National Competition Council

WATER REFORM IN NEW SOUTH WALES

National Competition Policy Supplementary 2002 Water Reform Assessment

April 2003

ISBN 0-9750631–3–8

Inquiries or comments on this report should be directed to:

Communications Officer
National Competition Council
9/128 Exhibition Street
MELBOURNE VIC 3000

Ph: (03) 9285 7474
Fax: (03) 9285 7477
Email: info@ncc.gov.au

An appropriate citation for this paper is:

National Competition Council 2003, *Water Reform in New South Wales: National Competition Policy Supplementary 2002 Water Reform Assessment*, *April*, AusInfo, Canberra.

The National Competition Council

The National Competition Council was established on 6 November 1995 by the *Competition Policy Reform Act 1995* following agreement by the Commonwealth, State and Territory governments.

It is a federal statutory authority which functions as an independent advisory body for all governments on the implementation of the National Competition Policy reforms. The Council's aim is to 'improve the well being of all Australians through growth, innovation and rising productivity, and by promoting competition that is in the public interest'.

Information on the National Competition Council, its publications and its current work program can be found on the internet at www.ncc.gov.au or by contacting National Competition Council Communications on (03) 9285 7474.

Table of contents

Abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
CoAG	Council of Australian Governments
Council	National Competition Council
NCP	National Competition Policy
SWMOP	State Water Management Outcomes Plan

Background

At the time of the 2002 National Competition Policy (NCP) Assessment, New South Wales was developing its arrangements for managing water resources, with the objective of achieving a sustainable balance between the use of water for consumptive and environmental purposes. At the time of the assessment, New South Wales:

- had released an interim State Water Management Outcomes Plan (SWMOP), setting the overarching policy, targets and strategic outcomes for the development, conservation, management and control of the State's water sources, for public consultation in October 2001;
  - the Government was reviewing the targets in the plan to address issues raised by water management committees and during consultation with stakeholders on the development of the plan, and was seeking to ensure the plan was consistent with government policy, the State's legislative obligations and international agreements; and
- was developing water sharing plans for 39 regulated and unregulated river and groundwater systems, covering about 80 per cent of the State's water;
  - the water sharing plans, when gazetted, lock in water sharing and operation rules, including rules governing allocations to water users and to the environment, for 10 years.

Outstanding issue, 2002 assessment

The Council of Australian Governments (CoAG) water reform obligations required governments to have allocated water to the environment in all river systems which have been overallocated, or are deemed to be stressed, by the 2001 NCP Assessment. The CoAG water reform strategic framework requires governments to give priority to determining entitlements to water, including allocations to the environment. In allocating water to the environment, governments should have regard to the work undertaken by the Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) and the Australian and New Zealand Environment and Conservation Council (ANZECC) (see box 1). Governments need to determine environmental allocations wherever possible on the best scientific information available, and have regard to the intertemporal and interspatial water needs required to maintain the health and viability of river systems and groundwater basins.

Because the New South Wales Government was still developing the SWMOP and its first round water sharing plans, the Council was not able to conclude

that the State had met its obligations on environmental allocations. The Council supported, however, the direction being taken by New South Wales in the interim SWMOP. It also accepted that New South Wales was facing a difficult and complex task in balancing the wide ranging views and opinions of interest groups with the technical information required to make appropriate decisions on allocations. Moreover, New South Wales has had interim environmental flow rules for regulated river systems in place since 1998. Accordingly, in the 2002 assessment, the Council considered it reasonable for New South Wales to have more time to finalise the SWMOP and the first round of water sharing plans, and deferred consideration of New South Wales's progress with meeting CoAG obligations on stressed or overallocated river systems.

Scope of the supplementary 2002 assessment

This supplementary assessment considers the final SWMOP, the first round of gazetted water sharing plans and the arrangements for implementing the water sharing plans. In the 2002 assessment, the Council noted that it would consider particular matters in the supplementary assessment including:

- the final SWMOP, including the targets in the SWMOP;
- the gazetted first round water sharing plans, including how these plans have had regard to the ARMCANZ/ANZECC national principles on the allocation of water to ecosystems and how they have incorporated the SWMOP targets;
  - the 2002 assessment noted that the draft water sharing plans for the Namoi, Lachlan, Murrumbidgee, and Gwydir regulated rivers, while improving environmental allocations, were some way from reaching the targets in the interim SWMOP;
- the monitoring arrangements and performance indicators in the water sharing plans to enable assessment of the achievement of water management targets;
- the timeframes for achieving sustainable resource use and transparency in reaching decisions on water sharing;
- the first round of implementation plans; and
- the process and timeframe for developing the next round of water sharing plans;
  - recognising that the first round of New South Wales water sharing plans would cover the bulk of the State's river systems including those facing the most pressing environmental problems, the Council accepted that the second round of water sharing plans would not be in place by the 2003 assessment.

The Council will consider other aspects of water resource management in the water sharing plans in future annual assessments, consistent with the reform timetable established by CoAG. In particular, remaining property rights obligations for New South Wales will be considered in 2003 with a full assessment for all jurisdictions in 2004, intrastate water trading arrangements will be considered in 2003 and interstate water trading arrangements in 2004.

Box 1: 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.

Action by New South Wales since the 2002 assessment

New South Wales gazetted the SWMOP in December 2002. New South Wales has also finalised 35 of the 39 first round plans that were in preparation at the time of the 2002 assessment.[1] The 35 plans have been gazetted by the

[1] The 39 first round plans are listed in appendix A.

Minister under the *Water Management Act 2000*, and will become operational on 1 July 2003. Of the remaining four plans:

- the water sharing plan for the Hunter Regulated River, while almost complete, was subject to further consideration at the time the Government called the State election for 22 March 2003;

- New South Wales has extended the timetable for finalisation of the water sharing plans for the Lower Murray Groundwater and Orara River to permit further studies and consultation; and

- the water sharing plan for the Great Artesian Basin has been placed on a slower timetable because it is also subject to a separate joint process involving New South Wales, Queensland, South Australia and the Northern Territory.

The Council had originally expected to conduct this supplementary assessment in December 2002. This was on the basis that New South Wales intended the water sharing plans to be finalised and gazetted between September and November 2002. However, reflecting the magnitude of the task and the complexity of many of the issues, New South Wales did not gazette most of its water sharing plans until February 2003.

For this supplementary assessment, the Council considered the SWMOP and a sample of 10 of the 35 water sharing plans so far gazetted by the New South Wales Government. The 10 plans comprised five regulated river plans, two unregulated river plans and three groundwater source plans. In the Council's view, the plans chosen allowed for a sufficiently broad investigation of the approaches being taken by New South Wales to addressing its environmental obligations across different types of water sources. Appendix B discusses key elements of the 10 plans considered in this supplementary assessment.

New South Wales Government officials advised the Council that the finalisation of the four remaining first round plans, the implementation programs needed for the 35 first round plans to commence in July 2003, and the process and timeframe for developing the second round of water sharing plans are all matters for the incoming New South Wales Government elected on 22 March 2003. Officials were unable to provide any information on these matters for this supplementary assessment.

The State Water Management Outcomes Plan

The SWMOP, gazetted in December 2002, directs all water management in New South Wales. The purpose of the plan is to protect and enhance the environmental services provided by aquatic ecosystems while providing a framework for the use of water for human needs including more secure access licences. The SWMOP 'details the Government's commitment to effectively manage the important linkages between the environment, human health, prosperous communities and profitable industries' (Department of Land and Water Conservation 2002a, p. 1). The plan is consistent with the New South Government's 1999 interim (water quality and river flow) environmental objectives and seeks to ensure these objectives are addressed in water resource management. The plan is also consistent with intergovernmental and national obligations such as the Murray–Darling Basin Agreement. The plan has effect for five years after which it will be reviewed and updated.

The SWMOP sets both long-term outcomes and five-year management targets for water management. These span regulated river,[2] unregulated river,[3] groundwater, estuarine and coastal water sources. The long-term environmental, social and economic outcomes included in the SWMOP are summarised in box 2. The five-year management targets seek to, among other things, achieve clear and legal water entitlements and healthy, productive and diverse ecosystems (see boxes 3 and 4).[4]

Monitoring and reporting are essential components of the cyclic management planning established by the Water Management Act. Water management in New South Wales is required to provide for the collection of information to enable: assessment of performance against management targets; assessment of social and economic impacts; and benchmarking of current conditions and evaluation of trends in long-term outcomes. This performance assessment work

---

2 A regulated river is a river where flows are supplemented and rescheduled by artificial means (for example, via a government-owned headwater storage) and which is declared by the Minister to be a regulated river (Department of Land and Water Conservation 2002a, p. 80).

3 An unregulated river is: a natural surface water source that is not supplemented by releases from a dam; or a river that is not a declared regulated river but which may still be subject to water extractions and includes on-river storages for town water supply or industrial purposes (Department of Land and Water Conservation 2002a, p. 82).

4 The SWMOP five-year water management targets address: limits on extractions; environmental management; clear and legal access entitlements; groundwater dependencies; basic and cultural needs; water use efficiencies; cost recovery; artificial barriers and openings; river channel rehabilitation; drainage management; and river and groundwater quality.

is to be undertaken within six months of gazetting the SWMOP (that is by June 2003). Management plans developed under the Water Management Act must provide for the monitoring of performance against relevant local targets. This information will be collated and reviewed by New South Wales to assess performance against the SWMOP targets.

Box 2: Intended outcomes of the SWMOP

Environmental outcomes – healthy, productive and diverse water ecosystems

- primary ecological production maintained or improved;
- degraded wetlands improved and those listed as wetlands of national or international significance protected and restored; and
- the diversity and abundance of native aquatic animals and plants protected and restored by addressing the cumulative impacts of water management on their habitats and life cycles.

Social outcomes – the community's basic needs and values sustained

- water supplies necessary to maintain or improve the health and well being of rural and urban communities assured;
- Aboriginal traditional and contemporary dependencies on, and cultural association with, water protected and improved; and
- incidents of blue green algal blooms affecting essential water supplies and recreational values reduced.

Economic outcomes – the economic value of water improved

- the productive capacity of land and water maintained – in particular, the rate of land degradation associated with irrigation activities reduced, and the rate of increase in river salinity levels reduced;
- water use efficiency increased; and
- the economic efficiency of investment in water industries improved.

Source: Department of Land and Water Conservation (2002a)

Box 3: Key SWMOP five-year water entitlements targets

Limits on extractions

Limits on the total volume of water that can be extracted are to be established, such that:

- extractions in the Murray–Darling Basin's regulated rivers are limited to the level of the long-term average annual extraction below the Murray–Darling Basin Ministerial Council cap which results from the long-term impact of the environmental water rules;
- extractions in the Murray–Darling Basin's unregulated rivers are limited to the Murray–Darling Basin Ministerial Council cap level;
- long-term average annual extraction limits which are ecologically sustainable, and which minimise downstream impacts, are established in all coastal water sources;
- floodplain water harvesting extractions are licensed and capped at 1993-94 levels in the Murray–Darling Basin, and at levels consistent with the long-term average annual extraction limit in other water sources;

- the long-term average annual extractions for groundwater are limited (or being phased down) to an ecologically sustainable level (the sustainable yield) as determined by detailed assessment of each groundwater source and consultation with the relevant management committee. In the absence of such an assessment, the following limits are to apply: 100 per cent of average annual recharge for a groundwater source where there is no significant ecosystem dependency; or 70 per cent of average annual recharge where there is significant ecosystem dependency; and

- rules for adjustments to future available water determinations in the event that the extraction limits are exceeded are clearly prescribed in consultation with the relevant management committee, and acted upon.

Clear and legal access entitlements

Access rights for water access licensees are to be clearly and legally specified in terms of share and extraction components.

The total volume of share components specified on access licences is to be more closely matched over the term of a water sharing plan to the extraction limit of the plan, such that:

- for groundwater sources, the total volume of water specified on access licences is reduced over the term of a water sharing plan to no more than 125 per cent of the sustainable yield; and

- for surface water sources, a pathway for reducing the share components to 200 per cent of the long-term average annual extraction limit is established not later than the end of the term of the SWMOP.

Mechanisms are to be in place to enable Aboriginal communities to gain an increased share of the benefits of the water economy.

Daily extraction components are to be specified and tradeable, subject to metering, reporting and compliance, for at least 50 per cent of unregulated river access licences and for 80 per cent of stressed unregulated rivers.

Supplementary water for regulated rivers is to be clearly specified and volumetrically licensed such that:

- flow thresholds for declaration of supplementary water access, which take into account environmental water needs, are clearly specified;

- annual limits on supplementary water extractions, consistent with the long-term average annual extraction limits, are established in all regulated river water sources;

- rules for sharing between supplementary water access licence holders are made explicit; and

- supplementary access licence dealings are made possible in regulated river water sources, subject to extraction limits and environmental assessment and Aboriginal spiritual and cultural constraints.

Measures are to be in place in all water sources subject to a gazetted water sharing plan to protect domestic and stock rights from the impact of other water access and use.

At least 90 per cent of approved water management works for the extraction of surface or ground waters (except domestic and stock bores) are to be metered and reported in each water source that is subject to a gazetted water sharing plan.

Source: Department of Land and Water Conservation (2002a)

Box 4: SWMOP five-year environmental targets related to water extraction and use

All management plans are to incorporate mechanisms to protect and restore aquatic habitats, and the diversity and abundance of native animals and plants, with particular reference to threatened species, populations and communities and key threatening processes.

A network of aquatic reference sites based on biogeographical regions is to be identified, and the monitoring and management implications assessed.

Environmental water rules and extraction limits are to be established in regulated and unregulated rivers subject to a gazetted water sharing plan, such that:

- wherever the frequency of 'end of system' daily flows would be less than 60 per cent of the predevelopment level without environmental water rules or extraction limits, the flows are increased to 60 per cent of predevelopment levels or increased by at least 10 per cent of the predevelopment frequency;
- the frequency of 'end of system' daily very low flows (as defined by local field investigation) is protected or restored to predevelopment levels to maintain or restore their critical ecological functions, drought refuges and habitat connectivity. In the absence of such local assessments, protection is extended up to at least the predevelopment 95th percentile;
- the channel capacity of all lower river and effluent creek systems used for the delivery of regulated water is determined. Subject to reasonable socioeconomic impacts, limits on daily supply volumes are established for effluent systems such that they do not exceed 80 per cent of the channel capacity for more than 10 per cent of days, in each month of each year. Where daily supply volumes are currently substantially less than channel capacity, alternative limits are established to reduce the impact of unseasonable flows arising from future access licence dealings; and
- a proportion of the natural drying phases is reinstated in the core areas of terminal wetlands.

The degree of connectivity between aquifers and rivers is to be assessed, and zones of high connectivity mapped to enable base flows to the river to be maintained or improved.

Groundwater dependent ecosystems are to be identified and mapped for all priority aquifers, and the ecological water requirements assessed to enable local groundwater extraction rates and/or sustainable yields to be reviewed.

There is to be no, or minimal, increase in basic domestic and stock rights resulting from rural subdivisions in sensitive or stressed water sources.

Action is to be taken to (re)connect at least 60 per cent of the natural one-in-five-year flooded area to the river for 11 key rural floodplains by ensuring: major flood paths and flood dependent ecosystems are mapped; and significant barriers to flooding are identified and action to deal with the major barriers commenced.

Dams responsible for cold water pollution are to be identified, a priority listing prepared, and action initiated to ensure that the temperature regime below these dams is kept within the 20th to 80th natural percentile range for each month (or within bounds determined by site specific investigations), by ensuring: structural modification of at least two priority dams; and improved operational protocols are established for priority dams with existing temperature management infrastructure.

The frequency of artificial manipulations of coastal lagoon entrances is to be reduced, with management strategies to improve natural flow dynamics recognising their consequences on ecosystems and social assets.

The percentage cover of native riparian vegetation within waterfront land is to be increased consistent with an approved catchment management plan, or by at least 5 per cent where it is currently less than 50 per cent of the natural average on third order and larger rivers.

Zones of high irrigation salinity risk are to be mapped, and irrigation accession rates assessed to enable action to be taken to stabilise or reduce accession rates within these zones. All management plans are to incorporate water quality objectives that have considered Government approved interim environmental objectives, the current ANZECC guidelines and the recommendations of relevant Healthy Rivers Commission inquiries.

Source: Department of Land and Water Conservation (2002a)

Discussion

Water entitlements

The water management targets in the SWMOP seek to clarify, secure and protect licensed access to water. The SWMOP requires access rights for water access licensees to be clearly and legally specified. In turn, the water sharing plans, which implement the SWMOP, seek to provide security of access for all water users, including the environment, during the 10-year term of the plans. Water access licence holders will be able to claim compensation if water access is reduced during the term of a water sharing plan beyond limits specified in each plan.

In responding to the need to balance the rights of the individual with the needs of the broader community, the SWMOP recognises that any changes to access rights should be subject to clear conditions and processes established at the outset. The SWMOP states:

> *Such access rights to water must still be able to be attenuated or diminished by the conditions that are applied to their existence so as to enable the rights of the broader community to be safeguarded and sustainability ensured, as required by the* Water Management Act 2000. *The conditions and processes by which this may happen should however be made clear and transparent in water sharing plans.* (Department of Land and Water Conservation 2002a, p. 46)

The SWMOP targets also specify limits on extractions.

- In the Murray–Darling Basin, extractions from regulated rivers are set at a level below the Murray–Darling Basin Ministerial Council cap on diversions. The level set reflects the impact of the prevailing environmental water rules. The maximum extractions from unregulated rivers, and from floodplain harvesting (which has not previously been subject to licensing or control processes), are set at the cap on diversions.

- In coastal river water sources, long-term average annual extractions, and floodplain harvesting (also not previously controlled), are limited to a level that is ecologically sustainable and which minimises downstream impacts.

- For groundwater sources, long-term average annual extractions are limited to the assessed sustainable yield. Where the sustainable yield has not been assessed, extractions are limited to 100 per cent of average annual recharge for groundwater where there is no significant ecosystem dependency or 70 per cent where there is significant ecosystem dependency.

To provide greater certainty for licence holders, the SWMOP requires water sharing plans to specify clear rules covering the nature and timing of management responses to any growth in water use beyond the extraction limits established by the plans or, for inland surface water sources, the cap on diversions. These must include reference to the audit processes, the triggers for adjustment, the mechanisms for adjustment (including the licence categories affected) and the process for calculating the degree of adjustment to be imposed.

Other key targets in the SWMOP seek to ensure licensed rights better reflect actual water availability for both surface and groundwater sources in order to address unsustainable growth and overallocation. The aim is to reduce (or phase down) the total volume of water specified in licences (the licence share component) to:

- in surface water systems, no more than 200 per cent of the long-term average extraction limit, not later than the end of the five-year term of the SWMOP; and

- in groundwater systems, no more than 125 per cent of the sustainable yield, over the 10-year term of a water sharing plan.

The SWMOP indicates that, in setting these targets, the Government considers it reasonable to expect the total volume specified in licences to exceed the extraction limit for a system, particularly for surface water sources. This is because the extraction limit is generally specified as a long-term average annual volume, while licence volumes are maximum volumes that can be extracted by a licence holder in any one year. As a result of variability in climatic conditions and the water demands of crops and stock, the maximum volume extracted in a particular year can be higher than the average annual volume extracted over a number of years. Water users have treated the volume specified on a licence as a buffer against drought or reduced water availability. In most years, however, water extractions will be less than the total volume specified in water licences. The Murray–Darling Basin Ministerial Council cap also works to keep extractions significantly below licensed entitlements.

New South Wales considers that the targets set for the reduction in the total volume of water specified on licences, relative to extraction limits, are reasonable. While the precise numbers chosen were a matter for judgment, based on several decades of water management experience, New South Wales considers that its water resources can be effectively managed to the targets. The degree of difference that can be tolerated, between the total volume specified on licences and the long-term extraction limit, is less in water

sources where there is less variation in the water available. The higher target of 200 per cent for surface water systems reflects the greater variability of flows and water use in these systems relative to groundwater systems.

The SWMOP indicates that the 200 per cent target is likely to affect about 10 per cent of surface water extraction management areas across the State – seven surface water areas. Of these, three will need to have the total volumes specified on access licences reduced by up to 25 per cent to meet the target, a further two by between 25 and 50 per cent, and two by over 50 per cent. In addition, eight priority groundwater sources are expected to be affected, with three requiring reductions of up to 25 per cent, two by between 25 and 50 per cent, and two by over 50 per cent.

The required reductions are not addressed in the initial round of surface water sharing plans covering the most stressed of the rivers. For these plans, the Minister is to ensure that a pathway for reducing the volumes specified on licences to 200 per cent of the extraction limit is determined by the end of the SWMOP. This will be a matter for consideration by the new Government. However, for the affected groundwater sources, the required reductions are addressed in the water sharing plans. For example, the plan for the Lower Lachlan groundwater source requires reductions in the licence share components to 150 per cent of the extraction limit at the commencement of year five of the plan and to 125 per cent at the end of year 10. All future water sharing plans are to take the targets into account from the outset.

The SWMOP notes that the short-term economic impact of any reductions in volumes specified on licences depends on the degree of adjustment required. The economic impact is expected to be largely limited to the fully active water users and can be managed by announcing higher available water determinations in the first few years to give irrigators time to adjust. The SWMOP anticipates some short-term economic impacts from the reductions in licence share components, but expects that these should not be large and that they will be mitigated through appropriate management of announced available water determinations and carryover provisions. The conclusions in the SWMOP on the likely magnitude of the economic impacts are consistent with the findings of a study by ACIL Consulting commissioned by the New South Wales Government (see box 5).

In recognition that there may be significant impacts for some water users in some areas, the New South Government has been considering structural adjustment assistance. A structural adjustment program for the Namoi groundwater region has been established (see box 6). It is understood that the new Government will be giving consideration to similar programs for other groundwater regions.

Box 5: Independent assessment of economic impacts of draft water sharing plans

In July 2002, the New South Wales Government commissioned ACIL Consulting to assess the statewide economic impact of a selection of draft water sharing plans that cover about 80 per cent of water extractions in the state. The assessment included seven surface water sources (Murray and Lower Darling, Murrumbidgee, Macquarie, Lachlan, Namoi, Gwydir and Hunter) and five groundwater sources (Lower Macquarie, Lower Gwydir, Lower Lachlan, Lower Murrumbidgee, and Upper and Lower Namoi). As the study was based on the draft water sharing plans, the estimates make no allowance for any changes in the availability of water for extraction in the final plans.

Given differences in views between farming organisations and the Department of Land and Water Conservation, ACIL looked closely at the appropriate baseline against which the changes in the draft water sharing plans should be measured. ACIL noted that an early or mid-1990s baseline might have been appropriate for assessing the impacts of the overall water reform process over the last decade. However, ACIL considered that the water sharing plan process should be viewed as a discrete step in the wider reform process. As a result, ACIL adopted 'use under the current rules' as the appropriate baseline.

In three out of the seven surface water sources considered, the information available to ACIL indicated that there would be no change in the average availability of extractive water. In addition, ACIL assumed no change for the Hunter River as modelling of that system remains incomplete. For each of the five groundwater sources included in the study, ACIL found that the draft water sharing plans implied no change in extraction overall. However, ACIL noted that in the areas where no aggregate change in extractions was expected, individual irrigators may suffer significant reductions in access (for example, with some 250 groundwater irrigators in the Namoi having access to less water than they have been using in recent years).

In a 'normal' climatic year, ACIL found that the irrigation water losses arising from the adoption of the plans could result in a $2.4 million reduction in agriculture's contribution to the state's economy (measured in terms of value added, rather than gross value of production). In a typical year, the overall reduction in regional value added across the 12 regions could amount to $4.8 million, with a loss in employment of 48 full-time equivalent jobs. The loss in regional value added ranged from zero (for regions in which there would be no water loss) to $2.3 million (and 23 jobs) in the Gwydir region.

In a dry year, ACIL considered the implications of the draft water sharing plans would be more pronounced. ACIL estimated that the reduction in agricultural value added could amount to $6.8 million per annum during a severe drought across the state, which might occur once in every 50 years. In such a dry year, the overall loss of regional value added could be $13.6 million, with 136 jobs lost. The Gwydir region was again estimated to incur the largest loss in terms of regional value added ($5.5 million) and jobs (55).

ACIL considered these economic consequences to be minor in regional and statewide terms. The annual gross state product of New South Wales is well in excess of $200 billion and a river valley with a population of 100 000 might be expected to have a gross regional product of as much as $3 billion a year.

In releasing the ACIL study, the Minister for Land and Water Conservation stated that 'The report has concluded that adoption of the plans would result in a minimal economic loss to the State's agriculture sector … This contrasts greatly with claims by some producer groups that the plans would cost 4500 jobs and $1.7 billion in a reduction in regional output' (Minister for Land and Water Conservation 2002).

Source: ACIL Consulting (2002)

Box 6: Structural adjustment for Namoi groundwater users

As a result of the water sharing plan for the Upper and Lower Namoi groundwater sources, the Department of Land and Water Conservation has estimated that around 250 (out of a total of 770) groundwater irrigators may ultimately have access to less water than they have been using in recent years.

Following advice from the Namoi Groundwater Management Committee, the New South Wales Government allocated $20 million to a Groundwater Structural Adjustment Program for the region. Of this, $18 million is to be provided as assistance to high level water users and $2 million for community infrastructure projects.

The Groundwater Structural Adjustment Program contains two major components to assist the 250 high level users:

- a phasing in of reductions in water allocations, with a 'guaranteed pathway' for reductions over the 10 years of the water sharing plan; and
- financial assistance to help water licence holders adjust to changes in groundwater access over the 10-year period.

The starting point of the program is that high level users will receive initial access to water equal to their share of the sustainable yield of the groundwater source, plus a 'history of use' component (or supplementary access). The latter component reflects the amount by which their past extraction was in excess of their share of the sustainable yield. The end point of the program is that high level users will receive access to groundwater equal to their share of the sustainable yield of the groundwater source.

The program provides a guaranteed, but declining, volume of water over the 10 years of the plan. The pathway for each high level user depends on the particular zone in which they are located and their initial level of supplementary access. In zones one and five, where the new aquifer access entitlement will be 125 per cent of sustainable yield, the available water determination may result in water access exceeding the guaranteed pathway in the latter years of the plan. Reductions in supplementary access will begin in a 'risk management year'. The risk management year is determined for each management zone based on the risk to the aquifer of ongoing extractions above the sustainable yield and the potential for activation of currently unused entitlements. For example, in zone two, the risk management year is the first year of the water sharing plan and the zone's over-use is withdrawn in 10 equal instalments. In zone five, the risk management year is the fifth year of the plan, with over-use withdrawn in six equal instalments.

The amount of structural adjustment assistance paid to high level users will be directly linked to the reductions in water access (ie to the amount of supplementary access withdrawn in each year of the plan). The assistance available will be equivalent to half the present value of the water withdrawn (calculated using valuations estimated by a taskforce, the Namoi Groundwater Taskforce, and using a discount rate of 10 per cent). High level users will be reimbursed for expenditure on the following on-farm investments:

- water use efficiency investments (made after 1 July 1998);
- on-farm business diversification, such as into dry land primary production;
- farm investment plans (to a maximum of $5000); and
- purchase of water licences (for those who have maximised all cost-effective opportunities for improving efficiency and for whom buying licences is the only means left to maintain viability).

New South Wales advised that the Commonwealth Government is also providing assistance, but for community development rather than direct assistance to irrigators.

Source: Department of Land and Water Conservation (2002b)

The SWMOP targets also include measures to protect the flow regime and supply to downstream users in unregulated rivers. The SWMOP notes that access to water from unregulated rivers depends on the flow regime, which typically is highly variable. The SWMOP states that:

> *Setting limits on daily extraction for low, median and high flows respectively is essential to ensure that basic rights and fundamental river and estuarine health are protected.* (Department of Land and Water Conservation 2002a, p. 49)

The SWMOP indicates that all unregulated river water sources are ultimately expected to be subject to daily flow extraction limits. However, in recognition that it is not currently possible to have the same level of sophistication for all unregulated rivers, the daily flow extraction limits may not be assigned initially as extraction components of access licences in low demand rivers that do not have established river flow gauges. In such rivers low flows will be protected through 'cease-to-pump' levels. The target therefore seeks to ensure that daily extraction components are specified (and tradeable) for at least 50 per cent of unregulated water access licences (over 5000 licences), and for 80 per cent of stressed unregulated rivers, within five years.

Under this target, daily extraction components would not be specified (or tradeable) for the other 20 per cent of stressed unregulated rivers before at least 2008. Under the water reform agreements, allocations for stressed or overallocated rivers were to be in place by 2001, with allocations (and trading) substantially completed for all river systems and groundwater sources (identified in each State's implementation program) by 2005. New South Wales considers that many unregulated rivers may not warrant the sophisticated level of management inherent in daily flow sharing arrangements. For such rivers, New South Wales indicated that it will introduce a sufficient degree of management to protect the environment and the rights of other users and that, in the meantime, annual allocations and limits on extractions during low flows are in place.

The SWMOP recognises the rights of stock and domestic users, and Aboriginal traditional and contemporary dependencies on, and cultural association with, water. The SWMOP acknowledges that water extractions by access licence holders can impact on the basic domestic and stock rights if appropriate provisions or extraction limits are not put in place. Under the SWMOP:

- in unregulated rivers, cease-to-pump levels and daily flow extraction limits are to be set at levels adequate to protect the flows to support these rights throughout a catchment;

- in regulated rivers, storage reserves are to be set aside to keep the river running to supply these rights through drought years;

- in groundwater sources, extraction limits and distances between high yielding and domestic and stock bores may be needed to protect the water levels; and

- the inclusion of Aboriginal representatives on management committees is recognised as an important step, with it being critical over the next few years for training, information, other resources and support systems to be established to improve the effectiveness of Aboriginal participation.

The SWMOP also includes targets for the management of access to supplementary water. These seek to protect the environment through the management of access to high flows while ensuring a share of the water is provided to holders of supplementary access licences. Supplementary water access may be granted to licence holders on regulated rivers at times when inflows from the catchment below the headwater dams, or flows arising from dam overflows, are in excess of environmental water provisions and the immediate water needs of higher priority water users. Any water extracted at these times is not debited against the licence holder's regulated river water account and therefore supplements their normal supplies. The SWMOP recognises that the establishment of clear and transparent rules for sharing the extraction component of this source of water is becoming critical.

In recognition that the integration of surface and ground water management has been slow to develop, the SWMOP targets further work in this area. In particular, it provides for the degree of connectivity between aquifers and rivers to be assessed and zones of high connectivity mapped to enable base flows to the river to be maintained or improved. Because the mapping and assessment required will have to be undertaken as a prerequisite to planning, the SWMOP acknowledges that this target may not be fully addressed in the first round of water sharing plans.

The SWMOP notes that about 80 per cent of water pumps in regulated rivers, and most groundwater extractions (except domestic and stock bores), are currently metered. However, few unregulated river pumps are currently metered or have water use monitored. New South Wales is developing a strategy for monitoring water extraction. The strategy will guide the progressive installation of new meters and monitoring procedures, as well as the replacement of defective meters on most licensed pumps and bores over the next five to 10 years, In the long term, the SWMOP indicates that all pumps and bores with works approvals (excepting domestic and stock bores) should be properly monitored and recorded in all water sources. In the short term, it is recognised that it is critical for all pumps and bores to be monitored and reported in accordance with a water sharing plan.

Provision for the environment

The SWMOP provides a detailed explanation of the environmental targets for water management and their rationale. It acknowledges that modification and use of many rivers and floodplains in New South Wales have resulted in

a range of social and economic benefits. However, it also recognises the need to address environmental deterioration, stating that:

> *Many rivers and aquifers are now being used at a level that is likely to result in ongoing deterioration in environmental health. This decline in health, when fully realised, is likely to be unacceptable to this generation and potentially disastrous to future generations. It is critically important to minimise existing impacts and in many cases actively attempt to reinstate key ecological processes and biodiversity.* (Department of Land and Water Conservation 2002a, p.18)

The water management targets proposed in the SWMOP seek to address the concerns about environmental deterioration. The SWMOP requires all management plans under the Water Management Act, including water sharing plans, to incorporate mechanisms to protect and restore aquatic habitats and the diversity and abundance of native animals and plants. It places particular emphasis on threatened species and key threatening processes.

One approach adopted in the SWMOP is to limit extractions by setting targets which seek to preserve residual flows, maintain groundwater levels, maintain wetland inundation events and prevent the incidence of blue-green algal blooms. New South Wales expects the outcomes of this approach to be the protection and restoration of biodiversity and significant wetlands, and improvements to degraded wetlands and ecological production. The SWMOP also recognises another approach for providing similar outcomes; that of setting targets directly related to environmental management so as to protect or restore key elements of the flow regime (flow variability, flood frequency, high flow events and low flow periods etc) and essential habitats.

The SWMOP requires environmental water rules and extraction limits to be established in the water sharing plans. For regulated and unregulated rivers, for example, the target is to protect or reinstate flows to at least the level equivalent to 60 per cent of their natural frequency. This is based on the assumption that a river maintaining 60 per cent of its natural flow has a high probability of sustaining a healthy ecology over the long term. The validity of this assumption was supported by the assessment of stressed rivers in New South Wales in 1998. Other targets seek to protect or restore the frequency of 'end of system' very low flows and to reinstate a proportion of the natural drying phases in the core areas of terminal wetlands.

The SWMOP also includes targets aimed at managing access to supplementary water. Supplementary water becomes available when there are natural uncontrolled flows (generally all that remains of the natural high flow variability) in the regulated rivers. These flows are important for maintaining general river health, providing water for wetlands and providing environmental triggers for a range of ecosystem processes (such as the spawning and migration of fish). The SWMOP recognises this, while also pointing to the need to establish clear and transparent rules for sharing the extraction component of this source of water. The objective is to protect the

environment through the management of access to high flows while providing a share of the water to holders of supplementary access licences.

Other targets in the SWMOP relate to the establishment of reference sites to provide benchmarks for habitats and for the assessment of ecological flow responses. The importance of groundwater to some ecosystems is recognised in targets that seek to improve river base flows and water quality, to sustain groundwater dependent vegetation, and to maintain water levels in dependent wetlands, swamps and springs. Specific ecosystem types are also addressed, such as limestone cave systems and the zone of the river channel kept wet by groundwater seepage.

In addition, the SWMOP proposes that zones be established where water dealings face environmental constraints, to ensure water trading does not cause environmental damage.

The SWMOP recognises that in some water source areas there is a significant potential for rural subdivision. In these areas, increased water consumption associated with the subdivision can place stress on existing water sharing arrangements and on environmental health, particularly during dry periods. This is of particular concern in sensitive and already stressed water sources. The SWMOP includes a target aimed at ensuring that subdivisions of properties that front stressed rivers, or overlay stressed aquifers, do not increase the impact of basic landholder rights on the health of the water source and on other holders of basic rights. In such cases, action would be taken, for example via the environmental protection provisions of the Water Management Act or other planning regulations.

Environmental issues related to water use and storage are also addressed in the SWMOP. There are several targets relating to water quality. Some of these focus on wastewater, with the aim of reducing wastewater, encouraging higher value uses of water and making higher treatment levels for effluent more cost effective (by, for example, allowing high quality return flows to be credited against town water access licences). Others focus on river salinity or seek to increase native riparian vegetation cover, through river channel rehabilitation, in order to trap nutrients moving overland to rivers.

Targets relating to water storages aim to address the impacts on aquatic fauna of cold water pollution from water releases. Other specific targets address issues related to artificial barriers and openings including weirs, tidal barriers and floodplain levees. Drainage management is also targeted in order to address acid drainage issues.

Some of the SWMOP environmental targets are best considered as 'enabling targets' because they are aimed at the gathering of information – assessment of condition, mapping of extent, identification of impacts and development of priorities for action – over the next five years to enable appropriate management responses to be developed and implemented subsequently.

The water sharing plans

Under the CoAG water agreements, governments must ensure appropriate allocations to the environment, wherever possible determined on the best available information and having regard to the water needs required to maintain the health and viability of river systems and groundwater basins. In allocating water to the environment, governments are obliged to have regard to the 1996 ARMCANZ/ANZECC National Principles for the Provision of Water for Ecosystems (the national principles). In line with the approach adopted in the 2001 NCP Assessment, this supplementary assessment considers the extent to which the New South Wales water sharing plans take account of the national principles.

As noted earlier, New South Wales has so far gazetted 35 of its 39 first round plans. Water sharing plans for the Lower Murray groundwater source, Hunter Regulated River, Orara River and the Great Artesian Basin remain to be released. Appendix A lists the 39 plans. For this supplementary assessment, the Council considered in detail a sample of 10 plans (see box 7), comprising plans for five regulated rivers, two unregulated rivers and three groundwater sources. These plans included the plans (then in draft) about which the Council raised questions in the 2002 assessment. Appendix B summarises the 10 plans.

Box 7: Water sharing plans considered in the supplementary assessment

Gwydir Regulated River Water Source
Lachlan Regulated River Water Source
Murrumbidgee Regulated River Water Source
New South Wales Murray and Lower Darling Regulated Rivers Water Sources
Upper Namoi and Lower Namoi Regulated River Water Sources
Kangaroo River Water Source
Upper Brunswick River Water Source
Lower Lachlan Groundwater Source
Stuarts Point Groundwater Source
Upper and Lower Namoi Groundwater Sources

The Council's purpose in considering the detail of the 10 plans was to understand how water management arrangements in New South Wales provide for allocations to the environment, and whether they sufficiently take account of the ARMCANZ/ANZECC national principles. The Council's approach in this supplementary assessment therefore mirrored its approach in the 2001 NCP Assessment, which considered governments' compliance

with environmental allocation objectives consistent with the CoAG strategic water reform framework. The supplementary assessment considers matters common to all plans or to a subset of plans, such as the plans for unregulated rivers.

Discussion

The extent to which New South Wales has had regard to the national principles in preparing the water sharing plans, and related measures, is discussed below. The discussion considers the arrangements in New South Wales against 11 of the 12 national principles. New South Wales advised that the plans are not intended to address principle 10 (appropriate demand management and water pricing strategies should be used to assist in sustaining ecological values of water resources), which is being addressed by other means (for example, pricing reviews and determinations by the Independent Pricing and Regulatory Tribunal).

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

The approach taken to water management in New South Wales explicitly recognises that river regulation and water extraction can impact on ecological values. This has been evidenced in the past by, for example, the approach taken by New South Wales in its assessment of stressed rivers in 1998. More recently, New South Wales released extensive water policy advisory notes to assist water management committees in developing the water sharing plans. The policy advisory notes highlighted the potential environmental impacts. For example, the policy advisory note on water extraction volumes and daily flow shares in unregulated rivers noted that:

> *If river extraction is allowed to proceed unrestricted, … [t]his would affect not only the water users downstream, but leave insufficient water to provide drought refuge or relief for native aquatic plants and animals.*
>
> *In some systems, particularly where there is a large amount of storage, water extraction can also threaten high flows and freshes that are important for river and estuary ecosystems.* (Department of Land and Water Conservation undated, p. 1)

In response to these potential impacts, the SWMOP requires environmental water rules and extraction limits to be established in water sharing plans. With information derived from the stressed river assessments and other sources, together with the policy advisory notes, the Government charged water management committees with developing the first round of water sharing plans in priority areas. All of the water sharing plans in the subset considered by the Council include environmental rules and extraction limits.

For many of the water sources, these plans provide the first formalised approach to allocating water to the environment.

The Council is satisfied that New South Wales has had due regard for this principle.

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

New South Wales advised that it developed the targets in the SWMOP relating to the provision of water for the environment using a multi-agency approach that drew on the scientific knowledge base within those agencies.

For the water management committees tasked with developing the water sharing plans, the Government provided reports and studies on the environmental condition and requirements of the relevant water sources where such documents were available. The committees generally included a significant proportion of members with tertiary science qualifications. Information and advice was also provided by experienced regional agency staff as an input to formulation of the plans. In some cases, possibly for around 20 to 30 per cent of the plans, expert panels were used. For example, the Shoalhaven–Illawarra Water Management Committee developed its recommendations for the Kangaroo River after considering advice from a scientific panel. In turn, the advice of the scientific panel was subject to external peer review.

The extent and robustness of the scientific information available to the water management committees varied depending on the nature of the water source:

- For the regulated river plans, the results from extensive modelling (using an integrated quantity and quality model) and previous studies (for example, reports on the state of catchments from the mid-1990s) were available. In addition, considerable experience had been obtained from monitoring outcomes from the interim environmental flow rules established by New South Wales in 1998 for regulated rivers.

- For the unregulated river plans, usually much less data and fewer studies were available on which to base flow provisions. Unless the stream contained threatened species for which the flow requirements had previously been identified, environmental requirements tended to be based on general principles aimed at protecting key aspects of the flow regime.

- For the groundwater plans, reliable modelling was available for only a few aquifers (for example, the Lower Gwydir and parts of the Namoi groundwater sources). For the most part, only limited information was available on groundwater ecosystems and the extent of their dependence on the groundwater. The Lachlan Groundwater Committee indicated that an expert panel was used, but the panel's assessment in turn had to rely

on information from a desktop study by the Nature Conservation Council from 1999. A variety of recharge estimating techniques was used depending on the extent of information available.

A number of the water sharing plans considered by the Council make provision for further studies or reviews to better determine environmental requirements. These include the plans for the Kangaroo River (very low flow limits), the Lachlan River (inflow level trigger for translucent releases), the Murrumbidgee River (environmental water and provisional storage volume rules), and the Namoi and Lower Lachlan groundwater systems (a better understanding of aquifer recharge).

Overall, New South Wales appears to use the best scientific information available to inform the determination of water allocations for the environment. In recognition that, apart from the major regulated rivers, the extent of scientific information is limited, New South Wales has indicated its commitment to further improving the scientific basis for environmental allocations.

The Council is satisfied that New South Wales has had due regard for this principle.

Principle 3: Environmental water provisions should be legally recognised

The water sharing plans make explicit provision for environmental water. As the plans are gazetted under the *Water Management Act 2000*, the environmental water provisions have statutory backing. The water sharing plans effectively provide security of access for all water users, including the environment, during their 10-year term.

All water sharing plans provide for environmental health water. This water is committed for fundamental ecosystem health at all times and may not be taken or used for other purposes. In addition, some plans provide for supplementary environmental water, which is committed for specific environmental purposes at specific times (or in specific circumstances), but may be used for other purposes at other times. Supplementary environmental water is generally required where the flooding of wetlands has been identified as a specific environmental need (for example, in the regulated river plans for the Murray and Lower Darling, Lachlan and Gwydir Rivers). Some plans also provide for adaptive environmental water, which is committed for specific environmental purposes through an access licence (for example, the regulated river plan for the Murray and Lower Darling Rivers).

The Council is satisfied that New South Wales has had due regard for this principle.

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

The water sharing plans provide for allocations to the environment and water for extraction.

For each of the river and groundwater sources, the plans set an annual extraction limit to apply over their 10-year life. In addition, extractions for the unregulated rivers are based on the sharing of daily flows subject to a daily extraction limit. The flow regime is typically split into three or more flow classes, with daily extraction limits applying separately to each flow class.

In the regulated river plans, extractions are to be managed so as not to exceed the average long-term extraction limit set in each plan. While the volume of water specified in access licences (the licence share component) may significantly exceed the extraction limit, extractions under access licences are managed through announced water determinations, which control the amount of the share component that can be taken in any year by a licence holder.

For all of the regulated rivers in the Murray–Darling Basin, the extraction limit is set at the lesser of the extractions permitted under the Murray–Darling Basin Ministerial Council cap on diversions or the extractions permitted under the specific rules established in the plan. The latter limit prevails in all of the plans. This means that, for all of the plans, the extractions are to be lower than those permitted under the Murray–Darling Basin Ministerial Council cap on diversions. Under the plan for the Murray and Lower Darling Rivers, extractions by New South Wales are reduced by approximately 3 per cent relative to diversions under the cap (down from 2036 to 1973 gigalitres per year). For the Murrumbidgee River, the plan provides for a reduction of approximately 3 per cent, rising to 4.5 per cent by the fifth year. The largest improvement in environmental allocations, relative to diversions established under the cap, is approximately 10 per cent for the Macquarie and Cudgegong Rivers.

In the unregulated river plans, the lowest of flows (at or above the 95th percentile) are typically protected through the application of 'cease-to-pump' rules. The cease-to-pump rules are, for some users in some plans, phased in over the life of the plan. Typically, access to flows below the cease-to-pump level is for the most part not permitted after year five of the plan. The proportion of flows reserved for the environment in the other flow classes varies for each plan and for each class. In the plan for the Kangaroo River, for example, 40 per cent of the upper limit of low (A class) flows is protected from extraction. This represents an 18 per cent improvement over pre-plan conditions. However, in most instances, the Council has not been able to determine the extent of change expected to result from the rules established in the plans relative to pre-plan conditions. In the Kangaroo River plan, the flow protected from extraction amounts to 66 per cent for the upper limit of

medium (B class) flows and ranges upwards from 77 per cent for high (C class) flows. In the plan for the Upper Brunswick River, no A class flows are established. At the upper limit of B class flows, 55 per cent of flows are protected and, at the upper limit of C class flows, 70 per cent of flows are protected. The plans manage extractions by the assignment of total daily extraction limits, with individual daily extraction limits specified for each flow class.

In the groundwater source plans, with the exception of the Upper and Lower Namoi, the long-term average storage component (less extraction for basic landholder rights in some cases) is set aside for the environment. Where groundwater dependent ecosystems have been identified, the plans have also provided a portion of annual aquifer recharge to meet identified environmental requirements. Under the plans, the amount of recharge set aside ranges from zero (Upper and Lower Namoi) to 90 per cent (Dorrigo Basalt). The proportion of recharge set aside for the environment is intended to reflect the degree of ecosystem dependency on the groundwater source. In most cases, such as for the Upper and Lower Namoi where no significant groundwater dependent ecosystems have been identified, further studies of groundwater ecosystem dependency are proposed and the plans permit modification of the amount of recharge set aside for the environment as a result of those studies. As for the surface water plans, the share component specified in access licences may significantly exceed the extraction limit, but extractions under access licences are managed to the extraction limit.

New South Wales considers that, compared to the position before the planning process began, the water sharing plans have: reinstated seasonal flow patterns; increased the frequency of inundation of wetlands; protected low flows and pools; increased medium and high flows; provided specific regimes for listed species and communities; and reduced total diversions.

New South Wales advised that, in developing the environmental allocations in the plans, the water management committees (and, subsequently, the Government) have taken into account social and economic considerations, in addition to environmental requirements. In general, the parameters in the water sharing plans reflect trade-offs between socioeconomic factors and the needs of the environment. New South Wales emphasised that it considers the CoAG strategic framework, taken as a whole, clearly intended that a range of factors – social, economic and scientific – should inform the water reforms of jurisdictions, including on the provision of water to the environment.

The making of trade-offs is evident from the Government's assessment of the contribution each plan has made to the targets established in the SWMOP. The Government's assessment is reported in a schedule to each of the plans. For some of the key environmental targets in the SWMOP, the Government has generally assessed the water sharing plans to have made only a low or partial contribution to achieving the target (see more detailed discussion under principle 9).

While the national principle requires the existing rights of water users to be recognised, it also states that the provision of water for ecosystems should go

'as far as possible' to sustaining the ecological values of the ecosystems. On the information available, the Council has not been able to determine the extent to which the allocations provided in the water sharing plans address environmental needs. During the 2002 assessment, New South Wales indicated that the first round of water sharing plans was unlikely to deliver all of the water needed for the environment within the first SWMOP (NCC 2002, p. 2.53).

Whether the water sharing plans go 'as far as possible' to meeting environmental needs, while recognising the existing rights of water users, is ultimately a matter for judgment. New South Wales advised that the exhibited draft plans provided a context for assessing the trade-offs made by the water management committees and that these trade-offs were explained in public meetings. However, New South Wales has not provided the Council with specific information on the extent of the trade-offs made in the final water sharing plans. The Council notes that ACIL Consulting considered the economic consequences of the draft plans would be minor in regional and statewide terms (see box 5).

New South Wales indicated that a series of public information sheets is being prepared on its new water management arrangements including the expected environmental benefits.

Without more information, whether provided in the information sheets or in some other form, the Council is not in a position to conclude on the nature and extent of the trade-offs made in the water sharing plans and, in particular, the extent to which ecological values are likely to be sustained.

At this stage, the Council is unable to conclude whether New South Wales has had due regard for this principle.

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

As discussed under principle 4, all of the regulated river plans in the Murray–Darling Basin considered by the Council provide more water for the environment than required under the Murray–Darling Basin Ministerial Council cap on diversions.

For the Murray–Darling Basin regulated rivers, the water likely to be available under the rules in the water sharing plans builds on the environmental allocations attained under the 1998 interim environmental flow rules established by New South Wales.

- In terms of total flows for the environment, the greatest improvement appears to be achieved in the Namoi River plan. While the interim environmental flow rules represented a 3 per cent improvement over the cap on diversions, the Namoi River water sharing plan provides for a 7 per cent improvement.

- In contrast, the water sharing plan for the Lachlan River does not appear to provide for any significant improvement in total flows for the environment relative to the interim environmental flow rules. However, New South Wales considers that the rules in the plan provide for significantly better environmental outcomes for the river without taking additional water from users. New South Wales stated that the plan also eliminates access to off-allocation (supplementary) water and provides for a review that may result in further environmental benefits.

- The plan for the Murray and Lower Darling Rivers does not appear to provide any significant additional water for the environment relative to that available before gazettal of the plan. The largest supplementary water allocation in the plan, the Barmah-Millewa environmental water allowance, was already operational before gazettal of the plan.

- The plans for the Murray and Lower Darling Rivers and the Murrumbidgee River contain provisions permitting the extraction limit to be reduced as a result of system efficiency savings made to supply additional water to the Snowy River under the Snowy Water Inquiry Outcomes Implementation Deed. However, neither of these plans includes a mechanism to adjust the extraction limit in response to any future decision by the Murray–Darling Basin Ministerial Council to provide for further environmental flows in the River Murray.

- The Murrumbidgee River plan makes additional water available to increase end of system flows. This provides for some increase in flows in the River Murray and goes some way to addressing in-stream river health concerns for the Murrumbidgee River. Supplementary water provisions in the Murrumbidgee River plan are targeted at increasing flows for mid-system wetlands. No water has been specifically targeted at the wetlands of the lower Murrumbidgee. New South Wales indicated that the water available to these wetlands is adequate, given their degraded state, but needs to be better managed. A study of how best to manage the wetlands is being undertaken with a view to preparing a management plan.

For the unregulated river systems, the water sharing plans provide the first formal allocation of water to the environment. Typically, in these rivers the greatest environmental stress arises from extractions during very low and low to medium flows. The plans considered by the Council provide some protection of low flows by imposing 'commence-to-pump' and 'cease-to-pump' limits when flows reach levels set in the plan. Many plans allow nominated water users to have access to the very low flows for the first five years of the plan. In the Tenterfield Creek plan, there is a review of the access to low flows at year five and a decision made as to whether this should be allowed to continue to year eight. Under the Kangaroo River plan, access to low flows is conditional and does not apply all of the time. New South Wales advised that, based on historical modelling, access to low flows will occur only once every six years. New South Wales indicated that these restricted access conditions will have a significant impact on water users.

Above the very low flow classes, each plan provides for a portion of the flow to be extracted for consumptive use, with the remainder of the flow class allocated to the environment. As indicated under principle 4, for the unregulated rivers, in most cases the Council has not been able to determine the extent to which the amount of water going to the environment will change as a result of the new rules in the plans.

For the groundwater plans considered by the Council, the long-term average storage component (less extraction for basic landholder rights in some cases) has been set aside for the environment. With the exception of the Upper and Lower Namoi groundwater sources, the plans also provide a portion of annual aquifer recharge to meet identified environmental requirements. In some plans, such as for the Upper and Lower Namoi, and the Lower Lachlan, groundwater sources, extractions for consumptive use have been wound back to provide for environmental requirements. The plans also provide for declaration of local management areas where the Minister can require pumping to cease if evidence arises that extractions, under the rules in the plans, are damaging nearby ecosystems.

In summary, the water sharing plans for some stressed regulated and unregulated rivers and groundwater sources provide additional water for environmental requirements.

For other stressed regulated rivers (for example, the Lachlan and the Murray and Lower Darling), in terms of total flows, it appears that no additional environmental water has been provided, relative to that currently available under the interim environmental flow rules. The Council notes New South Wales's advice that, for the Lachlan, the rules in the water sharing plan provide for improved environmental outcomes without taking additional water from users. New South Wales also advised that, in some cases, it considers the extraction levels associated with the environmental flow rules introduced in 1998 to be appropriate, and therefore the water sharing plans do not provide additional environmental water. New South Wales has not, however, provided information to the Council to demonstrate how the rules in the water sharing plans meet environmental needs or to support its advice concerning the appropriateness of 1998 flows.

For the unregulated rivers, the water sharing plans provide the first formal allocation of water to the environment. However, insufficient information is available to determine whether the amount of water going to the environment, particularly above the very low flow classes, will in practice change as a result of the unregulated river plans.

As discussed under principle 4, New South Wales has indicated that a series of public information sheets is being prepared on its new water management arrangements including the expected environmental benefits. This may help improve understanding of the likely environmental outcomes of each plan.

At this stage, the Council is unable to conclude whether New South Wales has had due regard for this principle.

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)

For the most part, because the water sharing plans are for hydrologically and/or environmentally stressed water resources, they do not allow further allocation of water for extraction.

However, in at least some of the unregulated river plans, there appears to be further allocation of water for extraction in the higher flow classes. In the Upper Brunswick River plan, for example, provision is made for further allocations to existing licence holders up to a maximum of 250 ML/year. The additional allocations are contingent on licence holders surrendering their entitlement to take water during medium (B class) flows in exchange for up to twice the entitlement during high (C class) flows. This appears to be aimed at reducing the environmental impact from current extraction during medium flows.

Of the groundwater plans considered by the Council, only the Stuarts Point plan has identified further water available for extraction, but only after providing 45 per cent of recharge for the environment. This environmental provision is significantly greater than the SWMOP target of 30 per cent of recharge for groundwater sources where there is significant ecosystem dependency.

In those cases where provision has been made for additional allocation of water for extraction, it appears that environmental objectives have been appropriately considered.

The Council is satisfied that New South Wales has had due regard for this principle.

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

New South Wales released a draft of each water sharing plan for public consultation, in line with the requirements of the Water Management Act. The draft plans listed physical characteristics related to the water source and provided details of the use of the water source by the community (for both social and economic purposes). The draft plans also described what was known about possible water dependent ecosystems.

The approach to determining environmental water allocations was generally open and transparent for plans covering groundwater sources. However, for the surface water plans, the amount of technical information made available to the broader community on how a water management committee determined relevant rules and limits in the plans (such as the environmental health water and supplementary environmental water provisions) was variable. While each draft plan contained technical information and further

details were presented at public meetings, the manner in which environmental science has been considered and incorporated in the process is not transparent. There is also little information available on the extent to which the various rules and limits will achieve environmental outcomes.

As noted under principle 2, the Government provided reports and studies on the environmental condition and requirements of the relevant water sources where such documents were available, as well as policy advisory notes, to the water management committees. Experienced regional agency staff also provided input. In addition, the Government assisted the committees by modelling the effects of the various options being considered where models were available.

The Council has no information, however, on how water management committees weighed up the relevant information to reach decisions on the balance between environmental and consumptive uses. New South Wales has not made available to the Council information on the deliberations of the water management committees (or documentation on the modelling results).

As discussed under principles 4 and 5, New South Wales has indicated that a series of public information sheets is being prepared on its new water management arrangements including the expected environmental benefits. This may provide greater transparency in relation to the basis of decisions on water management, including on environmental water allocations, in each plan.

At this stage, the Council is unable to conclude whether New South Wales has had due regard for this principle.

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

In accordance with the Water Management Act, each water sharing plan clearly states its vision, a set of objectives and strategies to meet those objectives. For each of the plans, an appendix lists performance indicators and how performance against the indicators will be measured. Many of the indicators relate to trends, such as in numbers of particular events, such that change would trigger investigation. The criteria for determining whether performance is satisfactory are to be the subject of further work, including in the development of the implementation programs.

The Minister is responsible for ensuring that monitoring and reporting against the performance indicators is undertaken. The Council understands that the ecological outcomes of the plans for regulated rivers will be assessed using the Integrated Monitoring Environmental Flows (IMEF) program. New South Wales advised that a statewide monitoring program is being developed for the unregulated river and groundwater plans. An interim State Water Monitoring Strategy has been in place since 2001.

A number of the water sharing plans identify requirements for further studies and reviews to improve the understanding of environmental water requirements (see discussion of principles 2 and 11). In these cases, the plans provide for amendments to be made following the reviews, within specified limits. Otherwise, if water access were to be reduced during the term of a water sharing plan, licence holders are able to claim compensation. While this may reduce the flexibility to adjust environmental water provisions in response to improvements in the understanding of environmental requirements, it is necessary for the protection of the rights of access licence holders.

The Council is satisfied that New South Wales has had due regard for this principle.

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

The New South Wales Government has taken this principle into account in developing the Water Management Act, in setting the targets in the SWMOP and in the policy advisory notes provided to the water management committees responsible for developing the water sharing plans. However, New South Wales considers that principle 9 is not relevant to the water sharing plans because it has deliberately separated its approaches to water sharing and water use, for consistency in approach to separating water access from land management. New South Wales advised, for example, that mechanisms such as the catchment blueprint process and the water quality objectives in place for each major river system will contribute to achieving the SWMOP's water quality targets.

The Council acknowledges the New South Wales Government's view on the relevance of principle 9 to this supplementary assessment of water sharing plans. Nonetheless, the Council considers there is some relationship between the water sharing plans and water use. While none of the water sharing plans manages the impacts of water use directly, the rules in the plans govern how much water can be used and, in the case of the unregulated river plans, also influence when water can be used. In other words, while the water sharing plans strictly speaking deal with water extraction rather than water use, they impact indirectly on water use. In any case, New South Wales needs to demonstrate regard for principle 9 to show that it has met CoAG obligations relating to water provisions to the environment: if not in relation to water sharing plans in this supplementary assessment, then in future annual assessments as relevant reforms fall due.

As noted under principle 4, the Government has assessed how well each of the water sharing plans meets the targets in the SWMOP. The assessment is reported in a schedule to each of the plans, with compliance rated as full, high, partial or low. Under the Government's assessment, none of the water sharing plans considered by the Council was rated as fully meeting the SWMOP targets. Less than full compliance with the SWMOP is particularly evident for the environmental targets which require plans to incorporate

mechanisms to: protect and restore aquatic habitats and the diversity and abundance of native animals and plants (target 2); and provide adequate protection for end of system flows and very low flows (targets 4a and 4b).

In the regulated river plan for the Murrumbidgee River, for example, of the 19 relevant targets, New South Wales rated the contribution of the plan to achieving four SWMOP targets (including targets 2, 4a and 4b) as low and as partial for a further six targets. In the plan for the Murray and Lower Darling Rivers, of the 16 targets assessed, New South Wales rated the contribution of the plan as partial for six targets. In the Lachlan River plan, New South Wales assessed 14 targets, rating one as low and six as partial. Among the unregulated river plans, New South Wales assessed 17 targets for the Kangaroo River, rating one as low and five as partial, while for the upper Brunswick River, New South Wales rated two targets as partial.

The groundwater plans considered by the Council show a generally partial contribution to achieving the SWMOP targets, as assessed by New South Wales. The contribution of the Stuarts Point plan to the SWMOP targets was rated by New South Wales as partial for four of the 17 targets assessed. For the Lower Lachlan plan, of the 14 targets assessed, New South Wales rated nine as partial. In the plan for the Upper and Lower Namoi, New South Wales rated seven of the 16 targets as partial. The groundwater plans were generally rated by New South Wales as only partially contributing to two key SWMOP targets, reflecting the lack of detailed assessments of aquifer and surface water connectivity and of groundwater dependent ecosystems. These assessments may occur during the life of the plans.

New South Wales advised that it had expected outcomes such as these from the first round of water sharing plans and indeed had foreshadowed them in the SWMOP. New South Wales is looking for the water sharing plans to move towards achievement of the targets over time.

While the Council considers there are linkages between the water sharing plans and water use, it accepts the New South Wales advice that the water sharing plans are not the State's primary tool for achieving the water use objectives in the SWMOP. The Council has therefore decided that it should consider the regard which New South Wales has demonstrated for principle 9 in future assessments as relevant reforms fall due. The Council notes, for example, that CoAG determined that integrated catchment management and the National Water Quality Management Strategy reforms must be in place for the 2003 assessment, and that implementation of the CoAG water resource policy must be completed by 2005.

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

As noted under principles 2 and 8, several water sharing plans identify requirements for further studies and reviews to improve the understanding of environmental water requirements.

Of the regulated rivers, the plan for the Lachlan River, for example, provides for amendments to be made following a review of the rules governing translucent releases from Wyangala Dam (that is, releases of some portion of inflow to the dam coincident with that inflow).

The plan for the unregulated Kangaroo River provides for amendments to be made to vary the very low flow levels established in the plan following field verification.

For groundwater sources, the plans generally provide for reviews in cases where groundwater dependent ecosystems are known to exist or may exist. For example, the groundwater plan for the Upper and Lower Namoi foreshadows a review of ecosystem requirements and allows amendments to be made to the plan to take account of the outcome of the review. The plan for the Lachlan groundwater source contains similar provisions.

In addition, the Department of Land and Water Conservation appears to be conducting a range of research into environmental water requirements, not specific to particular plans, and other agencies are conducting related research.

The Council is satisfied that New South Wales has had due regard for this principle.

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

The process adopted for the preparation of the water sharing plans was in accordance with the Water Management Act. The water management committees responsible for developing the plans had a wide representation from the relevant management agencies, the local community, industry groups and environmental interests.

It appears that, in most cases, the committees have discussed development of the plans with local communities, though to varying degrees. For example, in its draft plan, the Namoi Groundwater Management Committee provided an extensive list of the consultation undertaken. Consultation on the Stuarts Point plan was conducted in a different manner, with most of the consultation occurring after release of the draft plan. In the draft plan, the Mid North Coast Water Management Committee stated:

> *There has been limited community liaison during the preparation of the water sharing plan as the public exhibition period was seen as the core consultative process.*
>
> *The Water Management Committee established a subcommittee, with irrigator members, to develop most of the recommendations within the water sharing plan.* (p. A2)

All plans were made available as drafts for public consultation, with the committees subsequently considering the responses from the public before finalising their recommendations to the Minister. The Council acknowledges that there has been considerable effort by New South Wales to involve relevant environmental, social and economic stakeholders in the preparation of the water sharing plans.

In the 2002 NCP Assessment, the Council noted comments from some individuals and organisations who were involved in developing the first round of draft water sharing plans. In particular, the timing of the release of the interim SWMOP, delays in the release of advisory notes and delays in finalising the SWMOP meant that some water management committees had insufficient opportunity to incorporate SWMOP targets adequately into the initial draft plans. Some committees also raised concerns with the timing of the release of key sources of technical and scientific information.

While the release for public comment of the draft plans provided an opportunity for water management committees to further consider the SWMOP targets and additional technical information, New South Wales acknowledged that there had been some deficiencies, particularly in relation to the early availability of technical and scientific information. New South Wales undertook to monitor future processes for the development of water sharing plans to ensure that similar problems do not arise. New South Wales noted that the gazettal of the SWMOP and the experience gained from developing the first round of water sharing plans will help to inform the process for future plans.

The Council is satisfied that New South Wales has had due regard for this principle.

Assessment

Under the CoAG strategic water reform framework, governments needed to have made substantial progress in implementing arrangements to provide water to the environment by 2001, including allocations in all river systems that are overallocated or deemed to be stressed. At the time of the 2002 NCP Assessment, New South Wales was still developing its water management arrangements. New South Wales was still to determine the amount of water that would be provided to the environment in overallocated and stressed river systems and was still to establish its water property rights arrangements.

At the time of the 2002 assessment, New South Wales had developed a draft SWMOP for the State setting overarching goals and objectives. It was also developing water sharing plans, including for major water sources, which were intended to achieve a sustainable balance between consumptive and environmental uses. Acknowledging that development of appropriate water management arrangements is a significant task requiring considerable consultation with water users and communities, the Council considered it

reasonable for New South Wales to have more time to implement the CoAG obligations on providing water to the environment. The Council deferred the assessment of New South Wales's compliance to this supplementary assessment. The Council also identified progress in establishing property rights arrangements as a significant issue for the 2003 NCP Assessment. It noted that January 2003 – when the new access licence system was to be introduced, regulations under the Water Management Act to establish renewal systems for the new licences were to be in place and the property rights register was to go 'live' – was a key milestone.

Since the 2002 assessment, New South Wales has continued to work towards implementing the environmental allocations required by CoAG. It gazetted the SWMOP in December 2002. New South Wales has also gazetted 35 first round water sharing plans, which are due to come into operation in July 2003 and which will lock in water entitlements and environmental provisions for the following 10 years. The SWMOP provides water use targets, explains why those targets are needed and describes the outcomes anticipated from meeting the targets. While the SWMOP permits the total volumes specified on water access licences to continue to exceed the extraction limit for a system, it specifies requirements to be met by water sharing plans in setting long-term extraction limits for each water source. Provided relevant targets are substantially adopted in the water sharing plans (and in catchment blueprints and subsequent water management plans), the SWMOP should contribute significantly to the long-term sustainable use of water resources in the State.

The Council has identified one question regarding the SWMOP. This relates to the application of extraction limits for unregulated rivers. The SWMOP indicates that all unregulated river water sources are ultimately expected to be subject to daily flow extraction limits. However, under the relevant SWMOP target, daily extraction components will not be specified in licences (or tradeable) for 20 per cent of stressed unregulated rivers until at least 2008. The CoAG requirement is that allocations for stressed or overallocated rivers be in place by 2001, with allocations (and trading) substantially completed for all river systems and groundwater resources (identified in each State's implementation program) by 2005.

New South Wales has advised that many unregulated rivers, including some stressed unregulated rivers, may not warrant the sophisticated level of management inherent in daily flow sharing arrangements. For these rivers, which account for a relatively minor share of overall water diversions, New South Wales indicated that a sufficient degree of management will be introduced to protect the environment and the rights of other users and that, in the meantime, annual allocations and limits on extractions during low flows are in place. The Council will look for New South Wales to demonstrate in the water sharing plans to be developed for the remaining stressed unregulated rivers how environmental needs are addressed.

The Council considered 10 of the 35 gazetted water sharing plans against the ARMCANZ national principles for the provision of water to ecosystems. The Council concluded that New South Wales has demonstrated due regard for

seven of the 11 relevant national principles. Because there is currently insufficient information available, the Council was not able to conclude in this supplementary assessment in relation to principles 4, 5, 7 and 9.

- 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.

New South Wales advised the Council that extraction limits and environmental water allocations in the water sharing plans generally reflect trade-offs made between the needs of the environment and socioeconomic factors. As a result, the New South Wales Government's assessment is that several of the water sharing plans make only a low or partial contribution to achieving some of the key environmental targets in the SWMOP.

Principle 4 makes clear that governments need to go as far as possible to provide water to sustain ecological values, while recognising the existing rights of water users. Ultimately, decisions on appropriate allocations of water for consumptive and environmental purposes will be matters for judgment based on relevant information about ecological requirements of systems and socioeconomic impacts. New South Wales has not provided the Council with specific information on anticipated environmental impacts or on the extent of the trade-offs made in reaching decisions on environmental allocations for each plan. The Council is therefore not able to assess whether New South Wales has gone as far as possible to meeting environmental objectives.

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

The water sharing plans for some stressed regulated and unregulated rivers and groundwater sources provide additional water for environmental requirements. New South Wales has not, however, provided information to the Council on whether this additional water provides appropriate outcomes for the environment. Moreover, for some stressed regulated rivers, in terms of total flows, it appears that no additional environmental water is provided, relative to that currently available under the interim environmental flow rules.

New South Wales argued that the rules in several water sharing plans provide for improved environmental outcomes without taking additional water from users, and that for other plans it considers the extraction levels associated with the existing environmental flow rules to be appropriate. New South Wales has not, however, provided information to the Council to show how the rules in the water sharing plans meet environmental needs or to support its advice concerning the appropriateness of existing environmental flows. In addition, while the Council acknowledges the New South Wales argument that, for the unregulated rivers, the water sharing plans provide the first formal allocation of water to the environment, New South Wales has

not provided information to substantiate whether the allocations for the unregulated rivers, particularly above the very low flow classes, will result in any change in the amount of water going to the environment.

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

There was considerable public consultation during the preparation of the water sharing plans, with each plan being developed by a local water management committee taking account of the overarching SWMOP targets and New South Wales's national and international obligations. However, New South Wales has provided no information to the Council on the manner in which the environmental science underpinning the extraction limits and environmental provisions was considered and incorporated in developing the water sharing plans, particularly for surface water. There is also little information available on the extent to which the various rules and limits are expected to achieve environmental outcomes.

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

The Council considers that the New South Wales Government has had regard for this principle in developing the Water Management Act, in setting the targets in the SWMOP and in the policy advisory notes provided to the water management committees responsible for developing the water sharing plans. Notwithstanding this, the Government's own assessments of the plans examined by the Council indicate that none of the plans fully meets SWMOP targets relating to ecological values.

While the Council considers the plans will have at least an indirect impact on water use, it accepts the New South Wales argument that mechanisms other than water sharing plans will be more significant in managing water use such that ecological values are recognised. The Council did not therefore conclude on the regard had for principle 9 by New South Wales in this supplementary assessment (which focused on the SWMOP and the water sharing plans). The Council will, however, consider the regard had by New South Wales for principle 9 when it looks at implementation by New South Wales of relevant elements of the CoAG water resource policy, including for example the catchment blueprint process, water quality objectives in place for each major river system and future water management plans that extend beyond water sharing in future NCP assessments.

Finalising the supplementary assessment matters

New South Wales is preparing a series of public information sheets on its new water management arrangements including the expected environmental benefits. To conclude on whether New South Wales has demonstrated due regard for national principles 4, 5 and 7, the Council would need New South

Wales to provide robust information — in the information sheets or in some other form — showing the extent to which each water sharing plan improves environmental flows and addresses SWMOP environmental objectives, and how and why socioeconomic trade-offs have influenced decisions on the allocation of water for consumptive and environmental uses. The Council proposes to finalise consideration of the regard which New South Wales has shown for the national principles in the 2003 NCP Assessment, taking account of relevant information provided by New South Wales.

There is some other work required before New South Wales meets all of its 2002 water reform obligations. This includes gazettal of the four remaining first round water sharing plans, development of the implementation programs to allow the gazetted plans to become operational, and a decision on a process and timeframe for developing the second round of water sharing plans for the remaining stressed and overallocated systems. New South Wales' officials have advised that these are all matters for decision by the Government elected on 22 March 2003. The Council will look for advice from New South Wales on these matters by the 2003 assessment, at which time it will consider recommendations on competition payments for the State.

Notwithstanding the above, given the progress made by New South Wales in gazetting the SWMOP and 35 water sharing plans (covering the majority of the State's water), and the prospect that New South Wales will make available information on the effect of its plans, the Council considers that the matters addressed in this supplementary assessment that remain to be finalised do not warrant an adverse recommendation on 2002-03 competition payments. The Council will seek to conclude its assessment of the actions by New South Wales to allocate water to the environment for stressed and overallocated river systems in the 2003 NCP Assessment when it will look for New South Wales to have:

- substantially progressed, and preferably to have finalised, the four remaining first round water sharing plans;
- published, or at least made available to the Council, the information required to finalise the Council's assessment of whether New South Wales has had due regard in its water sharing plans for principles 4, 5, and 7 (of the national principles for the provision of water for ecosystems);
- finalised the implementation programs needed for the gazetted water sharing plans to commence in July 2003;
- demonstrated how it has had regard to national principle 9 through means other than the water sharing plans; and
- committed to a satisfactory process (ensuring effective community consultation) and timetable for developing water sharing plans for the State's remaining stressed or overallocated river systems.

Under the CoAG water resource policy, New South Wales should have determined its allocation arrangements for all river systems which have been

overallocated or are deemed to be stressed by 2001. In the 2002 assessment, the Council noted that New South Wales will have made substantial progress towards this objective when its first round of water sharing plans (which cover the bulk of the State's water) become operational. In establishing the supplementary 2002 assessment to consider the SWMOP and the first round of water sharing plans, the Council acknowledged that it was reasonable for New South Wales to have additional time to complete its first round water sharing plans. The Council will look for New South Wales to have gazetted plans which satisfactorily address environmental needs in the remaining stressed rivers by the 2005 NCP Assessment, the date set by CoAG for completion of the water reform program.

In the 2004 NCP Assessment, the Council will report on progress by all jurisdictions with the implementation of environmental allocations, and conclude its assessment of jurisdictions' compliance with obligations in this area in 2005 consistent with the timetable established by CoAG. As noted above, progress by New South Wales in establishing property rights arrangements will be a significant element of the 2003 assessment.

Appendix A: 2003 water sharing plans

Water management area	Water management committee (MC)	Water source covered by water sharing plan
Border Rivers	Border Rivers Unregulated River and Groundwater MC	Tenterfield Creek
Central Coast	Central Coast Unregulated River MC	Jilliby Jilliby Creek
		Ourimbah Creek
	Kulnura Mangrove Mountain Groundwater MC	Kulnura Mangrove Mountain Groundwater Sources
Central West	Macquarie Cudgegong River MC	Macquarie and Cudgegong Regulated Rivers
	Central West Unregulated Streams MC	Castlereagh River above Binnaway
	Macquarie Groundwater MC	Lower Macquarie Groundwater Sources
Gwydir	Gwydir River (Regulated) River MC	Gwydir Regulated River
	Gwydir Unregulated River MC	Rocky Creek, Cobbadah, Upper Horton and Lower Horton
	Gwydir Groundwater MC	Lower Gwydir Groundwater Source
Hunter	Hunter River MC	Hunter Regulated River Water Source
		Wybong Creek
	Tomago Tomaree Groundwater MC	Tomago Tomaree Stockton Groundwater Sources
Lachlan	Lachlan River MC	Lachlan Regulated River
	Lachlan Unregulated River MC	Mandagery Creek
	Lachlan Groundwater MC	Lower Lachlan Groundwater Source
Lower North Coast	Lower North Coast Water MC	Karuah River

Mid North Coast	Mid North Coast Water MC	Apsley River
		Commissioners Waters
		Toorumbee Creek
		Stuarts Point Groundwater Source
Murray	Murray Lower-Darling Community Reference Committee	NSW Murray–Lower Darling Regulated Rivers
	Murray Unregulated River MC	Upper Billabong
	Murray Groundwater MC	Lower Murray Groundwater Source
Murrumbidgee	Murrumbidgee River MC	Murrumbidgee Regulated River
	Murrumbidgee Unregulated Streams MC	Adelong Creek
		Tarcutta Creek
	M'dgee Groundwater MC	Lower Murrumbidgee Groundwater Sources
Namoi	Namoi Regulated River MC	Upper and Lower Namoi Regulated River
	Namoi Unregulated River MC	Phillips Creek, Mooki River, Quirindi Creek, and Warrah Creek Water Sources
	Namoi Groundwater MC	Upper and Lower Namoi Groundwater Sources
Northern Rivers	Northern Rivers Water MC	Upper Brunswick River
		Coopers Creek
		Alstonville Plateau Groundwater Sources
South East	South Coast Water MC	Wandella Creek
Southern	Shoalhaven/ Illawarra Water MC	Kangaroo River
Upper North Coast	Upper North Coast Water MC	Dorrigo Plateau Surface Water Source and the Dorrigo Basalt Groundwater Source
		Orara River
Western, Border Rivers, Gwydir, Namoi, Central West	Great Artesian Basin Groundwater MC	Great Artesian Basin

Source: Department of Land and Water Conservation website

Appendix B: Summary of selected water sharing plans

The Council considered 10 of the 35 water sharing plans gazetted to date by the New South Wales Government in order to understand how New South Wales is proposing to manage its water resources to meet the CoAG obligation to provide water to the environment. The plans considered comprised five regulated river plans, two unregulated river plans and three groundwater source plans. In the Council's view, the subset chosen allowed for a sufficiently broad investigation of the approaches being taken by New South Wales to addressing its environmental obligations across different types of water sources. This appendix summarises key elements of the 10 plans relevant to the CoAG water reform obligations, other than the provisions relating to water trading which will be considered in the 2003 NCP Assessment. The plans are available on the Department of Land and Water Conservation's website (www.dlwc.nsw.gov.au).

Regulated river plans

Gwydir Regulated River Water Source

Under the plan, the long-term average annual extraction limit is the lesser of:

- the long-term average annual extraction from the water source that would occur with the water storages and water use development that existed in 1999-2000, the share components at the commencement of the plan and the water management rules defined in the plan, resulting in an extraction volume of 388 000 megalitres per year (ML/year); or

- the long-term average annual extractions that would occur under the baseline conditions used for assessment of the cap under the Murray–Darling Basin Agreement, resulting in an extraction volume of 415 000 ML/year.

The extraction limit represents a 27 000 megalitres (ML), or 6.5 per cent, reduction over the 1993-94 Murray–Darling Basin Ministerial Council cap on diversions.

The total water volume specified on all access licences is 706 874 ML/year, comprised of:

- 4245 ML/year for licences for domestic and stock supply (additional current requirements for domestic and stock rights are estimated to be 6000 ML/year);

- 3836 ML/year for local water utility supply;
- 19 293 ML/year for regulated river (high security) access licences;
- 509 500 ML/year for regulated river (general security) access licences; and
- 170 000 ML/year for supplementary water access licences.

The long-term average annual extraction from the water source is permitted to exceed the long-term extraction limit. If the current long-term average annual extraction exceeds the lower end of the plan's extraction limit by 3 per cent or more, or if the assessments for three consecutive years indicate that the current long-term average annual extraction exceeds the long-term extraction limit, water determinations for supplementary water access licences will be reduced. Once the available water for supplementary water access licences has been reduced to zero, the maximum volumes that may be taken or assigned from a regulated river (general security) access licence will be reduced.

The water supply system is to be managed to enable supply to be maintained for domestic and stock, water utility and regulated river (high security) use, through a repeat of the worst period of low inflows.

Water determinations for high security access licences must take into account environmental water provisions, stock and domestic, and town water utility requirements. An available water determination will not be made for regulated river general security access licences in any year until requirements for high security access licences are fully met. Once the requirement for high security access licences is met, assessments of available water will be made at least monthly, and available water determinations made for general security access licences if additional water can be provided to them.

An available water determination will be made at the commencement of each year to define the percentage of supplementary water access licence share components that can be taken. Supplementary water use is to be managed, as far as possible, to evenly share access opportunities among all supplementary water access licences. No more than 50 per cent of the supplementary water event volume may be permitted to be taken under supplementary water access licences. The taking of water under supplementary licences nominating works on the Mehi River, Carole Creek, or on rivers which receive effluent flows from the Mehi River or Carole Creek, is not permitted, or is restricted, when required to ensure the passage to the Barwon–Darling River of locally generated uncontrolled flows needed to meet the requirements of the interim unregulated flow management plan for the north-west.

For domestic and stock, local water utility, high security and supplementary water users, allocations cannot be carried over from one year to the next. Carryovers are permitted for general security access licences. The maximum that may be held in a water account at any time is 150 per cent of the access licence share component.

Two types of environmental water provisions are established: environmental health water and supplementary environmental water.

Under the environmental health provisions, approximately 56 per cent of the long-term average annual flow is to be preserved to contribute to the maintenance of basic ecosystem health. In addition, the minimum flow passed through to the Gwydir Wetlands is to be the lesser of: 500 ML/day; or the sum of flows in the Horton River at Rider, Myall Creek at Molroy, and Halls Creek at Bingara, and any water spill or pre-release for flood mitigation purposes from Copeton Dam. This flow rate represents the level at which meaningful flows can reach the wetlands to sustain core area rookeries. These passing flows can be suspended or temporarily curtailed if the Minister considers this would be environmentally beneficial to the Gwydir Wetlands. Any of these flows not passed to the Gwydir Wetlands must be used elsewhere to support fundamental ecosystem health.

In relation to supplementary environmental water, an environmental contingency allowance is to be set aside in Copeton Dam. Whenever an available water determination for general security access licences is made, the environmental contingency allowance account is to be credited with a volume equal to the lesser of:

- 45 000 ML multiplied by the percentage of share component specified in the available water determination; and
- 90 000 ML minus the volume currently in the account.

Water in the environmental contingency allowance account may be released under a release program prepared each year, based on advice from a committee consisting of representatives of irrigator, landholder and conservation interests and government agencies. The program will establish guidelines for the release of water for any of the following purposes:

- to support a colonially nesting native bird breeding event that has been initiated in the Gwydir wetlands following natural flood inundation;
- to provide additional inundation in the Gingham and Lower Gwydir wetlands during or following periods of extended dry climatic conditions;
- to provide inundation of higher level benches in the river reaches between Copeton Dam and the Gwydir River at Gravesend;
- to provide short-term inundation of the wetlands to promote germination of hyacinth as part of a weed management strategy involving a wetting and drying cycle;
- to provide flows for environmental purposes in effluent streams;
- to support native fish populations and habitat;
- to support invertebrates and other aquatic species;

- to support threatened species; and
- to maintain aquatic ecosystem health.

The rules controlling the taking of supplementary flows also contribute to the maintenance of basic ecosystem health. Thresholds and limits are put in place to optimise native fish breeding requirements and to enable the passage of fish across the major weirs in the Barwon–Darling River (of which the Gwydir River is a tributary), as required in the interim unregulated flow management plan for the north-west. In addition, environmental impacts are taken into account when considering water delivery and channel constraints, and rates of change to releases from Copeton Dam.

The draft plan noted that wetlands of the Lower Gwydir are listed as internationally important under the Ramsar Convention. The fauna of the wetlands includes endangered and vulnerable species and species protected under international migratory bird agreements.

The New South Wales Government's assessment of the plan against the SWMOP targets notes that the National Parks and Wildlife Service considers the environmental flow rules provide only the minimum necessary to protect these species. The rules include the environmental contingency allowance of 45 gigalitres (GL). A dissenting report to the draft Gwydir water sharing plan referred to a scientific study which recommended a significantly greater environmental contingency allowance.

Lachlan Regulated River Water Source

Under the plan, the long-term average annual extraction limit is the lesser of:

- the long-term average annual extraction from the water source that would occur with: the access licence share components existing at the plan's commencement; the water storages, private water management infrastructure and cropping mix that existed in 1999-2000; the maximum crop area and the crop planting behaviour adopted as representative of baseline conditions for assessment of the cap under the Murray–Darling Basin Agreement; and the water management rules defined in the plan – resulting in an extraction volume of 305 000 ML/year; or
- the long-term average annual extractions that would occur under the baseline conditions used for assessment of the cap under the Murray–Darling Basin Agreement, resulting in an extraction volume of 315 000 ML/year.

The extraction limit represents a 10 000 ML, or 3.2 per cent, reduction over the 1993-94 Murray–Darling Basin Ministerial Council cap on diversions.

The total water volume specified on all access licences is 647 958 ML/year, comprised of:

- 13 100 ML/year for licences for domestic and stock supply (additional current requirements for domestic and stock rights are estimated to be 4211 ML/year);
- 15 539 ML/year for local water utility supply;
- 26 472 ML/year for regulated river (high security) access licences; and
- 592 847 ML/year for regulated river (general security) access licences.

In addition, at the commencement of the plan, a yet to be specified volume will be assigned to Jemalong Irrigation Limited under a regulated river (conveyance) access licence.

The water supply system is to be managed to enable supply to meet domestic and stock rights, and water utility and regulated river (high security) use through a repeat of the worst period of low inflows.

Water determinations for high security access licences must take into account environmental water provisions, stock and domestic, and town water utility requirements. An available water determination will not be made for regulated river general security access licences in any year until requirements for high security access licences are fully met. There is no supplementary water available under the plan.

The plan limits the annual volume that may be taken under or assigned from regulated river (general security) access licences to:

- in 2003-04, 75 per cent of the licence share component volume plus the volume of water assigned to the access licence account from another access licence account during that year; and
- for the remainder of the plan, the percentage of licence share components necessary to ensure the long-term average annual extraction from the water source meets the long-term extraction limit.

For domestic and stock, local water utility and high security water users, allocations cannot be carried over from one year to the next. Carryovers are permitted for general security access licences, but the maximum that may be held in a water account at any time is 136 per cent of the access licence share component.

The Minister is to establish a compliance assessment advisory committee to provide advice regarding assessments of the long-term extraction limit, current long-term average extraction and compliance with the long-term extraction limit. In providing its advice, the committee is to consider possible improvements to:

- the process for assessing current long-term average annual extractions;
- the computer model for assessing long-term extractions;

- the data used in the computer model; and

- the effect of any actions taken when assessments indicate reductions in extractions are necessary to return the long-term average annual extraction to the long-term extraction limit.

The committee is to consist of government agency staff and representatives from local government, the irrigation industry and nature conservation interests. Membership is to be for five years.

Two types of environmental water provisions are established: environmental health water and supplementary environmental water.

Under the environmental health provisions, approximately 75 per cent of the long-term average annual flow is to be preserved to contribute to the maintenance of basic ecosystem health.

Supplementary environmental water rules apply to the management of releases from Wyangala Dam. Translucent releases may be made from the dam during the period 15 May to 15 November only if the inflows to the dam since 1 January of that calendar year have exceeded 250 000 ML. New South Wales advised that this limit was recommended by the water management committee to achieve a more equitable sharing of water between the environment and general security licence holders. Inflows to the dam have exceeded 250 000 ML in around 80 out of 100 years. The Minister will conduct a review of this limitation before the end of the fifth year of the plan.

These releases are to be made when the combination of Wyangala Dam inflows and downstream tributary inflows would be sufficient to produce a flow downstream of Lake Brewster of greater than:

- 4000 ML/day when the volume of water held in Wyangala Dam is less than or equal to 50 per cent of the full supply volume, or

- 3500 ML/day when the volume of water held in Wyangala Dam is more than 50 per cent of the full supply volume.

Releases are only to be made when the flows passing downstream of Lake Brewster Weir, less downstream water orders and replenishment flows (and associated losses), and any flow resulting from airspace releases, are less than 350 000 ML in the period 1 June to 30 November.

In addition, the plan establishes rules for management of environmental contingency allowances held in Wyangala Dam and Lake Brewster. Ten thousand megalitres is to be credited to the accounts for each of the two allowances:

- on 1 July each year, if the total volume of water in the water allocation accounts of general security access licences exceeds 50 per cent of the total volume of general security access licence share components, or

- if no credit occurred on 1 July, when the volume of water in the water allocation accounts of general security access licences at 1 July, plus the volume of water provided by available water determinations for those licences during the water year, is equivalent to 75 per cent of the total general security access licence share components.

Water in the allowance accounts may be released for ecological purposes, including completion of waterbird breeding events, promotion of fish breeding and fish passage, wetland watering and increasing flow variability. Water remaining in the allowance account cannot be carried over to the next year.

The plan also establishes supplementary environmental water rules for the management of a water quality allowance. A volume of 20 000 ML is to be credited to the water quality allowance account on 1 July each year. Water in the account may be released for any water quality management purpose but, in particular, for reduction of salinity levels and mitigation of blue-green algae impacts. Credits remaining in the account cannot be carried over.

Murrumbidgee Regulated River Water Source

The plan establishes a long-term average annual extraction limit which is the lesser of:

- the long-term average annual extractions from the water source that would occur with the water storages, access licence share components and water use development that existed in 1999-2000, and the water management rules defined in the plan, resulting in an extraction volume of 1 925 000 ML/year; or

- the long-term average annual extractions that would occur under the baseline conditions used for assessment of the cap under the Murray–Darling Basin Agreement, resulting in an extraction volume of 1 980 000 ML/year.

The extraction limit proposed under the plan therefore represents a 55 000 ML/year, or 2.8 per cent, improvement over the 1993-94 Murray–Darling Basin Ministerial Council cap on diversions. After the fifth year of the plan, the average long-term extraction volume is estimated to be 1 890 000 ML/year, a 4.5 per cent improvement over the cap.

The plan does not make allowance for the possibility that the Murrumbidgee River will supply some of the additional water required by the River Murray under the Murray–Darling Basin Commission's environmental flows project. New South Wales advised that this issue would need to be considered by the new Government.

The total water volume specified on all access licences is 2 993 428 ML/year. This is comprised of:

- 35 572 ML/year for licences for domestic and stock supply (additional current requirements for domestic and stock rights are estimated to be 4560 ML/year);
- 23 403 ML/year for local water utility supply;
- 298 021 ML/year for regulated river (high security) access licences;
- 2 043 432 ML/year for regulated river (general security) access licences;
- 243 000 ML/year for the Murrumbidgee Irrigation (conveyance) access licence;
- 130 000 ML/year for the Coleambally Irrigation (conveyance) access licence; and
- 220 000 ML/year for supplementary water access licences.

The water supply system is to be managed to enable available water determinations to:

- fully meet the requirements for domestic and stock, and local water utility access licences through a repeat of the worst period of low inflows on record; and
- meet 95 per cent of requirements for regulated river high security access licences in such circumstances.

An available water determination will not be made for regulated river general security access licences in any year until the 95 per cent requirement for high security access licences is met. A water determination for general security access licences is to be made at the commencement of each year if water is available. If water is not fully available, further water determinations will be made monthly. A water determination for a supplementary water access licence share component is also to be made at the commencement of each year.

The plan includes rules for extractions where the extraction components of an access licence do not specify the rate as a share of supply capacity or a volume per unit of time (clause 49). New South Wales advised that most licences now have a share component. For some areas within the river, it is necessary to specify supply capacity limits due to the physical constraints of the river.

For domestic and stock, local water utility, high security and supplementary water users, unused allocations cannot be carried over from one year to the next. The water allocations credited to a general security access licence account, from available water determinations in any year, plus the volume of water carried over from the previous year cannot exceed 100 per cent of the licence share component. For general security access licences, the maximum allocation that may be carried over from one year to the next is 15 per cent of the access licence share component. This may be increased to 50 per cent for

zones within the water source, following the completion of a review to be undertaken within the first three years of the possible impact of such a change.

Two types of environmental water provisions are established: environmental health water and supplementary environmental water.

Under the environmental health provisions, approximately 56 per cent of the long-term average annual flow is initially preserved to contribute to the maintenance of basic ecosystem health. By the fifth year of the plan, 57 per cent of flow will be reserved for the environment. The provisions initially ensure minimum end of system flows at Balranald of 200 ML/day when available water determinations for regulated river (general security) access licences, plus water allocations carried over, amount to less than 80 per cent of licence share components. The minimum flow rate increases to 300 ML/day when more than 80 per cent of licence share components is available. The environmental water cannot be used to meet access licence water requirements or basic landholder rights requirements below Balranald. From July 2008, the minimum flow at Balranald is to be 300 ML/day, plus an amount equivalent to 40 per cent of the 95th percentile natural daily flow rate (after adjusting for the 300 ML already allocated, irrespective of available water determinations, to regulated river general security access licences).

Under the supplementary environmental water provisions, rules are established for transparent releases of water for environmental flow use from Blowering Dam of up to 560 ML/day, and from Burrinjuck Dam of up to 615 ML/day, coincident with dam inflows. Rules are also established to provide further releases between April and October of some proportion of inflows (known as translucent releases) from Burrinjuck Dam coincident with dam inflows. The plan also establishes three environmental water allowances:

- The first allowance of up to a maximum of 50 000 ML in any year is to be credited when the available water determinations for the current year, and carryovers from the previous year, for general security access licences total at least 60 per cent of the general security access licence share components. New South Wales advised that this 60 per cent trigger point reflected a trade-off made through the committee process based on modeling of the environmental effects. The allowance will be the volume of water in excess of that required to meet the 60 per cent trigger. Water remaining at the end of each year may be carried over, up to a maximum of 50 000 ML. However, during any flow event where water is spilled from Blowering or Burrinjuck dams, the environmental water allowance carried over will be reduced in proportion to the water spilled, up to a limit of 50 per cent of the water carried over from the previous year.

- Whenever a transparent release from Burrinjuck Dam is made, the second allowance will be credited with a volume equal to the storage inflow from which the release was determined, less 300 ML. Each day that translucent releases from Burrinjuck Dam are made, 315 ML will be credited to the allowance. Only water remaining in the allowance at the end of each year

that was not carried forward from the previous year may be carried over to the following year.

- The third environmental water allowance will be credited when the available water determinations, and carryovers from the previous year, for general security access licences total at least 80 per cent of the general security access licence share components. A maximum limit for this allowance is determined by rules relating to transparent release volumes and the month of the year. The allowance cannot be credited from January to June.

Releases of water from the environmental water allowances are expected to provide environmentally beneficial outcomes for water bird breeding, wetland inundation, fish passage and breeding, and water quality. This water cannot be used by access licence holders or to meet water requirements in another water source that result from water transfers. Before the commencement of each year, detailed release rules are to be developed which address the ecological objectives. Releases from the third allowance are to occur first, followed by carryover water in the second allowance. The remaining second allowance water then takes precedence over water in the first allowance that has been carried over from the previous year, and the remaining first allowance water. An environmental water allowance reference group may be established by the Minister to provide advice on the release rules.

As part of the system operating rules, the plan establishes two provisional storage volumes for the purposes of increasing the size and frequency of spill events and the water availability in the following season.

The Minister may amend the supplementary environmental water rules and the provisional storage volume rules following completion of a review of the provisions against the objectives of the plan. The review would be required to consider and make recommendations on changes which would:

- maximise the accrual of water and early season access to environmental water allowances and minimise forfeiture from environmental water allowances; and

- improve environmental outcomes, in particular by:

  - providing flow patterns which better match natural variability and seasonality in the upper river,

  - improving the extent and seasonal timing of mid and lower river wetland inundation, and

  - better matching natural flow variability and seasonality in the end of the system.

Any amendment to the supplementary environmental water rules and the provisional storage volume rules is not permitted to result in a change to the long-term extraction limit of greater than 0.5 per cent.

In relation to many of the environmental targets in the SWMOP, New South Wales has assessed the water sharing plan as making a low or partial contribution (schedule 2 of the water sharing plan). The New South Wales assessment against the SWMOP targets notes the following.

- The system is in the Lower Murray area which has been listed as an endangered ecological community, with river regulation specifically identified as a major cause. (For example, eight aquatic species in the Murrumbidgee have been listed as threatened.) The plan will not eliminate this problem.

- While environmental objectives have been identified for the use of environmental water allowances, the triggers for releases are not specified.

- The environmental flow rules focus on wetland inundation in the middle reaches. However, the frequency of the highest flows in the Tumut junction to Carrathool reach will be marginally reduced compared to the cap.

- The supplementary water access rules do not take into account environmental considerations, although there is provision for these considerations to be introduced during the life of the plan.

- The rules applying after the fifth year of the plan improve the frequency of flows that are less than the natural 80th percentile exceedance flow, in line with the SWMOP target. However, the SWMOP target is not met for flows greater than the natural 80th percentile and the frequency of flows greater than the natural 20th percentile has been reduced.

- The plan includes rules that improve low flows at the end of the system after year five, so that flows only drop below the natural 95th percentile flow 20 per cent of the time rather than 41 per cent of the time at the commencement of the plan. However, the SWMOP target is for protection of these flows to be extended up to at least the predevelopment 95th percentile.

Reports from New South Wales Fisheries (Harris and Gehrke 1997) and the New South Wales National Parks and Wildlife Service (Kingsford and Thomas 2001) concerning the Murrumbidgee River have indicated that fish and waterbird communities have severely declined.

New South Wales advised that the environmental water rules in the plan target wetlands in the middle of the river system. For the lower wetlands, New South Wales indicated that it is undertaking a study of how best to manage the wetlands, with a view to preparing a management plan. The study is expected to take eighteen months to two years. As there is scope for small changes to the long-term extraction limit in the water sharing plan, New South Wales expects the amount of water delivered to the lower wetlands to be sufficient for environmental purposes given their already degraded state.

Murray and Lower Darling Regulated River Water Source

The plan applies to the regulated sections of the River Murray and Lower Darling River system that lie within the management jurisdiction of New South Wales. The area covered includes the River Murray downstream of the upper reaches of Hume Dam to the New South Wales–South Australian border, and the Lower Darling River from the junction of the River Murray upstream to the influence of the weir pool of Lake Wetherell, including the Menindee Lakes. These water sources are under joint government control through the Murray–Darling Basin Ministerial Council. This places limits on the extent of management of the total flow regime by any single jurisdiction.

Under the plan, the long-term average annual extraction limit is the lesser of:

- the long-term average annual extraction from the water source that would occur with the water storages, share components and water use development that existed in 2000-01, and the water management rules defined in this plan, resulting in an extraction volume of 1 973 000 ML/year; or

- the long-term average annual extractions that would occur under the baseline conditions used for assessment of the cap under the Murray–Darling Basin Agreement, resulting in an extraction volume of 2 036 000 ML/year.

The extraction limit represents a 63 000 ML, or 3.1 per cent, reduction over the 1993-94 Murray–Darling Basin Ministerial Council cap on diversions.

The plan provides for the long-term average annual extraction limit to be adjusted as a result of system efficiency savings made as a consequence of the release of water to the Snowy River under the Snowy Water Inquiry Outcomes Implementation Deed.

The plan does not make allowance for the possibility that the Murray and Lower Darling regulated river water source will supply some of the additional water required by the River Murray under the Murray–Darling Basin Commission's environmental flows project. New South Wales advised that this issue would need to be considered by the new Government.

The total water volume specified on all access licences is 3 078 421 ML/year, comprised of:

- 15 119 ML/year for licences for domestic and stock supply, with 14 518 ML/year from the River Murray and 601 ML/year from the Lower Darling River (additional current requirements for domestic and stock rights are estimated to be 2118 ML/year from the River Murray and 3727 ML/year from the Lower Darling);

- 43 496 ML/year for local water utility supply, with 33 336 from the River Murray and 10 160 ML/year from the Lower Darling River;

- 206 010 ML/year for regulated river (high security) access licences, with 198 011 from the River Murray and 7999 ML/year from the Lower Darling River;

- 1 983 796 ML/year for regulated river (general security) access licences, with 1 953 508 from the River Murray and 30 288 ML/year from the Lower Darling River;

- 330 000 ML/year for regulated river (conveyance) access licences from the River Murray; and

- 500 000 ML/year for supplementary water access licences, with 250 000 ML/year from each of the River Murray and Lower Darling River systems.

If assessments for three consecutive years indicate that the current long-term average annual extraction from the water source exceeds its long-term extraction limit, the available water determination made for supplementary water access licences will be reduced. Once the available water determination for supplementary water access has been reduced to zero, the determination for general security access licences will be reduced.

The water supply system is to be managed to enable supply to be maintained for domestic and stock and water utility requirements, as well as 100 per cent of regulated river (high security) requirements in the Lower Darling and 97 per cent in the River Murray, through a repeat of the worst period of low inflows.

Water determinations for high security access licences must take into account environmental water provisions and requirements for stock and domestic and town water utility supply. An available water determination will not be made for regulated river general security and/or conveyance access licences in any year until requirements for high security access licences are fully met.

A water determination for supplementary water access is also to be made at the commencement of each year. Extraction of supplementary water will be managed to evenly share access opportunities among all supplementary water access licences. Extractions may not be permitted if supply requirements for South Australia have not been met or if salinity levels in the River Murray at Morgan are above a set level. In addition, extractions will only be permitted if the Minister considers that the water that will be taken would not assist in the reduction of existing medium or high blue-green algae alerts, or would not prevent or threaten the success of a waterbird breeding event. There are also constraints directed at the provision of fish passage and beneficial flooding of riverine ecosystems.

Water allocation remaining in the accounts of domestic and stock, local water utility, regulated river (high security and conveyance) and supplementary water access licences cannot be carried over from one year to the next. The

maximum volume that may be carried over by general security access licence holders is 50 per cent of the access licence share component. In addition, general security access licence holders in the Lower Darling water source can carryover the storage volume of on-farm storages supplied by works nominated on the access licence less the volume of water contained in the on-farm storages at the end of the water year.

Three types of environmental water provisions are established: environmental health water; supplementary environmental water; and adaptive environmental water.

Under the environmental health provisions, water in excess of the long-term extraction limits may not be taken from this water source and used for any purpose.

The plan establishes supplementary environmental water rules for the management of three environmental water allowances:

- New South Wales Barmah–Millewa allowance – to provide a flood event for an important wetland system, where up to 50 000 ML/year is to be made available and credited to the allowance each year. The maximum credit to be held in the allowance is 350 000 ML and releases in the form of overdraws are permitted. (This volume represents the contribution by New South Wales and does not include the contribution by Victoria.) Whenever Hume Dam spills, and the volume in the allowance at the time of the spill exceeds 100 000 ML, the allowance is debited by a volume equal to the lesser of the New South Wales share of the volume of water spilled, or the volume held in the account at the commencement of the spill minus 100 000 ML. Releases of water are timed to coincide with natural high river flows in spring once the flow at Yarrawonga has exceeded a set trigger level (500 000 ML) in a four week period. Water in the allowance is borrowed for irrigation purposes whenever water available to general security access licences is less than 30 per cent of the total volume of the share components of all Murray water source regulated river general security access licences;

- Lower Darling allowance – to provide flushing flows whenever a high blue green algal alert level, as set out in the Sunraysia regional algal contingency strategy, is announced by the Minister in the Lower Darling water source. No water is credited to the allowance if the volume stored in the Menindee Lakes is less than 480 000 ML or if the volume has not risen above 640 000 ML since the volume stored last fell below 480 000 ML. Otherwise, 30 000 ML will be provided to the allowance minus any water released during the present water year; and

- New South Wales Murray regulated river water source additional allowance – to provide water to address the environmental health objectives of the plan. The maximum credit held in the allowance at any time is equal to 15 per cent of the total volume of the share components of regulated river high security access licences. The allowance is to be credited with a volume equivalent to three per cent of the total volume of

the share components of Murray water source high security access licences at the end of any water year when the sum of allocations to the high security access licences for the water year has not exceeded 97 per cent.

Under the adaptive environmental water provisions, the plan provides for a regulated river (conveyance) access licence with a share component of 30 000 ML, and a regulated river (high security) access licence with a share component of 2027 ML, to be granted and held by the Ministerial Corporation. The management of water allocations accruing to these access licences is to be in accordance with a protocol established by the Minister in consultation with the Minister for the Environment.

New South Wales advised that the supplementary environmental water provisions are primarily aimed at wetland health and have been based on advice from the New South Wales Murray Wetland Advisory Committee. New South Wales indicated that, while the plan does not provide any significant additional environmental water other than for the wetlands, it considers that significant improvements have been made over the past four to five years.

Upper Namoi and Lower Namoi Regulated River Water Source

Under the plan, the long-term average annual extraction limit is the lesser of:

- the long-term average annual extractions from the water source that would occur with the water storages, access licence share components and water use development that existed in 1999-2000, and the water management rules defined in the plan, resulting in an extraction volume of 238 000 ML/year; or

- the long-term average annual extractions that would occur under the baseline conditions used for assessment of the cap under the Murray–Darling Basin Agreement, resulting in an extraction volume of 256 000 ML/year.

The extraction limit represents an 18 000 ML, or 7 per cent, reduction over the 1993-94 Murray–Darling Basin Ministerial Council cap on diversions. The current long-term average annual extraction from these water sources, plus 95 per cent of the growth in extraction by Tamworth City Council, is not permitted to exceed the long-term extraction limit. The remaining 5 per cent of the growth in extraction by Tamworth City Council is to be provided for in the water sharing plan for the Peel River.

The total water volume specified on all access licences is 374 353 ML/year, of which 364 348 ML/year is for the Lower Namoi and 10 005 ML/year for the Upper Namoi. The total is comprised of:

- 2013 ML/year for licences for domestic and stock supply (additional current requirements for domestic and stock rights are estimated to be 1936 ML/year);
- 2421 ML/year for local water utility supply;
- 3498 ML/year for regulated river (high security) access licences;
- 256 421 ML/year for regulated river (general security) access licences; and
- 110 000 ML/year for supplementary water access licences (all in the Lower Namoi).

The water supply system is to be managed to enable supply to be maintained to those exercising domestic and stock rights through a repeat of the worst period of low inflows. Growth in extractions by Tamworth City Council is to be accommodated by reducing water determinations for supplementary access licences and, subsequently, for general security access licences.

Water determinations for high security access licences must take into account environmental water provisions, stock and domestic and town water utility requirements. An available water determination will not be made for regulated river general security access licences in any year until requirements for high security access licences are fully met.

When water determinations made for general security access licences in the Upper Namoi Regulated River water source are less than or equal to 60 per cent of licence share components, uncontrolled flows may be extracted without debit to access licence accounts within certain constraints.

For the Lower Namoi Regulated River water source, an available water determination will be made at the commencement of each year to define the percentage of supplementary water access licence share components that can be taken. Supplementary water use is to be managed, as far as possible, to evenly share access opportunities amongst all supplementary water access licences. The taking of water under supplementary licences will be restricted when required to ensure outflows from the Lower Namoi Regulated River water source contribute to meeting the requirements of the interim unregulated flow management plan for the north-west.

For domestic and stock, local water utility, high security and supplementary water users, and for access licences in the Upper Namoi Regulated River water source, allocations cannot be carried over from one year to the next. Carryovers are permitted for general security access licences in the Lower Namoi Regulated River water source, but the maximum that may be held in a water account at any time is 200 per cent of the access licence share component.

Two types of environmental water provisions are established: environmental health water and supplementary environmental water.

Under the environmental health provisions, approximately 73 per cent of the long-term average annual flow is to be preserved to contribute to the maintenance of basic ecosystem health. For the months of June, July and August, the plan provides for a minimum daily end of system flow of 75 per cent of the natural 95th percentile daily flow for each month.

The rules controlling the taking of supplementary flows also contribute to the maintenance of basic ecosystem health. Thresholds and limits are put in place to optimise native fish breeding requirements and to enable the passage of fish across the major weirs in the Barwon–Darling River (of which the Namoi River is a tributary), as required in the interim unregulated flow management plan for the north-west. The supplementary water rules also contribute to maintaining natural flow variability and to protecting important rises in water levels, thereby maintaining wetland and floodplain inundation. In addition, environmental impacts are taken into account when considering water delivery and channel constraints, rates of change to releases from water storages and the bulk transfer of water from Split Rock Dam to Keepit Dam.

Unregulated river plans

Kangaroo River Water Source

The water sharing plan establishes four flow classes and sets total daily extraction limits for each class. These classes and limits, and other rules in the plan, are intended to protect water for the environment by limiting both the volume of water extracted and the rate of extraction in different flow ranges.

At the commencement of the plan, the water requirements for extraction under access licences are estimated to be 4313 ML/year. The water requirements of domestic and stock rights are estimated at an additional 1047 ML/day and native title rights at 73 kilolitres/day.

The long-term average annual extraction limit is set at the total of:

- the quantity of water specified in entitlements immediately before the commencement of the Water Management Act for this water source; and

- an estimate of the annual extraction of water under domestic and stock rights, and native title rights, in the water source at the commencement of the plan.

The plan permits water extractions from very low flows for basic rights holders and by access licences in all categories from years two to eight of the plan. The provision for the environment amounts to 40 per cent of flows at the

upper limit of low flows, 66 per cent at the upper limit of medium flows and upwards from 77 per cent during high flows.

Limits apply to the water allocation that can be carried over from one year to the next (100 per cent from 2003-04 to 2004-05, 200 per cent from 2004-05 to 2005-06, and thereafter the sum of the previous two available water determinations). In any year, water taken under an access licence may not exceed twice the water allocation accrued under the licence that year.

The plan establishes four flow classes (clause 17) as a basis for sharing daily flows and establishes total daily extraction limits (clauses 45, 46 and 62):

- a very low flow class: in the first year, up to 2.96 ML/day on a falling river and up to 4 ML/day on a rising river; in the second year, up to 4 ML/day on a falling river and up to 5.4 ML/day on a rising river; and in years three to 10, up to 5.4 ML/day on a falling river and up to 7 ML/day on a rising river – no extraction is permitted during years one, nine and 10; 2 ML/day during year two (50 per cent of the upper limit of very low flows); 3.4 ML/day during years three to five (63 per cent of the upper limit of very low flows); and 2.44 ML/day during years six to eight (45 per cent of the upper limit of very low flows);

  – where extractions are permitted after seven consecutive days of flow conditions under which pumping is not permitted, extraction is required to cease when flow is at or below 2 ML/day (for years two to five) and 2.96 ML/day (for years six to eight) or after 10 days of consecutive access to very low flows;

- A class flows: in the first year, from 2.96 ML to 30 ML/day on a falling river and from 4 to 30 ML/day on a rising river; in the second year, from 4 to 30 ML/day on a falling river and from 5.4 to 30 ML/day on a rising river; and in years three to 10, from 5.4 to 30 ML/day on a falling river and from 7 to 30 ML/day on a rising river – with extractions of up to 18 ML/day permitted (60 per cent of the top of A class flows);

- B class flows: from 30 ML/day to 118 ML/day – with extractions of up to 40 ML/day permitted (34 per cent of the top of B class flows); and

- C class flows: greater than 118 ML/day – with extractions of up to 48 ML/day permitted (based on 23 per cent of the 30th percentile flows in December).

Water is allocated for the environment in each of the flow classes (clause 21):

- in very low flows: in years one, nine and 10, the flow minus 1.12 ML/day (the amount of water estimated at the commencement of the plan for basic landholder rights); in the second year, the flow minus 3.12 ML/day; in years three to five, the flow minus 4.52 ML/day; in years six to eight, the flow minus 3.56 ML/day (which, for years two to eight, is the amount of water estimated at the commencement of the plan for basic landholder rights and the very low flow daily extraction limit);

- in A class flows: the flow minus 19.12 ML/day (the total daily extraction limit for A class flows plus basic landholder rights at the commencement of the plan);

- in B class flows: the flow minus 41.12 ML/day (the total daily extraction limit for B class flows plus basic landholder rights at the commencement of the plan); and

- in C class flows: the flow minus 49.12 ML/day (the total daily extraction limit for C class flows plus basic landholder rights at the commencement of the plan).

The definition of A class flows encompasses a daily flow of less than the permitted total extraction (including basic landholder rights) of 19.12 ML/day. This suggests it is possible that no water may be available for environmental purposes when the flow is less than 19.12 ML/day if the permitted total extraction is taken up. A similar outcome could occur for B class flows. New South Wales confirmed that, if all users were taking their daily access, there may be no environmental share. However, it considered this to be a very unlikely event (during medium flows) which, in any case, would be likely to trigger a lower flow class and possibly a cease-to-pump notification. The Department of Land and Water Conservation also intends to encourage irrigators to establish water user groups, if one does not currently exist, for the purpose of rostering. New South Wales advised that the five-yearly review of the plan and the annual review of its related implementation program would ensure action was taken if problems arose.

The draft plan reported that the water management committee sought the advice of an inter-agency scientific panel (comprising New South Wales National Parks and Wildlife Service, New South Wales Fisheries and the Department of Land and Water Conservation) regarding the environmental health water requirements for the Kangaroo River (Part A, p. 11). The scientific panel recommended a minimum environmental health water volume of 7 ML/day (ie the cease-to-pump limit). The panel considered that below 7 ML/day there is an increasing risk of not meeting some of the objectives recommended by the committee, most notably the protection of pool and riffle habitats or aquatic dependent biota. The independent external peer review of the scientific panel suggested that the data could support a higher cease-to-pump limit than the 7ML/day proposed by the panel (Part A, p. 12). In addition, in terms of the protection of threatened biota, the most significant species for the Kangaroo River is the Macquarie Perch recorded in the lower reaches. It was not clear to the panel that the minimum environmental health water volume of 7 ML/day would meet the requirements of the Macquarie Perch.

The draft plan also indicated that the flow rules proposed probably did not meet the requirements of fish at very low flows, but were a trade-off between environmental flows and the social and economic needs of water users. In addition, the draft plan indicated that a cease-to-pump limit for both basic rights and licensed users would help to ensure that pools remain connected to

one another (allowing limited fish migration) and water quality (particularly dissolved oxygen levels) is maintained during dry periods (Part A, p. 14).

Upper Brunswick River Water Source

The water sharing plan establishes three flow classes and sets total daily extraction limits for each class. These classes and limits, and other rules in the plan, are intended to protect water for the environment by limiting both the volume of water extracted and the rate of extraction in different flow ranges.

At the commencement of the plan, the water requirements for extraction under access licences are estimated to be 526 ML/year. The water requirements of domestic and stock rights are estimated at an additional 2.2 ML/year.

During the operation of the plan, provision is made for further allocations to existing licence holders up to a maximum of 250 ML/year. The additional allocations are contingent on licence holders surrendering their entitlement to take water during 'medium' flows in exchange for up to twice the entitlement during 'high' flows. This appears to be aimed at reducing the environmental impact from current extraction levels during medium flows.

The long-term average annual extraction limit is set at the total of:

- the quantity of water specified in entitlements immediately before the commencement of the Water Management Act for this water source;

- an estimate of the annual extraction of water under domestic and stock rights, and native title rights, in the water source at the commencement of the plan; and

- any additional access licence share component granted during the operation of the plan under the provision for further allocations to existing licence holders up to a maximum of 250 ML/year, as noted above.

The only water extractions permitted at very low flows are for domestic and stock rights, with the remainder allocated to the environment. The provision for the environment amounts to 55 per cent of flows at the upper limit of medium flows and ranges upwards from 45 per cent during high flows.

Limits apply to the water allocation that can be carried over from one year to the next (100 per cent from 2003-04 to 2004-05, 200 per cent from 2004-05 to 2005-06, and thereafter the sum of the previous two available water determinations) (clause 43 (4)). In any year, water taken under an access licence may not exceed twice the water allocation accrued under the licence that year (clause 43 (6)).

The plan establishes three flow classes (clause 17) as a basis for sharing daily flows and establishes total daily extraction limits (clause 46):

- a very low flow class, up to 2 ML/day, where the only extractions permitted are for basic landholder rights (stock and domestic etc);

- B class flows, from 2 ML/day to 9 ML/day, with extractions of up to 4.05 ML/day permitted (45 per cent of the top of B class flows); and

- C class flows, greater than 9 ML/day, with extractions of up to 5.004 ML/day permitted (based on 30 per cent of the 30th percentile flows for all days in October).

Water is allocated for the environment (clause 21) in each of the flow classes:

- in very low flows, the flow minus 0.006 ML/day (the amount of water estimated at the commencement of the plan for basic landholder rights);

- in B class flows, the flow minus 4.056 ML/day (the total daily extraction limit for B class flows plus basic landholder rights at the commencement of the plan) ; and

- in C class flows, the flow occurring in this water source minus 5.010 ML/day (the total daily extraction limit for C class flows plus basic landholder rights at the commencement of the plan).

The definition of B class flows encompasses a daily flow of less than the permitted total extraction (including basic landholder rights) of 4.056 ML/day. This suggests it is possible that no water may be available for environmental purposes when the flow is less than 4.056 ML/day if the permitted total extraction is taken up. New South Wales confirmed that, if all users were taking their daily access, there may be no environmental share. However, it considered this to be a very unlikely event (during medium flows) which, in any case, would be likely to trigger a cease-to-pump notification. The Department of Land and Water Conservation also intends to encourage irrigators to establish water user groups, if one does not currently exist, for the purpose of rostering. New South Wales advised that the five-yearly review of the plan and the annual review of its related implementation program would ensure action was taken if problems arose.

For all access licences, the initial determination of the volume of water available from July 2003 is to be two times that specified on the access licence (the access licence 'share component'). The initial determination will apply for one year (clause 38 (2d)). From July 2004 the volume of water determined to be available for all access licences is to be equivalent to the access licence share component (clause 38 (2e & 2f)).

Groundwater plans

Lower Lachlan Groundwater Source

The water sharing plan establishes an extraction limit of 80 per cent of the average annual recharge. Average annual recharge is estimated to be 120 000 ML/year, meaning on average 96 000 ML/year is available for extraction.

The draft plan noted that the relatively high extraction limit (80 per cent compared with the 70 per cent target set in the SWMOP for groundwater sources where there is significant ecosystem dependency) may result in significant impacts on discharges to the river and creeks. In the foreword to the draft plan, the Water Management Committee indicated that:

> *'the task of the Committee was made more difficult by the paucity of information relating to the long-term average recharge estimates, [and] the existence of groundwater dependent ecosystems'.* (Part A, p.4)

In view of these uncertainties, the final plan permits the extraction limit to be varied by the Minister on 30 June 2007 following further recharge studies.

The plan allocates 20 per cent of annual recharge to the environment. While there has been no detailed assessment of the needs of groundwater dependent ecosystems, an expert panel has identified wetlands and floodplain vegetation along the Lachlan River and prior streams as likely to be groundwater dependent. The groundwater source also discharges to the Lachlan River.

At the commencement of the plan, the water requirements for extraction under access licences are estimated to be 215 417 ML/year. The water requirements of domestic and stock rights are estimated at an additional 4000 ML/year.

At the end of the plan, the water requirements for extraction under access licences will be 125 per cent of the extraction limit. Reductions in access licence volumes begin in year five of the plan and continue until year 10. Therefore, at the end of year 10, water requirements for extraction under access licences will be 120 000 ML/year.

A maximum of 20 per cent of any aquifer access licence share component may be carried forward in a water allocation account from one year to the next (clause 34 (7)).

In addition to providing an allocation to the environment, the plan allows for local access rules to apply in a defined area to protect water quality within this groundwater source. The plan also provides for specific actions to address salinity issues, including the restriction of extractions.

While detailed assessment of connectivity was not undertaken, an expert panel concluded that the groundwater source would lose or gain from the river depending on the season.

The plan excludes licensed extraction from within 40 metres of any creek and from within 200 metres of wetlands. In addition, extraction from a water supply work (bore) nominated by an access licence will not be permitted within 1000 metres of another water supply work (bore) nominated by an access licence authorised to extract up to, and including, 10 ML/day. New South Wales advised that the different exclusion limits were based on technical assessments and local knowledge of the strength of connectivity between the groundwater source and the various extraction points.

Stuarts Point Groundwater Source

The water sharing plan establishes an extraction limit of 55 per cent of the average annual recharge. Average annual recharge is estimated to be 7032 ML/year, resulting in the long-term average extraction limit being set at 3868 ML/year.

At the commencement of the plan, requirements for water for extraction under access licences are estimated to be 1601.5 ML/year. This includes 300 ML/year for local water utility access licences for the Stuarts Point township and surrounding districts. Water requirements of holders of domestic and stock rights are estimated at an additional 75 ML/year. The plan provides rules for the granting of further access licences up to the extraction limit.

Several significant groundwater dependent ecosystems have been identified. To protect these ecosystems, the plan reserves for the environment:

- the long-term average storage component of the groundwater source less the extraction for basic landholder rights; and

- 45 per cent of the average annual recharge.

The plan places restrictions on the construction of new bores, and on increases in extraction from existing bores, within specified distances of high priority groundwater dependent ecosystems. Drawdown limits on groundwater levels also apply to the construction of new bores to protect these ecosystems.

Water quality is protected through the capacity for local access rules to be declared for specific local impact areas. Extraction can be restricted to the extent, and for the duration, necessary to mitigate or avoid the impact.

If water levels in any part of the groundwater source have declined to such an extent that an adverse impact is occurring, or is likely to occur, extraction from all water supply works (bores) within a local impact area may be

restricted. The restrictions may apply to the extent, and for the duration, necessary to mitigate or avoid the impact (clause 37 (2)).

The Department of Land and Water Conservation is to identify monitoring bores, specify the target levels (in consultation with stakeholders), and determine the method for specifying an affected area.

In the draft Stuarts Point water sharing plan, the Mid North Coast Water Management Committee indicated that there had been limited community liaison during the preparation of the plan as the public exhibition period was seen as the core consultative process. The Water Management Committee established a subcommittee, with irrigator members, to consider a number of issues within the plan. In finalising the plan, the estimate of the average annual recharge to the groundwater source was revised upwards (from 6216 ML/year in the draft plan to 7032 ML/year). In addition, the share of average annual recharge reserved for the environment was reduced (from 50 per cent in the draft plan to 45 per cent). New South Wales advised that these revisions were in response to the deliberations of the subcommittee, further technical work by the Department of Land and Water Conservation and public consultation more generally.

Upper and Lower Namoi Groundwater Sources

Under the water sharing plan, the Namoi groundwater aquifer system has been separated into two management areas: the Upper and Lower Namoi. Recharge is estimated to be 86 000 ML/year for the Lower Namoi and 122 100 ML/year for the Upper Namoi. The Upper Namoi has been further split into 12 zones, with average annual recharge estimated for each zone (table A2.1).

At this stage, no significant groundwater dependent ecosystems have been identified but further investigations are to be undertaken. In the interim, the plan allocates all recharge to consumptive use. The extraction limit for each of the groundwater sources (ie management areas and zones) for each year of the plan is set equivalent to the amount of recharge plus the water under supplementary access licences. Following further recharge studies, the extraction limit for zone one of the Upper Namoi may be varied by the Minister on 30 June 2005. For the Lower Namoi and the other 11 zones of the Upper Namoi, the Minister may vary the extraction limits on 30 June 2007.

At the commencement of the plan, the water requirements for extraction under access licences are estimated to be 172 187 ML/year for the Lower Namoi and 301 922 ML/year for the Upper Namoi. This includes local water utility access licences totalling 11 194 ML/year. The water requirements for domestic and stock rights are estimated at an additional 6126 ML/year.

Groundwater licence entitlements are to be managed so that the long-term average annual rate of groundwater extraction is at or below the sustainable level. Reduction factors of between zero and 87 per cent will apply to all

entitlements from day one of the plan depending on the zone or management area (see table A2.1). For example, in zones six and 10, the new licensed yearly entitlement involves no reduction, while in zone one a reduction of 87 per cent applies. These entitlement reductions are effective from July 2003 and will impact on current use to varying degrees.

Table A2.1: Licensed yearly entitlements for the Upper and Lower Namoi Groundwater Sources

Zone	*Stock and domestic (ML/year)*	*Town water supply (ML/year)*	*Existing access licence requirement (ML/year)*	*Annual recharge (ML/year)*	*Reduction factor required to meet extraction limit*
Zone 1	39	1 716	8 510	2 100	87
Zone 2	359	59	23 801	7 200	70
Zone 3	470	199	56 017	17 300	69
Zone 4	667	4 660	82 590	25 700	73
Zone 5	262	0	36 042	16 000	45
Zone 6	274	0	11 448	14 000	0
Zone 7	89	0	6 321	3 700	41
Zone 8	166	56	48 204	16 000	67
Zone 9	187	97	11 342	11 400	0
Zone 10	36	0	1 420	4 500	0
Zone 11	210	0	8 740	2 200	75
Zone 12	73	0	7 487	2 000	73
Upper Namoi Total	2 822	6 778	301 922	122 100	61
Lower Namoi Total	3 304	4 407	172 187	86 000	51
Total	6 126	11 182	474 109	208 100	56

Note: The calculation of the reduction factors is complicated by a number of factors. For example, the access licence share components have been set at 125 per cent for zones one and five. In addition, decisions were made for each zone, where town water supply accounts for more than 50 per cent of extractions, to reallocate to irrigators any townwater usage considered to be in excess of a reasonable level. The reduction factors therefore generally cannot be derived by simple numerical calculations using the data in the table.

The plan provides for flexibility in the way individuals manage their entitlements through the provision of water account management rules including carryover.

Access licences in these groundwater sources with a history of extraction greater than the amended access licence share component (or, in zones one and five, 80 per cent of the amended access licence share component) will be issued with a supplementary water access licence. The initial share component of each supplementary water access licence will be equivalent to the history of extraction under the access licence, minus the amended access licence share component. Access to supplementary water will be phased out by the 10th year of the plan.

The extraction limit for each groundwater source each year of the plan is the recharge plus the total supplementary access provided for, less the proportion of recharge reserved as environmental health water (currently zero) (clause 27 (2)). For zones one and five, the amended access licence share components have been set at 125 per cent of the recharge, due to the uncertainty surrounding the recharge estimates.

These provisions appear to permit overallocation of the resource during the 10-year phasing out of supplementary water. New South Wales advised that the phasing arrangements are required to assist structural adjustment in the region. It considered that the risks for the environment had been adequately taken into account in determining the phasing arrangements.

The plan notes that priority will be given to recharge reviews for groundwater sources that do not currently have a numerically based model. These are zones one, two, four, five, 11 and 12. If new information becomes available, a priority for the review and update of existing models is to be given to zones three and eight.

Detailed assessments of groundwater dependent ecosystems and groundwater and surface water connectivity have not been undertaken. The foreword to the draft plan indicated that the major regulated stream, the Namoi River, is essentially a 'losing' stream, where surface water flows towards the groundwater system and is not dependent on a groundwater base flow. The lower end of the Namoi regulated river system towards Walgett appears to be a 'gaining' stream, where groundwater flows towards the surface water system, but with low dependency on groundwater base flow. The top of the Quirindi, Phillips and Werris Creek surface water systems, in the upper reaches of the Upper Namoi groundwater management area, appear from current information to be 'gaining' streams and have some level of dependence on groundwater base flow. It is also possible that the Lower Namoi groundwater system contributes base flow to the Barwon River at the lower end of the Namoi.

The plan reserves for the environment the long-term average storage component of the groundwater contained in the aquifers of zones one to 12 for the Upper Namoi and the aquifers of the Lower Namoi, less basic rights and supplementary water access. With the extraction limit set at 100 per cent of recharge, there is a possibility that the taking of basic rights and supplementary access water from the aquifer could gradually reduce the long-term storage component and impact on river base flows. New South Wales advised that buffer zones are used to manage connectivity and protect low flows in the river. During high flows, the surface water plan for the region limits extractions and therefore protects the level of recharge.

A new or replacement bore, except for the supply of basic landholder rights, cannot be constructed within a minimum distance of 500 metres of a wetland or 200 metres of a river. New South Wales advised that the different exclusion limits were based on technical assessments and local knowledge of the strength of connectivity between the groundwater source and the various extraction points.

References

ACIL Consulting 2002, *Economic Impacts of the Draft Water Sharing Plans, An Independent Assessment for the NSW Department of Land and Water Conservation*, Canberra, 12 September.

Department of Land and Water Conservation undated, *Water extraction volumes and daily flow shares in unregulated rivers,* Advice to Water Management Committees No. 6 (www.dlwc.nsw.gov.au).

—— 2002a, *State Water Management Outcomes Plan,* (www.dlwc.nsw.gov.au).

—— 2002b, *Water Management Act 2000, Structural Adjustment for Namoi Groundwater Users*, Sydney, December.

Harris, John H. and Gehrke, Peter C. (eds), New South Wales Fisheries and the Cooperative Research Centre for Freshwater Ecology 1997, *Fish and Rivers in Stress: the New South Wales Rivers Survey*, Sydney.

Kingsford, R. T. and Thomas, R. F., New South Wales National Parks and Wildlife Service 2001, *Changing water regimes and wetland habitat on the Lower Murrumbidgee floodplain of the Murrumbidgee River in arid Australia*, Report to Environment Australia, Sydney.

Minister for Land and Water Conservation 2002, *Independent report on water sharing plans,* Media Release, 18 September.

NCC (National Competition Council) 2002, *Assessment of governments' progress in implementing the National Competition Policy and related reforms, Volume two: Water reform, August 2002*, AusInfo, Canberra.