Murrumbateman fractured rocks	
Namoi groundwater:	
Lower Namoi Alluvium (GWMA 001)	
Upper Namoi Alluvium (GWMA 004)	The upper and lower Namoi groundwater source plan was gazetted in February 2003. Operation of the plan is deferred to July 2005.
North Coast Fractured Rocks	

(continued)

Table A.3 continued

<i>Aquifers</i>	<i>Plan status</i>
Peel Valley Alluvium (GWMA 005)	
Richmond Coastal Sands	
Richmond River Alluvium	
Stuart's Point ^a	The Stuart's Point groundwater source plan was gazetted in December 2002. It was amended in 2004.
Tomago Sandbeds	The Tomag Tomaree Stockton groundwater source plan was gazetted in February 2003. It was amended in 2004.
Upper Lachlan (GWMA 011)	
Upper Murrumbidgee Alluvium (GWMA 013)	
Viney Creek Alluvium	
Williams & Patterson Rivers Alluvium	
Wollombi Alluvium	Contained in the plan for the Kulnura Mangrove Mountain groundwater source that was gazetted in February 2003. The plan was amended in 2004.
Young Granites (GWMA 802)	

Sources: NCC 1999; DIPNR website (<http://www.dipnr.nsw.gov.au/water/sharing/>)

Medium and low risk aquifers

Table A.4: Progress towards completing the 1999 implementation program, New South Wales medium risk aquifers, as at August 2004

<i>Aquifers</i>	<i>Plan status</i>
Bega Valley Alluvium	
Bell River (GWMA 020)	
Blue Mountains Sandstone	
Broken Hill	
Brunswick Alluvium	
Castlereagh Alluvium	
Castlereagh Basalts	
Clarence Alluvium	
Clarence Coastal Sands	
Crookwell Basalts	
Darling River – anabranch	
Darling River – north of Menindee	
Darling River – south of Menindee	
Dorrigo Basalt	The Dorrigo Plateau surface water source and the Dorrigo Basalt groundwater source plan was gazetted in February 2003. It was amended in 2004.
Far West	
Great Artesian Basin (within GWMA 601) – shallow	

(continued)

Table A.4 continued

<i>Aquifers</i>	<i>Plan status</i>
Hawkesbury–Nepean Alluvium	
Hunter Coal-associated fractured rocks	
Hunter Coastal Sands	
Hunter miscellaneous tributaries alluvium	
Inverall Basalt (GWMA 803)	
Lachlan fold belt metasediments	
Lake George Alluvium	
Lower Lachlan (GWMA 012)	The lower Lachlan groundwater source plan was gazetted in February 2003.
Macquarie Marshes	
Macquarie-Lachlan Granites	
Manning River Alluvium	
Maules Creek Alluvium (GWMA 006)	
Miscellaneous fractured rocks	
Miscellaneous south coast Alluvium	
Murray Fractured Rocks – east	
Murray Fractured Rocks – west	
Murray River downstream of Murrumbidgee junction	
Murrumbidgee fractured rocks	
Muttama Creek Alluvium (part of GWMA 013)	
Namoi fractured rocks	
Namoi miscellaneous tributaries Alluvium (GWMA 007)	
North Coast metasediments	
North Coast miscellaneous Alluvium	
North Coast sedimentary rocks	
North East Hunter fractured rocks	
North West Hunter Basalts	
Orange Basalts (GWMA 801)	
Southern Coastal Sands	
Southern Highlands fractured rock	
Sydney Basin Sandstone (GWMA 603)	
Talbragar–Coolaburragundy (GWMA 019)	
Tweed Coast Sands	
Upper Macquarie (GWMA 009)	Contained in the lower Macquarie groundwater source plan, which was gazetted in February 2003.
Upper Murray Alluvium (GWMA 015)	
Upper tributaries Alluvium	
Wollombi Sandstone	

Sources: NCC 1999; DIPNR website (<http://www.dipnr.nsw.gov.au/water/sharing/>)

Victoria

Victoria has water management processes in place for stressed rivers, other regulated and unregulated rivers and streams, and groundwater.

Stressed rivers

Victoria identified the regulated rivers in table A.5 as stressed or overallocated in 1999, with an amendment in 2001. Table A.5 outlines Victoria's progress in providing water to the environment for the stressed and/or overallocated rivers covered by its 1999 implementation program (as amended in 2001).

Table A.5: Progress with environmental water provision for Victoria's stressed and/or overallocated rivers, as at September 2004

<i>Rivers and creeks</i>	<i>Current status</i>
Avoca River	Flow rehabilitation plan not required. Statewide or regional management rules will be used to manage the river, supplemented by 1500 megalitres each year of the water savings from the Wimmera–Mallee pipeline.
Broken River	Environmental flow assessment completed in 2001. The recommended environmental flows will be implemented via the bulk entitlement process by September 2004.
Lerderderg River	The flow rehabilitation plan was completed in 2003 and the recommended flows met. To overcome concerns about the need for summer flushes and the extended low summer flow period, Victoria allocated A\$360 000 from stressed river funds to modify the Lerderderg weir to enable it to pass fresher and flushing flows. It has also reviewed the bulk entitlement, which it expects to implement as the new environmental flow regime around October 2004.
Loddon River	Environmental flows investigation completed in 2002. It will use the bulk entitlement process and statewide or regional management rules to implement environmental flows.
Badgers Creek	Flow stress in Badgers Creek is caused by extractions to supply water to Healesville. To overcome this problem Victoria will connect Healesville to Melbourne's water supply. This upgrade is scheduled for 2012. In the interim Melbourne Water has committed around A\$200 000 to undertake work (conducted in conjunction with Healesville Sanctuary) to improve the health of the creek. This work includes bed and bank stabilisation, flood protection, and modification of two in-stream structures to promote fish passage.
Maribyrnong River	Victoria completed the Maribyrnong River Flow Rehabilitation Plan in June 2002. The plan indicates that flow variability is a greater problem than insufficient water. In place of implementing the remaining environmental flows in the Maribyrnong River, Victoria committed to implement the stream flow management plan for King Parrot Creek, which it considered would provide greater environmental benefits for the level of commitment required. Victoria is taking other actions through the catchment management authority processes to improve the health of the Maribyrnong River.

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Table A.5 continued

<i>Rivers and creeks</i>	<i>Current status</i>
Macalister River	The Thomson Macalister Environmental Flows Task Force reported its environmental flow recommendation in February 2004. The White Paper contains provisions that largely implement the recommendations of the task force. The Macalister River will receive 5000 megalitres a year by 2006 through a A\$5 million program of infrastructure improvement. Within 10 years the additional 2000 megalitres a year in the Macalister will be provided through water efficiency and system savings.
Snowy River	The Snowy Rescue Plan (a joint initiative between Victoria, New South Wales and the Australian Government) will return 21 per cent of the flow (212 000 megalitres) to the river over 10 years.
Thomson River (downstream of Cowwarr Weir)	The Thomson Macalister Environmental Flows Task Force reported its environmental flow recommendation in February 2004. The White Paper contains provisions that largely implement the recommendations of the task force. Victoria will commence implementation of the environmental flows via the bulk entitlement three months after the lifting of Melbourne's current water restrictions. Initially Victoria will provide 10 000 megalitres a year to the Thomson River, but it intends to increase the Environmental Water Reserve to 18 000 ML a year over the next 10 years. The additional 8000 megalitres will be derived from water savings. The Government has allocated funds to obtain the water savings and for monitoring the health of the Thomson and Macalister rivers.
Wimmera–Glenelg rivers	Victoria completed the environmental flow assessment in for the Wimmera River in 2002 and the Glenelg River in 2003. Victoria completed the bulk entitlement process for the Wimmera and Glenelg Rivers in June 2004. Victoria has implemented the MDBC cap. It has committed 34 690 megalitres of water savings a year from the Northern Mallee pipeline for the two rivers and is seeking to provide a further 65 000 to 85 000 megalitres of water for a sustainable Environmental Water Reserve if the second Wimmera–Mallee pipeline development proceeds.

Sources: DSE 2004; Government of Victoria 2004; NCC 2003a

Victoria's white paper on water (DSE 2004) states that 22 of the 29 catchments in Victoria are fully allocated and one third of rivers are in poor or very poor condition. Victoria is identifying priority actions for addressing river health problems for its regulated rivers through regional catchment and associated river health strategies. Table A.6 outlines the current status of Victoria's progress in developing its regional catchment and river health strategies.

Table A.6: Status of Victorian regional catchment and river health strategies, as at September 2004

<i>Region</i>	<i>Current Status</i>	
	<i>Regional catchment strategy</i>	<i>Regional river health strategy</i>
Corangamite	Accredited	The draft strategy is expected to be released for public comment in the latter half of 2004.
East Gippsland	First draft accreditation completed	The draft strategy (completed 2002) was re-released for stakeholder comment in April 2004.
Glenelg Hopkins	First accredited Integrated Natural Resource Management plan in Australia	The draft strategy was released for public comment in February 2004.
Goulburn Broken	Accredited	The draft strategy released for public comment March 2004.
Mallee	Accredited	The draft strategy is expected to be released for public comment in the latter half of 2004.
North Central	Accredited	The draft strategy was released for public comment in August 2004.
North East	Second draft submitted	The draft strategy is expected to be released for public comment expected in September 2004.
Port Phillip	First draft accreditation completed	The draft strategy was released for public comment in June 2004.
West Gippsland	Second draft submitted	The draft strategy was released for public comment in March 2004.
Wimmera	Accredited	The draft strategy is expected to be released for public comment expected in late October 2004.

Source: Government of Victoria 2004

Regulated rivers and streams

Victoria allocates water to consumptive uses and the environment through the bulk entitlements regime for regulated rivers. As at August 2004, Victoria had completed the bulk entitlement conversion process for 19 of its 25 water supply systems, although the entitlement for the Thomson and Macalister river system is being modified as part of the implementation of environmental flows for these rivers. (table A.7). Victoria committed to complete the bulk entitlement system, covering 78 per cent of all water used for consumptive purpose, over the next two years. It committed to complete the conversion process for the Ovens and Broken rivers by September 2004 and the conversion process for the mid-Loddon by June 2005 (DSE 2004).

Table A.7: Status of bulk entitlements in Victoria, as at August 2004

<i>Water supply system</i>	<i>Status of bulk entitlement</i>
Avoca ^a	Environmental requirements met under current management practices
Barwon	Finalised 2002
Broken ^a	Negotiation complete. Awaiting applications from relevant water authorities. (Expected completion: September 2004)
Campaspe	Finalised 1999–2000
Central Gippsland rivers – urban	Finalised 1997–98
Central Highlands – major urbans	Finalised 2002
Central Highlands region – urban (part)	Finalised 1998
East Gippsland rivers –urban	Finalised 1997
Glenelg region ^a – urban supplies	Finalised 1997
Goulburn	Finalised 1995
Grampians – urbans	Part of Wimmera-Mallee process.
Kiewa/Rubicon (Southern Hydro)	Finalised 1997
Latrobe	Finalised 1996
Lerderderg ^a	Managed under the stressed rivers program
Loddon ^a	Work progressing.
Maribyrnong ^a	Finalised 2000–01
Melbourne	Process complete. Awaiting Government resolution of a policy matter.
Moorabool	Finalised 1995
Murray	Finalised 1999
North East region – urban	Finalised 1995–99
Otway rivers – urban	Finalised 1997–98
Ovens	Negotiation complete. Awaiting applications from relevant water authorities.
Snowy ^a	Managed under Snowy Rescue Plan.
South Gippsland rivers – urban	Finalised 1997
Tarago System	Dependent on Melbourne system.
Thomson/Macalister ^a	Finalised 2001. The bulk entitlement will be modified as part of the implementation of the flow rehabilitation plan for the Thomson and Macalister river system.
Werribee	Finalised 1997
Wimmera-Mallee ^a	Finalised 2004

^a Priority rivers identified on the 1999 implementation program.

Sources: Government of Victoria 2004

Unregulated rivers and streams

For unregulated rivers, including unregulated portions of regulated systems, Victoria manages environmental flows and water allocations for consumptive purposes using stream flow management plans. Victoria's 1999 implementation program indicated that the government would develop 42 stream flow management plans. However, in light of the 2004 white paper, Victoria reviewed its arrangements, determining 21 priority catchments where the government will provide ecologically sustainable environmental water reserves by:

- developing stream flow management plans that will provide a water regime that sustains agreed ecological objectives within 10 years
- co-investing in implementing stream flow management plans that seek to provide the enhanced environmental water reserve in a shorter timeframe
- moving diverters from summer to winter diversions when this will reduce ecological damage
- co-investing with farmers to assist them to implement measures to apply the stream flow management plan, including the building of off-stream winter-fill dams.

The 21 priority catchments and the status of the stream flow management plan in each catchment is summarised in table A.8.

Table A.8: Management of unregulated catchments under stream flow management plans in Victoria, as at October 2004

<i>Stream flow management plan</i>	<i>Status</i>
Avon River	Draft plan released for public comment
Diamond Creek	Plan completed but not operational
Gellibrand River	Plan operational but not approved under current Water Act.
Hoddles Creek	Plan completed but not operational
Kiewa River	Draft plan released for public comment
King Parrot Creek	Draft plan released for public comment
Merri River	Plan operational but not approved under current Water Act.
Plenty River	Draft plan released for public comment
Upper Latrobe River	Plan operational but not approved under current Water Act.
Upper Ovens River	Draft plan released for public comment
Upper Wimmera River	Draft plan has been assessed by the Technical Audit Plan and is being amended prior to public release for comment
Yea River	Draft plan released for public comment

(continued)

Table A.8 continued

<i>Stream flow management plan</i>	<i>Status</i>
Barwon River	Environmental flows study proposed
Little Yarra River	Environmental flows study initiated
Olinda Creek	Committee established
Steels, Dixons and Pauls creeks	Committee established
Seven Creeks	Environmental flows study proposed
Stringybark Creek	Committee established
Tarra River	Environmental flows study proposed
Woori Yallock Creek	Environmental flows study proposed
Upper Maribyrnong River	Process to be recommenced

Source: Government of Victoria 2004

Groundwater

For groundwater sources where allocations exceed 70 per cent of the sustainable yield, Victoria establishes a water supply protection area and develops groundwater management plans. Victoria identified 10 water supply protection areas where groundwater allocation exceeded 70 per cent of sustainable yield on its 1999 implementation program. Except for Denison, Victoria has completed groundwater management plans for all water supply protection areas covered by its 1999 implementation program.

In 1999 Victoria also identified a number of other areas for future declaration as groundwater supply protection areas. Since that time Victoria has established an additional 15 groundwater supply protection areas. Table A.9 outlines Victoria's progress with groundwater management planning.

Table A.9: Progress with groundwater management planning in Victoria, as at February 2004

<i>Water supply protection areas</i>	<i>Status of plan</i>	<i>Target completion date</i>
Apsley	Consultative committee being established	December 2005
Ascot	Included in a proposal for the Upper Loddon	Na
Bungaree	Draft plan completed	December 2004
Campaspe ^a	Final plan completed	Na
Condah	Draft plan completed	December 2004
Denison ^a	Draft plan submitted to the minister for approval	June 2004 ^b
Deutgam	The minister did not approve the draft plan. A new consultative committee is being established and the plan will be redrafted.	June 2005
Gerangamete	Low priority ^c	

(continued)

Table A.9 continued

<i>Water supply protection areas</i>	<i>Status of plan</i>	<i>Target completion date</i>
Kaniva	Consultative committee being established	Na
Katunga ^a	Final plan completed	Na
Koo Wee Rup–Dalmore ^a	Final plan completed	Na
Lancefield	Low priority ^c	
Lang Lang	To be included in a plan for Westernport that will replace the Koo Wee Rup –Dalmore	na
Lower Loddon	Consultative committee being established	December 2005
Merrimu	Low priority ^c	na
Mid Loddon	Consultative committee being established	December 2005
Murrayville	Final plan completed	na
Neuarpur ^a	Final plan completed	na
Nullawarre ^a	Final plan completed	na
Sale	The Minister did not approve the draft plan. A new consultative committee is being established and the plan will be redrafted.	June 2005
Shepparton Irrigation Area ^a	Final plan completed	na
Spring Hill ^a	Final plan completed	na
Telopea Downs	Draft plan completed	June 2004 ^b
Wandin Yallock	Draft plan completed	December 2004
Warrion	Draft plan submitted to the minister for approval	June 2004 ^b
Wy Yung	Draft plan submitted to the minister for approval	June 2004
Yangery ^a	Final plan completed	Na
Yarram	Consultative committee being established	December 2005

^a Water supply protection areas covered by Victoria's 1999 implementation program. ^b Plans for these areas were not finalised as at September 2004. ^c Due to the small number of water users allocations are being dealt with via other mechanisms. **na** Not applicable.

Source: Government of Victoria 2004, NCC 1999

Queensland

Queensland uses water resource plans to determine rules for how water is shared between the environment and consumptive use in a particular catchment. Specific water allocations for each use and each water licence holder are included in a resource operations plan.

Queensland's 1999 implementation program for water planning covers 26 major surface water and groundwater systems located in 20 catchments.

Queensland has completed 11 of the 20 required water resource plans and 3 of the 19 resource operations plans for the river systems covered by its 1999 implementation plan. Queensland will not complete several resource operations plans until after 2005. The completed Queensland plans mostly cover surface water. Further amendments will be required to some of these plans to cover overland flows, less intensive water uses and groundwater. Table A.10 outlines the status and timetable for water resource and resource operations plans in Queensland.

Queensland publishes a summary of the status of its water planning on the Department of Natural Resources and Mines website. It reviews its arrangements periodically in response to issues raised, outcomes of community consultation and resource and risk priorities.

Table A.10: Status and timetable for water resource plans and resource operations plans in Queensland, as at March 2004

<i>Water system</i>	<i>Draft water resource plan released</i>	<i>Final water resource plan approved</i>	<i>Draft resource operations plan released</i>	<i>Final resource operations plan approved</i>
Atherton Basalts Groundwater	Incorporated into the Barron catchment planning process			
Barron ^a	December 2001	December 2002	August 2004	December 2004
Border Rivers ^b	July 2002	December 2003	March 2005	June 2005
Boyne	May 2000	December 2000	December 2001	June 2003
Brisbane	Incorporated into the Moreton catchment planning process			
Bundaberg Groundwater	Incorporated into the Burnett catchment planning process			
Burdekin ^b	June 2004 ^f	December 2004	June 2005	December 2005
Burnett ^{b,c}	June 2000	December 2000	December 2002	May 2003
Calliope	Jan 2005	July 2005	May 2006	November 2006
Condamine–Balonne ^b	December 2003	August 2004	March 2005	June 2005
Cooper	December 1999	February 2000	–	–
Fitzroy ^{b,d}	September 1998	December 1999	December 2002	January 2004
Flinders	Incorporated into the Gulf catchment planning process			
Georgina–Diamantina	November 2003	August 2004	December 2004	July 2005
Gulf	October 2004	April 2005	June 2005	December 2005
Herbert	Incorporated into the Wet tropics catchment planning process			
Logan–Albert	March 2005	March 2006	October 2006	September 2007
Marchy	September 2004	June 2005	June 2006	September 2007
Mitchell	October 2004	April 2005	June 2005	December 2005
Moonie	July 2002	December 2003	June 2004 ^f	December 2004

(continued)

Table A.10 continued

<i>Water system</i>	<i>Draft water resource plan released</i>	<i>Final water resource plan approved</i>	<i>Draft resource operations plan released</i>	<i>Final resource operations plan approved</i>
Moreton ^b	March 2006	October 2006	September 2007	May 2008
Pioneer ^e	December 2001	December 2002	August 2004	December 2004
Warrego-Paroo-Bulloo-Nebine	July 2002	December 2003	June 2004 ^f	December 2004
Wet tropics	July 2006	January 2007	2008	2008
Whitsunday	August 2005	February 2006	July 2006	January 2007

^a The Barron water resource plan includes relevant aquifers. ^b Queensland expects to amend the Border Rivers, Burdekin, Burnett, Condamine–Balonne, Fitzroy and Moreton water resource plans in future to include groundwater. ^c The Burnett water resource plan was amended in 2001-02. ^d The Fitzroy water resource plan was amended in 2003-04. ^e The Pioneer water resource plan is being amended to include groundwater. ^f Not completed by June 2004.

Source: Government of Queensland 2004

Western Australia

Western Australia nominated 77 water sources (40 river basins and 37 groundwater management areas) under its 1999 implementation program. None of the 40 river systems were identified as stressed or overallocated. Under its revised implementation program, agreed in the 2002 NCP assessment, Western Australia scheduled 37 water management plans covering most of the groundwater resources and main irrigation rivers covered by its original 1999 implementation program plus some new systems that had been identified as fully allocated or overallocated. It amends its program each year based on new information. Its current program covers 41 water planning areas.

Western Australia has implemented water management plans for around a quarter of the surface water and groundwater systems covered by its revised 1999 implementation program (table A.11). For another 20 per cent of systems, the Department of Environment advised that its information indicates that the systems are not in danger of becoming overallocated or stressed. It does not propose to prepare water management plans for these low priority areas. Western Australia has scheduled a total of seven water management plans and reviews for completion in 2005 and the bulk of its remaining 15 plans for completion over the following two years (including the four added to the program since 2002-03).

Table A.11: Status of water planning in Western Australia, as at May 2004

<i>Plan</i>	<i>Current status</i>
Albany local ^a	Strategy completed in 2001-02. Second review scheduled for 2009-10.
Arrowsmith subregional	Completed in 2001-02. Second review scheduled for 2009-10.
Blackwood subregional groundwater ^b	Interim ecological water requirements developed. Interim allocation management strategy scheduled for June 2005 and final plan scheduled for October 2007.
Bolgart groundwater management review	Low priority, no further action proposed.
Bremer Bay groundwater protection	Low priority, no further action proposed.
Bremer Bay local ^a	Low priority, no further action proposed.
Broome subregional	Scheduled for review in 2004-05.
Bunbury subregional	Incorporated into Busselton–Capel subregional review.
Busselton–Capel subregional groundwater	Review commenced. Scheduled for completion in 2006-07.
Canning River interim local ^c	Monitoring indicates system is exhibiting stress. Interim management strategy being developed.
Cape-to-Cape (Vasse) surface water subregional	Incorporated Busselton-Capel subregional review.
Carnarvon local ^a	Completed in 2003-04.
Cockburn subregional ^a	Completed in 2001-02. Second review scheduled for 2009-10. Sub-area allocation limit and boundary review in process, due for completion in June 2004.
Collie Water Resource Management Strategy (to be done as a subregional plan) ^a	Draft surface water plan completed in 2003. Final plan scheduled for completion in 2004-05. Groundwater environmental water provision to be determined in 2006-07 and plan to be made in 2007-08.
Derby local	Review scheduled for 2004-05.
Esperance local ^a	Completed in 2001-02. Second review scheduled to occur by 2009-10.
Exmouth local	Review scheduled for 2006-07.
Gascoyne Junction interim local	Low priority, no further action proposed.
Gingin subregional	Completed in 2001-02. Second review scheduled to occur by 2009-10
Gnangara groundwater review ^a	Review (under s46 of the Environmental Protection Act) scheduled for completion by June 2005. Review will be incorporated in the Perth–Gingin subregional plan.
Goldfields regional	Low priority, no further action proposed.
Harvey basin regional	Completed in 1999. plan operating well. Second review deferred until 2009-10.

(continued)

Table A.11 continued

<i>Plan</i>	<i>Current status</i>
Jandakot groundwater review ^a	Reassessed from low priority. Review (under s46 of the Environmental Protection Act) scheduled for completion by June 2005.
Jurien subregional	Completed in 2001-02. Second review scheduled to occur by 2009-10.
Kemerton local	Completed in 2001-02. Second review scheduled to occur by 2009-10.
Kimberley regional	Low priority, no further action proposed.
La Grange subregional	To be incorporated in Kimberley plan for which no further action is proposed.
Marbellup interim local	Completed in 2001-02. Second review scheduled to occur by 2009-10
Murray subregional	Low priority, no further action proposed.
Murray surface water	Review scheduled for 2005-06.
Ord River	Draft plan completed in 2001-02. Final plan rescheduled for completion in June 2005.
Perth Northwest Corridor groundwater management	To be incorporated in the Perth-Gingin subregional plan. Draft plan scheduled for 2006-07.
Perth-Bunbury regional ^a	Review scheduled for 2004-05. The need to progress this plan is being reviewed in light of the other priorities.
Perth-Gingin subregional ^{a,c}	Draft plan scheduled for 2006-07.
Pilbara regional	Issue scoping, initial cultural values assessment completed. Plan intended to deal with increased stress from mining activity. Strategy to be completed in 2004-05.
Rockingham-Stake Hill subregional	Completed in 2001-02. Second review scheduled to occur by 2008-09.
Rottneest groundwater management review	Low priority, no further action proposed.
South West Coastal groundwater management review	To be incorporated in the Kemerton plan.
Swan subregional ^a	To be incorporated in the Perth-Gingin subregional plan.
Wanneroo local ^a	To be incorporated in the Perth-Gingin subregional plan. Draft plan scheduled for completion in 2006-07.
Whicher regional (Busselton Coast-lower Blackwood groundwater and surface water) ^b	Due to other priorities, preparation of plan deferred until 2005-06.

^a The Auditor General has identified that licensed water use in parts of these groundwater management areas exceeded the estimated sustainable limits. ^b Added to the program in 2002-03. ^c Added to the program in 2003-04.

Source: Government of Western Australia 2004; NCC 2002, 2003a

South Australia

South Australia identified 15 water sources, mostly groundwater, on its 1999 water planning implementation program. It has completed water allocation plans for all 15 of the prescribed water resource areas covered by its 1999 program. South Australia subsequently identified five additional water systems, which it considered are stressed. It has commenced water allocation planning processes for these areas. In October 2004, the government announced its intention to prescribe the water resource of the Western Mount Lofty Ranges (Hill 2004). Table A.12 shows the status of water allocation plans for South Australia.

Table A.12: Water allocation plans in South Australia

<i>Water source</i>	<i>Status of plan</i>
Angas–Bremer	Adopted on 2 January 2001
Barossa	Adopted on 22 December 2000
Clare Valley	Adopted on 22 December 2000
Comaum–Caroline	Adopted on 29 June 2001
Eastern Mount Lofty Ranges ^a	Prescription process under way. The area is scheduled to be prescribed in the second half of 2004.
Western Mount Lofty Ranges	Government announced intention to prescribe on 14 October 2004
Far North Wells ^a	The proposal statement is being drafted. It is scheduled to be adopted in late 2005.
Lacepede Kongorong	Adopted on 29 June 2001
Mallee	Adopted on 21 December 2000
Marne/Saunders ^a	The proposal statement is being drafted. It is scheduled to be adopted in late 2005.
McLaren Vale	Adopted on 6 November 2000 ^b
Morambro Creek ^a	The plan is being drafted. It is scheduled to be adopted in early 2005.
Musgrave	Adopted on 2 January 2001
Naracoorte Ranges	Adopted on 29 June 2001
Noora	Adopted on 2 January 2001
Northern Adelaide Plains	Adopted on 22 December 2000
Padthaway	Adopted on 29 June 2001
River Murray	Adopted on 1 July 2002
Southern Basins	Adopted on 31 December 2000
Tatiara	Adopted on 29 June 2001
Tintinara Coonalpyn ^a	Adopted on 22 January 2003

^a Additional stressed systems identified since the development of the 1999 implementation plan. ^b A draft review of the plan has been completed. The review must be finalised by November 2005.

Source: Government of South Australia 2004

Tasmania

Tasmania has determined environmental water requirements for 43 of the 45 water systems on its 1999 implementation program (table A.13). While Tasmania has no stressed or overallocated river systems it identified 16 catchments on its 1999 implementation program for completion of water management plans (table A.14).

Since 1999 Tasmania also has completed environmental flow assessments for the Brumbies Creek and the Dee, King, and Blackman rivers (these waterways are not covered by Tasmania's 1999 implementation program). It has also identified a further five catchments at risk of over use for which it intends to prepare water management plans. For these catchments Tasmania is conducting water use sustainability projects as a means of capping extraction during the irrigation season until water management plans are finalised for these catchments.

Table A.13: Progress in determining environmental water requirements in Tasmania, as at August 2004

<i>Catchment or river</i>	<i>Date completed</i>
Ansons River	June 2000
Blythe River	December 2001
Boobyalla River	June 2000
Brid River	November 1999
Browns River	September 2001
Cam River	December 2001
Clyde River	November 2000
Coal River	October 2002
Derwent River (below Meadowbank)	February 2002
Duck River	December 2000
Elizabeth River	December 1990
Emu River	December 2001
Esperance River	November 1996
Forth River	Proposed completion June 2006
George River	November 1999
Gordon River	June 2001
Great Forester River	November 1999
Great Musselroe River	July 2000
Jordan River	August 2004
Lake River	October 2002
Leven River	February 2002

(continued)

Table A.13 continued

<i>Catchment or river</i>	<i>Date completed</i>
Liffey River	November 1999
Little Forester River	June 2000
Little Musselroe River	November 2000
Little Swanport River	December 2001
Lower Mersey River	March 2004
Lower Ringarooma River	July 2000
Macquarie River	September 1996
Meander River	September 1996
Montagu River	In progress — for completion March 2005
Mountain River	June 2000
Nicholls Rivulet	June 2000
North Esk River	August 1999
North West Bay Rivulet	June 2001
Ouse River	May 1996
Pipers River	November 1999
Rubicon River	May 2002
South Esk River	September 1996
St Patricks River	August 1999
Swan River	March 2001
Tomahawk River	July 2000
Tooms River	July 1999
Upper Mersey River	December 1997
Upper Ringarooma River	November 1999
Welcome River	December 2003

Source: Government of Tasmania 2004

Table A.14: Timetable for water management plans in Tasmania, as at October 2004

<i>Water management plan</i>	<i>Completion timeline</i>	<i>Current status</i>
Brid River ^a	na	Water use sustainability project under way. It is scheduled to be completed in January 2005.
Clayton's Rivulet ^a	na	Water use sustainability project under way. It is scheduled to be completed in June 2005.
Clyde River	April 2005	Draft plan prepared for statutory approval.
Coal River	December 2005	Environmental flows study complete.
Derwent River ^b	Low priority (after 2006)	Hydro Tasmania has commenced a water management review. Consultation is in progress. Data collection is progressing.
Elizabeth River ^c	November 2005	Environmental flows study complete and water use sustainability project in progress.

(continued)

Table A.14 continued

<i>Water management plan</i>	<i>Completion timeline</i>	<i>Current status</i>
Great Forester River	Completed	Plan adopted. River managed according to plan.
Inglis and Flowerdale rivers ^a	nd	Water use sustainability project under way. It is scheduled to be completed in November 2004.
Lake River and Macquarie River below Lake River ^c	November 2005	Environmental flows study complete and water use sustainability project in progress.
Lakes Crescent and Sorell	April 2005	Draft plan prepared for statutory approval.
Liffey River	December 2005	Environmental flows study complete. Water management plan to be completed as part of the Meander River catchment.
Little Swanport River	December 2004	Draft plan released for public comment.
Macquarie River downstream of Ross ^c	November 2005	Environmental flows study complete and water use sustainability project in progress.
Meander River	December 2005	Process to recommence after the Meander Dam issue is resolved. The completion date for the Meander River plan may be effected this matter
Mountain River ^a	nd	Water use sustainability project under way. It is scheduled to be completed in January 2005.
North Esk River ^d	Low priority	Environmental flows study complete.
Rubicon River ^a	nd	Water use sustainability project under way. It is scheduled to be completed in November 2004.
South Esk River (upstream of Macquarie including St Pauls and Nile rivers)	August 2005	Environmental flows study complete. Hydrological modelling and water use sustainability project in progress.
St Patricks River ^d	Low priority	Environmental flows study complete.
Tooms River ^c	November 2005	Environmental flows study complete.
Mersey River	December 2004	Draft plan released for public comment.
Upper and lower Ringarooma River including the Ledgerwood River	April 2005	Environmental flows study complete. Hydrological modelling and water use sustainability project in progress.

^a Catchments added to Tasmania's implementation program since 1999 because they are at risk of over use or because increased water extraction could have adverse impacts on industries in the area.

^b The Derwent River was not included on the 1999 implementation program for priority development of a water management plan. Hydro Tasmania's review of the Derwent River Basin contains many elements of a water management plan. ^c A single water management plans will be developed to cover the rivers in the Macquarie Basin. ^d Water allocation issues have been resolved through provision of water licences for use of the Launceston urban supply. **nd** Not determined.

Source: Government of Tasmania 2004

Australian Capital Territory

Under the Water Resources Management Plan, the ACT allocates water in 32 subcatchments. Table A.15 outlines the allocations of surface water and groundwater provided to the environment and for consumptive use for the ACT's 32 subcatchments.

Table A.15: ACT controlled surface water and groundwater allocations, by catchment and subcatchment, as at September 2003

Catchment and subcatchment	Total surface water ML	For the environment %	Available for consumptive use			
			Total %	Existing use %	Reserved %	Ground-water ^a ML
Murrumbidgee and tributaries						
Michelago	2 517	92	8	0	1	100
Tharwa	9 622	92	8	0	1	250
Kambah	7 259	92	8	3	1	173
Uriarra	17 009	92	8	0	1	180
Woodstock	1 334	92	8	0	7	30
Guises	2 145	90	10	0	2	76
Gudgenby and tributaries						
Naas	38 554	92	8	0	0	950
Gudgenby	50 522	92	8	0	0	1 300
Tennent	7 407	93	7	0	1	150
Cotter and tributaries						
Corin	75 751	25	75	39	2	950
Bendora	33 906	28	72	62	4	500
Lower Cotter	36 045	26	74	0	33	600
Paddys	39 799	92	8	0	1	1 010
Tuggeranong Creek and tributaries						
Tuggernanong	7 909	91	9	1	1	60
Molonglo and tributaries						
Upper Molonglo	1 274	91	9	0	1	34
Kowen	5 427	90	10	0	7	160
Fyshwick	1 896	90	10	7	3	68
Jerrabomberra Headwaters	0	0	0	0	0	0
Jerrabomberra	4 696	90	10	4	1	240
Lake Burley Griffin	5 625	91	9	1	2	68
Coppins	5 362	90	10	2	4	119

(continued)

Table A.15 continued

Catchment and subcatchment	Total surface water ML	For the environment %	Available for consumptive use			
			Total	Existing use	Reserved	Ground-water ^a
			%	%	%	ML
Molonglo and tributaries (continued)						
Woolshed	2 407	90	10	8	2	64
Sullivans	6 328	90	10	5	2	73
Woden	6 817	91	9	3	1	56
Weston	3 995	91	9	0	3	24
Queanbeyan River and tributaries						
Tinderry	82 805	9	91	12	3	0
Googong	8 575	9	91	14	3	0
Lower Queanbeyan	22	91	9	0	0	0
Burra	11 784	9	91	14	4	0
Ginninderra and tributaries						
Gungahlin	5 246	90	10	6	2	80
Lake Ginninderra	6 056	90	10	5	1	50
Parkwood	5 684	91	9	0	1	90
Total	493 776	55	45	13	4	7 455

^a The ACT allocates 10 per cent of its groundwater resources for consumptive use. ML Megalitres.

Source: Government of the ACT 2004a

Northern Territory

The Northern Territory has six water control districts. Under its 1999 implementation program the Northern Territory is developing water allocation plans for the Ti-Tree, Darwin, Katherine–Daly and Alice Springs water control districts. It has completed a plan for the Ti-Tree Basin.

Table A.16: Northern Territory's progress with water allocation plans

Water control district	Status
Ti-tree	The Ti-Tree Region Water Resource Strategy (including the water allocation plan) was declared in August 2002.
Darwin	The preliminary draft water allocation plan has been completed. Community consultation will commence soon and the Northern Territory has scheduled the final plan for declaration in 2005.
Katherine–Daly	The preliminary draft water allocation plan has been completed. The Northern Territory expects to finalise the plan in late 2004.
Alice Springs	Development of the draft water allocation plan is under way. The Northern Territory has scheduled the final plan for declaration in 2005.

Source: Government of the Northern Territory 2004

Murray–Darling Basin Commission

The Murray–Darling Basin Commission is responsible for managing the River Murray and implementing environmental flows provided through The Living Murray Initiative. The Australian Government and the governments of New South Wales, Victoria, Queensland, South Australia and the ACT agreed to implement the ‘First Step’ arrangement in the CoAG Intergovernmental Agreement on Addressing Water Overallocation and Achieving Environmental Objectives in the Murray–Darling Basin. The ‘First Step’ decision is a targeted initiative that focuses on maximising environmental benefits for six icon sites in the Murray system. It aims to recover water that will be built up to an estimated average 500 gigalitres a year of ‘new’ water within five years. CoAG agreed that roughly this volume of water should be released to the environment each year, but may be adjusted to take account of droughts or flood events. Funding for this work commenced on 1 July 2004. In October 2004, the Murray–Darling Basin Ministerial Council will consider a program of longer term actions aimed at addressing the health of the River Murray on a system wide basis.

B Allocating water to the environment

The Council of Australian Governments (CoAG) 1994 water reform agreement recognises the environment as a legitimate user of water. Among other things, it obliges governments to give priority to formally determining allocations or entitlements to water, including to the environment (see box B.1). Environmental requirements are to be determined, wherever possible, using the best scientific information available, and have regard to the water needs required to maintain the health and viability of river systems and groundwater basins. In river systems that are overallocated or deemed to be stressed, arrangements must provide a better balance in water resource use including appropriate allocations to the environment to enhance/restore the system's health.

Box B.1: Provision of water to the environment

Governments are to establish a sustainable balance between the environment and other uses, including formal provisions for the environment for surface water and groundwater systems.

In the 1994 CoAG water reform agreement, governments committed to determine environmental requirements using the best available scientific information wherever possible, and to have regard to the intertemporal and interspatial water needs required to maintain the health and viability of river systems and groundwater basins. For river systems that are overallocated or deemed to be stressed, governments committed to provide a better balance in water resource use, including appropriate allocations to the environment to enhance/restore the health of river systems. Governments committed to consider environmental contingency allocations and review allocations five years after they have been initially determined.

The 1999 tripartite meeting clarified the commitment to provide water for the environment and timeframes:

For the second tranche [1999], jurisdictions submitted individual implementation programs, outlining a priority list of river systems and/or groundwater resources, including all river systems which have been over-allocated, or are deemed to be stressed, and detailed implementation actions and dates for allocations and trading to the NCC for agreement, and to Senior Officials for endorsement. This list is to be publicly available.

For the third tranche [2001], States and Territories will have to demonstrate substantial progress in implementing their agreed and endorsed implementation programs. Progress must include at least allocation to the environment in all river systems which have been over-allocated, or are deemed to be stressed.

By 2005, allocations and trading must be substantially completed for all river systems and groundwater resources identified in the agreed and endorsed individual implementation programs.

Reference: CoAG water reform agreement, clauses 4(b)–4(f); and 1999 tripartite meeting (CoAG endorsed the recommendations from this meeting)

Under the 1994 CoAG water reform agreement, governments undertook to allocate water to the environment having regard to the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and Australian and New Zealand Environment and Conservation Council (ANZECC) National Principles for the Provision of Water for Ecosystems (box B.2). A key objective of the national principles is to sustain and, where necessary, restore ecological processes and the biodiversity of water-dependent ecosystems, recognising that appropriate water flow is critical for maintaining natural ecological processes and biodiversity.

Box B.2: ARMCANZ/ANZECC National Principles for the Provision of Water for Ecosystems

Principle 1: River regulation and/or consumptive use should be recognised as potentially impacting on ecological values.

Principle 2: Provision of water for ecosystems should be on the basis of the best scientific information available on the water regimes necessary to sustain the ecological values of water dependent ecosystems.

Principle 3: Environmental water provisions should be legally recognised.

Principle 4: In systems where there are existing users, provision of water for ecosystems should go as far as possible to meet the water regime necessary to sustain the ecological values of aquatic ecosystems whilst recognising the existing rights of other water users.

Principle 5: Where environmental water requirements cannot be met due to existing uses, action (including reallocation) should be taken to meet environmental needs.

Principle 6: Further allocation of water for any use should only be on the basis that natural ecological processes and biodiversity are sustained (that is, ecological values are sustained).

Principle 7: Accountabilities in all aspects of management of environmental water should be transparent and clearly defined.

Principle 8: Environmental water provisions should be responsive to monitoring and improvements in understanding of environmental water requirements.

Principle 9: All water uses should be managed in a manner which recognises ecological values.

Principle 10: Appropriate demand management and water pricing strategies should be used to assist in sustaining ecological values of water resources.

Principle 11: Strategic and applied research to improve understanding of environmental water requirements is essential.

Principle 12: All relevant environmental, social and economic stakeholders will be involved in water allocation planning and decision-making on environmental water provisions.

Under the Intergovernmental Agreement on a National Water Initiative signed in June 2004, signatory governments recognised a responsibility to ‘ensure that water is allocated and used to achieve socially and economically beneficial outcomes in a manner that is environmentally sustainable’ (CoAG 2004). Signatory governments committed to statutory provision of water access entitlements and planning frameworks to provide environmental and other public benefit outcomes, and to improve environmental management practices. They also undertook to complete the return of all

currently overallocated and overused systems to environmentally sustainable levels of extraction.¹ Signatory governments also committed to recognise connectivity between surface water and groundwater systems and to manage connected systems as a single resource, and to provide for the adaptive management of surface water and groundwater systems.

In considering governments' arrangements for allocating water to the environment, in the light of the guidance provided by the 1994 CoAG water reform agreement including the ARMCANZ/ANZECC national principles² and the National Water Initiative, the Council has looked for governments to establish arrangements that:

- are based on the best available science, wherever possible, and use strategic and applied research (principles 2 and 11)
- achieve a balance between environmental needs and human use that provides the water needed to sustain healthy aquatic ecosystems, while recognising, in systems where there are existing users, the existing rights of those users (principles 1, 4, 5, 6 and 9)
- involve monitoring and adaptive management where the regular assessment of ecosystem health guides water management processes (principle 8)
- involve stakeholder consultation and transparent processes that are robust, involve the timely provision of relevant information to all interested parties and allow wide public consultation (principles 7 and 12).

Best available science

The environmental water obligations in the 1994 CoAG water reform agreement and principle 2 of the ARMCANZ/ANZECC national principles state that the 'best available science' should be used wherever possible to determine environmental needs. Similarly, the National Water Initiative recognises that decisions between competing outcomes for water systems will need to involve judgments informed by, among other things, the best available science.

¹ Under the National Water Initiative, the environmentally sustainable level of extraction is defined as the level of extraction, which if exceeded, would compromise key environmental assets or ecosystem functions and the productive base of the resource.

² ARMCANZ/ANZECC national principles 3 and 10 are not directly relevant to governments' decisions on environmental allocations. The Council considers water pricing (national principle 10) in assessing progress with urban and rural pricing and the legal recognition of environmental water provisions (principle 3) in assessing governments' implementation of obligations on water access entitlements.

Early environmental water allocations were based on historical hydrological information and involved determination of a 'minimum flow' for a river or a specific reach. There have been recent advances in environmental flow methods, and holistic models such as the Best Practice Framework (Arthington *et al.* 1998), Land and Water Australia's recommended model (Schofield *et al.* 2003) and Victoria's FLOWS method are now recognised as more scientifically robust than minimum flows. These advances reflect scientific research that has concluded that the minimum flow approach is not sufficient for Australia, where variable flow regimes are common and native flora and fauna are adapted to, and in many cases reliant on, variability in water regimes.

While there are several different types of holistic methods, each typically:

- takes a multidisciplinary approach involving biologists, ecologists, geomorphologists, hydrologists and water quality specialists to ensure that all ecological and physical processes are considered
- considers all elements of the water system including: surface water, such as rivers, floodplain wetlands, receiving water bodies (for example, estuaries); groundwater; and terrestrial systems linked through the groundwater table
- uses data that are comprehensive, relevant, current and subject to quality control and quality assurance arrangements
- considers the entire water regime (that is, variability, duration, magnitude, frequency and timing), which is especially important in Australia where rainfall frequency and intensity are highly variable and native flora and fauna have adapted to variable flow environments
- considers human use constraints
- involves peer review of the recommended flow regime to ensure that sustainable conclusions are formed through a transparent process
- includes an ongoing monitoring phase that targets key ecological and physical performance indicators tied to adaptive management to allow for the evaluation of implemented water regimes and consequential improvements in system management.

The Council has used the above characteristics as indicators of the 'best available science' in considering governments' actions to provide water to the environment. In accord with ARMCANZ/ANZECC national principle 2, the Council has looked for governments to determine environmental water allocations using a holistic method establishing a water regime for the whole system. The Council has also looked for governments to continue to improve their scientific understanding of environmental water requirements. National principle 11 refers to the need for research into improving the methods of determining environmental water requirements and to committing resources into applying these methods to specific aquatic systems.

The Council accepts that existing scientific knowledge differs among jurisdictions and among aquatic systems and that in some systems there is likely to be considerable knowledge gained from managing and observing the system over many years that may be relevant to decisions on environmental flows. The Council also accepts that demands on governments' resources mean that it is not always possible to complete all-encompassing scientific studies for every system prior to determining allocation arrangements. The Council has looked, however, for governments to undertake strategic and applied research to determine the environmental water requirements of their more significant aquatic systems, particularly those deemed to be stressed or overallocated, and to transparently report the results of such research.

Balancing economic, environmental and other interests

CoAG's reference to the work of ARMCANZ/ANZECC in the section of the 1994 water reform agreement that deals with environmental allocations indicates that water management arrangements should aim to ensure the long term sustainability of aquatic ecosystems (national principle 2). This intent is also reflected in CoAG's objective of seeking to 'ensure ecosystem health by implementing regimes to protect environmental assets at a whole-of-basin, aquifer or catchment scale' (CoAG 2003). Within this objective of achieving a sustainable balance between environmental and human uses, the ARMCANZ/ANZECC national principles call for governments to adopt arrangements for providing water to the environment that recognise the existing rights of other water users.

The National Water Initiative acknowledges the need to ensure that water is allocated and used to achieve socially and economically beneficial outcomes in a manner that is environmentally sustainable. The initiative recognises the 'continuing national imperative to increase the productivity and efficiency of Australia's water use, the need to service rural and urban communities, and to ensure the health of river and groundwater systems by establishing clear pathways to return all systems to environmentally sustainable levels of extraction' (CoAG 2004, p. 1).

In some surface and groundwater systems, long term sustainability may be achieved by maintaining existing ecological values. In systems where there are existing users, however, there will generally have to be trade-offs between the needs of the environment and those of other (human) users. While a return to pristine or natural conditions is rarely feasible, improving the ecological health of stressed rivers is likely to require more water for environmental purposes, possibly obtained by reallocating water from existing users. Similarly, it may be necessary to reallocate water from entitlement holders to the environment in systems that are currently overallocated. The possibility that reallocation may be necessary is recognised in ARMCANZ/ANZECC national principle 5.

To determine whether water use is at a level that ensures the sustainable ecological health of aquatic systems, the Council considered the meaning of the term 'ecological health'. The ANZECC (2000a) National Water Quality Management Strategy and the National River Health Initiative (Department of Environment and Heritage 2002) adopt a definition of ecological health as follows:

the ability of an ecosystem to support and maintain key ecological processes and organisms so that their species compositions, diversity and functional organisations are as comparable as possible to those occurring in natural habitats within a region.

The phrase 'within a region' in the above definition recognises that Australia is a diverse continent with many different bioregions (EA 2000). Bioregions are large land areas characterised by broad, landscape-scale natural features and environmental processes that influence the functions of entire ecosystems. The bioregion concept recognises that ecosystems vary with topographic, climatic and geomorphic features, rather than political or social boundaries. Aquatic systems in different bioregions therefore have different ecological characteristics and needs (for example, river systems in the Australian Alps region will have different characteristics and needs from those of the Darwin Coast). As a consequence, assessment of environmental water requirements and water regimes needs to be considered from relevant bioregional contexts.

While the ANZECC (2000a) definition is useful, it relates only to the ecological health or integrity of an ecosystem in isolation from human use. It may therefore be important for determining a baseline condition, but less practical where there are human use constraints or where systems are highly modified and unlikely to be able to return to pristine condition. To this end, the Scientific Reference Panel established by The Living Murray Initiative (Cullen *et al.* 2003a) defined a 'healthy working river' as a river that is managed to provide a sustainable compromise between the condition of the river and the level of human use. A water regime based on the healthy working river approach would not return an aquatic system to pristine condition. It would, however, sustain ecological objectives indefinitely. The Living Murray Initiative advocates a holistic approach, with the water regime, condition of floodplain wetlands and in-channel habitats and water quality all considered. The end point will not be a pre-European flow regime. Rather, it will be one that meets the tests of long term ecological sustainability.

Environmental water may be obtained from a range of sources, including from reduced delivery losses achieved by upgrading infrastructure and pipelining, from increased on-farm water use efficiency and from changes in land use practices. In some systems, however there may be no alternative to obtain water for the environment other than by reallocating water from existing users. The Living Murray Initiative First Step decision, which is to provide an average of 500 gigalitres a year of 'new' water after five years for environmental purposes, recognises that this water could come from a range of sources, including reallocations. The National Water Initiative also

recognises a range of mechanisms for recovering water to achieve environmental and other public benefit outcomes. It acknowledges that the water available for consumptive uses may need to be reduced to address known overallocation. It also acknowledges that there may be a need to reduce the water available for consumption (additional to the reductions needed to address known overallocation and/or overuse) arising from, for example, seasonal or long term climate changes, natural events such as bushfires or improvements in the knowledge of water systems' capacities to sustain particular extraction levels.³

The essential point is that the CoAG agreements oblige governments to take action to achieve a sustainable balance in water use. Accordingly, the Council has considered whether governments are establishing allocation arrangements that are likely to achieve a sustainable balance. It has looked for governments' arrangements to demonstrate the following characteristics.

- Ecological sustainability objectives should be specific to individual systems and contextually consistent with the relevant bioregion.
- The allocation of environmental water in aquatic systems where there are existing users should be sufficient to achieve a 'healthy working river'.
- The allocation of environmental water in aquatic systems where ecological health is adequate should be at a level that at least maintains ecological health.

The Council accepts that it may not always be possible for governments to introduce arrangements that achieve a sustainable balance immediately, particularly in systems where the volume of water already allocated for consumptive use is significant. Notwithstanding this, in systems where there is identified overuse, the Council has looked for governments to introduce arrangements that substantially reduce overuse within a reasonable timeframe, taking account of socioeconomic and environmental benefits and costs. The Council notes that, under the National Water Initiative, signatory governments committed to substantial progress by 2010 toward adjusting all overallocated or overused systems.

³ The National Water Initiative contains arrangements that determine who should bear the risk of future reductions in the availability of water for consumptive use (additional to those identified to address known overallocation and/or overuse).

Monitoring and adaptive management

The 1994 CoAG water reform agreement states, in relation to work by governments on water allocations or entitlements, that:

4(e) in undertaking this work, jurisdictions would consider establishing environmental contingency allocations which provide for review of the allocations five years after they have been determined ...

Clause 4(e) indicates CoAG's intent that governments monitor the impact of environmental water allocations and amend management regimes on the basis of monitoring outcomes. In support of this, ARMCANZ/ANZECC national principle 8 advocates the use of monitoring and adaptive management in the development of environmental water provisions. The National Water Initiative commits signatory governments to the periodic independent audit, review and public reporting of environmental and other public benefit outcomes, and of the adequacy of the water provision and management arrangements in achieving those outcomes.

Ecological health is not a directly measurable parameter, and environmental managers must be careful to choose indicators that reflect the state of aquatic ecosystems. The Living Murray Initiative suggests that indicators should meet the criteria of relevance, responsiveness and repeatability. There are a number of systems and nationally recognised guidelines that aim to meet these requirements, such as:

- AusRIVAS (Australia wide Rivers Assessment Scheme) — developed under the National River Health Program to assess the biological health of rivers
- Australian guidelines for water quality monitoring and reporting (ANZECC 2000b) — national guidelines for the design of chemical, physical and biological monitoring programs for aquatic systems
- Index of Stream Condition — developed by the Victorian Government to assess river health by integrating biological, hydrological and chemical parameters.

The above guidelines tailor monitoring programs to meet the specific ecological objectives set for an aquatic system and monitor at intervals sufficient to detect ecological change. The guidelines also support an adaptive management (or Adaptive Environmental Assessment and Management) approach. Developed by a Canadian research facility in the 1970s, adaptive management recognises:

- the need for management decisions to examine economic, social and environmental values in an integrated way

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- the presence of many diverse stakeholders in environmental management issues
 - the uncertainty inherent in environmental processes (Holling 1978).

In assessing compliance with the CoAG obligations on environmental allocations, the Council has looked for governments to apply monitoring and adaptive management techniques that promote long term sustainability. In particular, the Council has looked for adaptive management that incorporates the results of monitoring as feedback leading to the adjustment (where necessary) of management regimes. In the context of environmental water regimes, this means using the results of monitoring to evaluate and, if necessary, adjust flow management at regular intervals (two to five years).

Stakeholder consultation and transparent processes

Both the 1994 CoAG water reform agreement and the National Water Initiative emphasise the need for robust public consultation processes. The 1994 agreement obliges governments to consult publicly on (particularly) pricing, allocation and trading. Under the National Water Initiative, governments agreed to engage water users and other stakeholders, to improve certainty and build confidence in reform, and to ensure transparent decision making. Regarding water management, the ARMCANZ/ANZECC national principles imply that processes should be transparent, consultative, include representative decision-making processes and be based on full and robust information and analysis.

The Council considers CoAG's emphasis on robust public processes to mean that governments' decisions on environmental allocations should be based, wherever possible, on comprehensive, relevant and rigorous information about the ecological requirements of ecosystems and the impacts of changes in management arrangements. Any analysis, whether of an ecological, economic or social nature, that is material to the allocation decision should be defensible and robust and, where possible, have been independently reviewed. Governments should ensure that interested stakeholders (including the affected community) have timely access to all relevant information, including scientific information on the water regime required to sustain ecological values (consistent with a healthy working river); information on the extent of any socioeconomic trade-offs and the rationales for the trade-offs; and science-based information on the expected impact of any trade-offs on ecological values.

Stakeholders should have the opportunity to provide input and feedback into the water management process. Decision-making bodies should be broadly representative of the interested stakeholders and the affected community. This may be achieved, for example, through balanced representation on

decision-making bodies or at least by ensuring that particular interest groups are not overrepresented.

C Submissions to the 2004 National Competition Policy water reform assessment

<i>Sub no.</i>	<i>Submitter</i>	<i>Date</i>
1	Murrumbidgee Horticulture Council Inc.	24 March 2004
2	Dorset Waterwatch Group Inc.	29 March 2004
3	Pioneer Valley Water Board	2 April 2004
4	Queensland Rural Water Boards	6 April 2004
5	Tasmanian Conservation Trust Inc.	8 April 2004
6	World Wide Fund for Nature	12 April 2004
7	Robert Rockefeller, Nekon Pty Ltd	12 April 2004
8	Anthony Hocking, EMRS Pty Ltd	13 April 2004
9	Queensland Conservation Council	14 April 2004
10	Geoffrey Cunningham and Fergus Duncan, Payne Butler Lang Solicitors	15 April 2004
11	Property Council of Australia	16 April 2004
12	New South Wales Irrigators' Council	16 April 2004
13	Nature Conservation Council of New South Wales Inc. and Inland Rivers Network	19 April 2004
14	Wide Bay Burnett Conservation Council Inc.	19 April 2004
15	Environment Victoria	23 April 2004
16	Arid Lands Environment Centre Inc.	22 July 2004

Note: The Council received a range of material from the East End Mine Action Group (Mount Larcom, Queensland) and information from the Gwydir Valley Irrigators Association (New South Wales), that it took into account in conducting the 2004 NCP assessment.

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