9 Northern Territory

9.1 Best practice pricing

Water and wastewater businesses should earn sufficient revenue to ensure their ongoing commercial viability while avoiding monopoly returns. To this end, governments agreed the following principles should apply:

- The jurisdictional independent pricing body should set or review prices or pricing processes for water storage and delivery and report publicly.
- To be viable, a water business should recover at least the operational, maintenance and administrative costs, externalities (defined as the natural resource management costs attributable and incurred by the water business), taxes or tax equivalents (not including income tax), the interest cost on debt, dividends (if any) and provision for future asset refurbishment/replacement. If a dividend is paid, it should be set at a level that reflects commercial realities and simulates a competitive market outcome. This is defined to be the lower bound of cost recovery.
- To avoid monopoly rents, a water business should not recover more than the operational, maintenance and administrative costs, externalities (all external costs and benefits), taxes or tax equivalent regimes, and provision for the cost of asset consumption and the cost of capital, the latter being calculated using a weighted average cost of capital. This is defined to be the upper bound of cost recovery.
- In determining prices, the independent pricing body should determine the level of revenue for a water business based on efficient resource pricing and business costs. Specific circumstances may justify transition arrangements to that level. Cross-subsidies that are not consistent with efficient and effective service, use and provision should ideally be removed.
- Where service deliverers are required to provide water services to customer classes at less than full cost, the cost of this should be fully disclosed and ideally paid to the service deliverer as a community service obligation (CSO).
- Asset values should be based on a deprival value method unless an alternative approach can be justified, and an annuity approach should be used to determine medium to long term cash requirements for asset replacement/refurbishment.
- Transparency is required in the treatment of CSOs, contributed assets, the opening value of assets, externalities (including resource management costs), tax equivalent regimes and any remaining cross-subsidies.

Future reform: Metropolitan water systems should continue movement toward the upper bound of cost recovery by 2008. Rural and regional water systems should achieve the lower bound of cost recovery, and continue to move towards the upper bound where practicable. Where upper bound pricing is unlikely and a CSO is necessary, it should be publicly reported and the government should consider alternative management arrangements. Jurisdictions' approaches to pricing and attributing the costs of water planning and management should be consistent by 2006. Water prices should be set on a consumption basis, comprising a fixed component and a variable use component, where this is cost effective.

References: 1994 Council of Australian Governments (CoAG) water reform agreement, clauses 3(a)–(d); guidelines for the application of section 3 of the CoAG strategic framework and related recommendations in section 12 of the expert group report (1998 CoAG pricing principles); Intergovernmental Agreement on a National Water Initiative

Cost recovery in issuing licences for water extraction

Assessment issue: The Northern Territory is to demonstrate that its approach to charging for water extraction licences will achieve cost recovery in accord with the CoAG pricing principles. In previous assessments, the National Competition Council found that the Northern Territory does not charge fees for licences granted under the *Water Act 1992*. For the 2004 National Competition Policy (NCP) assessment, the Council looked for the Northern Territory to provide information on the extent to which current water licence fees reflect costs.

Future reform: Signatories to the National Water Initiative are to bring into effect consistent approaches to pricing and attributing costs of water planning and management by 2006. This should involve identifying all costs associated with water planning and management, including the proportion of these costs that can be attributed to water access entitlement holders, consistent with the principle of linking charges as closely as possible to the costs of activities or products. These approaches should be consistent across sectors and jurisdictions where water entitlements can be traded.

References: 1994 CoAG water reform agreement, clauses 3(a), (d) and (e); 1996 Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ) paper; 1998 CoAG pricing principles; 1999 tripartite meeting; Intergovernmental Agreement on a National Water Initiative

The Northern Territory reported that 56 licences have been issued for surface water extraction. Of these, four are held by the Power and Water Corporation for public water supply and 52 are held by small-scale private irrigators. The total licensed entitlement for surface water extraction is 44 gigalitres a year, with the Power and Water Corporation entitled to 38 gigalitres and private irrigators entitled to 6 gigalitres.

There are 88 groundwater licences, of which 10 are held by the Power and Water Corporation for the operation of public water supply borefields, and 78 are held by private users. The total licensed groundwater extraction is 78 gigalitres a year, with the Power and Water Corporation entitled to 31 gigalitres and private irrigators entitled to 47 gigalitres.

The Northern Territory advised a taxpayer funded cost of $450 000 for water resource management associated with water extraction licences that it considers are subject to the 1994 water reform agreement.[1] This is the cost of surface water and groundwater extraction licence services provided by the Department of Infrastructure, Planning and Environment. Because it reserves 80 per cent of surface water and groundwater for environmental use, the government considers that the proportion of licensing costs attributable to water users is $90 000 (or 20 per cent of the total licensing cost of $450 000).

The Northern Territory advised that it considered two options for recovering the costs apportioned to water users: (1) a pro rata approach based on the number of licences in operation and (2) cost recovery on the basis of volumes

[1] The Northern Territory noted that the pricing obligations in the 1994 water reform agreement do not apply to groundwater harvested by small private users

extracted annually. It considered that the volumetric approach represents a more equitable way to apportion costs. This approach would add $83 000 annually to the cost base of the Power and Water Corporation, equivalent to 0.23 per cent of its revenue from public water supply customers. The corporation would need to increase water tariffs by 0.12 cents a kilolitre to recover this additional operational cost directly from customers. The Northern Territory considers that imposing such a small additional charge would not improve the efficiency of resource allocation, investment or consumption. Consequently, it has not sought to recover licensing costs through water charges. It considers that providing this subsidy does not undermine the overall policy objectives of the 1994 water reform agreement.

The Water Act provisions allow the Controller of Water Resources to require a licensee to provide any data or information deemed necessary as part of the licence conditions. The Northern Territory argued that licensees bear a significant proportion of monitoring and reporting costs, but did not provide any information to substantiate this statement.

Discussion and assessment

The National Water Initiative commits governments to bring into effect by 2006 consistent approaches to pricing and attributing costs of water planning and management. This should involve the identification of all costs associated with water planning and management, and the identification of the proportion of costs that can be attributed to water access entitlement holders consistent with the principle of linking charges as closely as possible to the costs of activities or products.

The Northern Territory and Western Australia are the only jurisdictions that do not charge for water licences. All other jurisdictions either impose a fee regime linked to the cost of licensing and associated water management activities or are considering the introduction of a cost-reflective charging regime. While it does not charge for licences, the Northern Territory may impose licence conditions that transfer responsibility for some water resource management (and thus some of the associated costs) to the Power and Water Corporation. Not charging a fee for licensing and associated water management costs to Power and Water Corporation, however, is not consistent with CoAG's intention that water use charges should include appropriate natural resource management costs.

Arising from the 1999 tripartite meeting on water, private withdrawals of groundwater are not subject to the pricing obligations in the 1994 water reform agreement for the purpose of NCP compliance assessment. Accordingly, the Council has not considered issues relating to the recovery of costs associated with private groundwater use in the 2004 NCP assessment.

Under the National Water Initiative, the Northern Territory will need to adopt by 2006 an appropriate and consistent approach to attributing the costs of water management to licence holders. Appropriate attribution will become

more important if arrangements for water trading between the Northern Territory and the Ord Irrigation Project in Western Australia are introduced (see section 9.4).

9.2 Water access entitlements

Assessment issue: The Northern Territory is to institute a statutory water access entitlement system and support systems for the consumptive use of water, separate from land. The water access entitlement system should be specified as a perpetual or open-ended share of the consumptive pool of a water source. These arrangements should be in place by 2006.

At the time of the 2003 NCP assessment, the Northern Territory had established a system of water entitlements separated from land title and specified in volumetric terms. Water licences are generally issued for up to 10 years. The Northern Territory had a register of water entitlements, but this register does not record third party interests and is available only in hard copy form from the Department of Infrastructure, Planning and Environment.

For the 2004 NCP assessment, the Council has looked for the Northern Territory to ensure its water access entitlements system and supporting arrangements are consistent with the government's commitments under the National Water Initiative. The Northern Territory will need to specify its water access entitlements as perpetual shares of water available for consumption and further develop its register of water entitlements.

References: 1994 CoAG water reform agreement, clause 4; 1999 tripartite meeting; Intergovernmental Agreement on a National Water Initiative

The Northern Territory specifies water access entitlements via surface water and groundwater extraction licences issued under the Water Act. Water entitlements are separated from land title and specified in volumetric terms. Licences are generally issued for up to 10 years, with the Minister able to approve a longer period. Subject to the Act, water resources and the rights to the use, flow and control of all water are vested in the Northern Territory Government.

Water planning in the Northern Territory is undertaken through an integrated regional resource management process covering both surface water and groundwater (see section 9.3). The government may declare water allocation plans for water control districts. The plans are set for 10 years and reviewed every five years. Water advisory committees oversee implementation of the plans.

The Northern Territory has a register of water entitlements and licences. The registry database contains details of licence holders, quantities of water and dates for renewal, but does not record third party interests. A hard copy of the register is available from the Department of Infrastructure, Planning and Environment.

Reform progress

The Northern Territory finalised a water allocation plan for the Ti-Tree Water Control District in August 2002. It is developing plans for three other districts (Darwin, Alice Springs and Daly) and expects to complete these plans in 2005. It does not intend to develop water allocation plans for the remaining two districts (Tennant Creek and Gove). The Northern Territory's progress with the three water allocation plans under development is discussed in section 9.3.

The Northern Territory monitors the need for further development of its water registry system. It advised that third party interests could be readily incorporated, but that there is no demand for this change from licence holders or financial institutions. It also advised that it may implement an Internet based system in the future.

Discussion and assessment

In previous NCP assessments, the Council found that the Northern Territory's Water Act establishes a comprehensive system of water entitlements separated from land title and specified in volumetric terms, consistent with the obligation in the 1994 CoAG water reform agreement. Licences are generally issued for up to 10 years. In the 2001 NCP assessment, the Council accepted that the ability of third parties to register an interest was not then an issue in the Northern Territory.

The National Water Initiative requires participating states and territories to introduce perpetual water access entitlements, with similar status to freehold land, and to ensure they have compatible, publicly accessible and reliable systems for registering entitlements (including any encumbrances) and (permanent and temporary) trades. The requirement that water access entitlements be specified as perpetual shares of water available for consumption will require the Northern Territory to amend its arrangements by 2006. Similarly, notwithstanding the absence of demand for water trading, the Northern Territory will need to further develop its registry of water entitlements. In its annual report, the Northern Territory stated that policy decisions arising from the National Water Initiative may prompt it to establish a more sophisticated register.

The Council considers that the Northern Territory has made satisfactory progress against its CoAG water entitlements obligations for the 2004 NCP assessment.

9.3 Water planning — providing a better balance in water use

Assessment issue: Governments are to establish water allocation systems that provide a sustainable balance between the environment and other uses of water, including by formally providing water in rivers and groundwater systems for use by the environment.

Under the 1994 CoAG water reform agreement, governments committed to determine environmental water requirements using the best available scientific information, wherever possible, and to have regard to the intertemporal and interspatial environmental water requirements needed to maintain the health and viability of river systems and groundwater basins. For river systems that are overallocated or deemed to be stressed, governments committed to provide a better balance in water use to enhance or restore the health of the river systems. Governments also committed to consider establishing environmental contingency allocations and to review allocations five years after they have been determined. In allocating water to the environment, governments agreed to have regard for the ARMCANZ/Australian and New Zealand Environment and Conservation Council (ANZECC) National Principles for the Provision of Water for Ecosystems (see appendix B).

Arising from the 1994 CoAG water reform agreement, each state and territory established a program in 1999 for implementing water allocations for priority river systems and groundwater resources. Governments committed to substantially complete their 1999 programs by 2005 (including allocations for stressed and overallocated rivers by 2001). Under the National Water Initiative, signatory governments confirmed the importance of water planning as a mechanism for assisting water management and allocation decisions. Signatory governments committed to prepare water plans for surface water and groundwater systems in which entitlements are issued, to assist with water management and allocation decisions to meet productive, environmental and social objectives. They agreed that management and allocation decisions would involve judgments informed by the best available science, socioeconomic analysis and community input. Signatory governments committed to substantially complete allocation arrangements by 2005 for overallocated and overused surface and groundwater systems covered by their 1999 implementation programs, and to prepare water plans by the end of 2007 for other systems that are overallocated, fully allocated or approaching full allocation and by the end of 2009 for other systems that are not approaching full allocation.

The Northern Territory's 1999 implementation program listed four of its six water control districts for the implementation of management strategies (including water allocation plans) by 2005. It did not identify these districts to be stressed systems. At the time of the 2003 NCP assessment, the Northern Territory had completed five major research projects on environmental flows in the Daly and Douglas rivers and a water allocation plan for the Ti-Tree Water Control District. It also had plans under way for the other water control districts covered by its 1999 program.

For the 2004 NCP assessment, the Council has asked the Northern Territory to report on progress against its 1999 implementation program and to report on any progress in its scientific research on environmental water requirements.

References: 1994 CoAG water reform agreement, clauses 4(b)–(f); 1999 tripartite meeting; Intergovernmental Agreement on a National Water Initiative

Water planning in the Northern Territory occurs through an integrated regional resource management process. Under the Water Act, a water allocation plan covering both surface water and groundwater may be developed for a declared water control district for the purpose of managing water extraction at sustainable levels.

Under its 1999 implementation program, the Northern Territory is developing water allocation plans for four of its six water control districts. The plans are set for 10 years and reviewed every five years. Water advisory committees oversee implementation of the plans. There are no stressed or overallocated rivers or groundwater systems covered by the Northern Territory's 1999 program.

Reform progress

The Northern Territory implemented the Ti-Tree Region Water Resource Strategy 2002 (comprising a water allocation plan and an ongoing work plan for the region) in August 2002. It is developing the remaining three plans — for the Katherine–Daly, Darwin and Alice Springs water control districts — and expects to declare these plans in 2005. Box 9.1 summarises the Northern Territory's progress with its water strategies.

Given that the Ti-Tree strategy is the Northern Territory's only completed water plan, the Council has considered it against the CoAG objectives for water planning in this 2004 NCP assessment. The Council has accounted for the extent to which the Northern Territory addressed the CoAG obligation to allocate an appropriate amount of water for environmental purposes in the Ti-Tree Basin.

Box 9.1: Northern Territory's progress with water allocation plans

Ti-Tree water control district

The Ti-Tree Region Water Resource Strategy (including the water allocation plan) and ongoing work plan, was declared under the Water Act on 16 August 2002. The Ti-Tree Water Advisory Committee oversees implementation of the strategy.

Darwin water control district

The preliminary draft water allocation plan has been completed. It proposes retaining a contingent provision for the environment of at least of 80 per cent of regional surface water and groundwater. The regional groundwater resource modelling is being reviewed and upgraded for the final plan. Community consultation will commence soon and the Northern Territory has scheduled the final plan for declaration in 2005.

Katherine–Daly water control district

The preliminary draft water allocation plan has been completed and is being used to regulate irrigation development for the region. Development of the final plan is under way, and regional water balances have been defined. The Daly Region Community Reference Group is conducting community consultation and expects to submit a final draft water allocation plan and a draft integrated regional land use plan to the government later in 2004.

Alice Springs water control district

Development of the draft water allocation plan is under way. Currently the main focus of activity is on defining regional water balances for the major groundwater systems. Community consultation is expected to commence soon, and the Northern Territory has scheduled the final plan for declaration in 2005.

Source: Government of the Northern Territory 2004

The Northern Territory is using the results of five major research projects on environmental flows in the Daly and Douglas rivers to provide a 'best available' scientific basis for establishing environmental flows.[2] In 2004 the government advised that:

- it intends to adopt the research recommendations on flow seasonal variability, frequency, magnitude and duration in the Daly River in the Daly Region Water Allocation Plan

- the Expert Reference Group is refining its scientific findings to aid the Daly Region Community Reference Group to finalise the water allocation plan

- it is using the research findings on the environmental water requirements of the wetlands and native woodlands in the Darwin rural area to refine regional water balance models, and is undertaking additional research to determine the water requirements for groundwater dependent ecosystems for the Darwin Region Water Allocation Plan.

Ti-Tree Region Water Resource Strategy

The Ti-Tree Basin is a 5500 square kilometre sedimentary basin located 200 kilometres north of Alice Springs in the arid zone of the Northern Territory. It services a water control district covering 14 000 square kilometres with a population of less than 500. The basin contains no permanent surface water sources, so users in the region rely on groundwater. This water is used mainly for horticulture, which is the most significant economic activity in the region, generating income of approximately $20 million a year (DIPE 2002b). Based on current trends, the Department of Infrastructure, Planning and the Environment expects the irrigated area to double in the near future.

The Department of Infrastructure, Planning and Environment developed the Ti-Tree Region Water Resource Strategy with advice from the Ti-Tree Water Advisory Committee. This committee comprised irrigators, other landholders, representatives of the community, Indigenous groups and Northern Territory Government representatives. It also included an expert hydrogeologist. The stated purpose of the strategy is to provide for the best long term use of water, balancing social and environmental protection needs while allowing for economic growth (DIPE 2002b). The strategy has a life of 10 years and will be reviewed, under the supervision of the Ti-Tree Water Advisory Committee, within five years.

As required under the Water Act, the strategy allocates water resources for defined 'beneficial uses'. The beneficial uses were determined through a

[2] The Council considered these research projects in previous assessments, finding that they provided an appropriate scientific basis for determining environmental flows.

community process and declared under the Act in August 2002. The declared beneficial uses are:

- agricultural — to provide irrigation water for primary production including related research
- cultural — to provide water to meet aesthetic, recreational and cultural needs
- environmental — to provide water to maintain the health of aquatic ecosystems
- public water supply — to provide source water for drinking purposes delivered through community water supply systems
- riparian — public rights and ownership rights to take water for rural stock and domestic purposes (DIPE 2002a).

The strategy allocates surface water across the entire water control district, but recognises three separate groundwater use zones: western, central and eastern. The strategy allocates only good quality groundwater (salinity less than 1000 milligrams a litre), which is suitable for irrigation and drinking. Table 9.1 shows the allocation of surface water and groundwater by declared beneficial use category and zone.

Table 9.1: Water allocation for the Ti-Tree Water Control District, by use

		Groundwater zone		
Water use	*Surface water*	*Western*	*Central*	*Eastern*
Agricultural irrigation	–	80%	80%	–
Public water supply	–	10%	–	–
Environmental and cultural	95%	–	–	–
Riparian — homestead and stock supply	5%	1%	1%	1%
Reserved for later allocation	0%	9%	19%	100%
Aquifer storage		680 GL	1 130 GL	1 560 GL
Annual recharge rate[a,b]		3.67 GL	3.47 GL	2.90 GL
Water use in 2002		900 ML	1.7 GL	20 ML
Sustainable yield[b]		3.2 GL	7.0 GL	nd

[a] Estimate. [b] While the strategy indicates that the total annual recharge rate is 10 040 megalitres, the CSIRO (2001) estimated it to be 1140 megalitres. **–** The beneficial use category is not declared for the specified zone. **nd** Not defined. **ML** Megalitres. **GL** Gigalitres.

Source: DIPE 2002b, pp. 6, 11

Because surface water in the basin is ephemeral, the strategy allocates it primarily for environmental and cultural uses. A small amount of stream flow and catchment runoff is allocated for stock and domestic uses. One per cent of

the groundwater in each zone is also allocated for this purpose. In the western and central zones, the strategy allocates most of the groundwater water for farm irrigation purposes, although some water in the western zone is allocated for drinking water. Allocations for drinking water and irrigation are intended to provide sufficient water to meet the likely future increase in demand as the region develops. A small contingency in the western and central zones is reserved for later allocation. Irrigation development prospects in the eastern zone are not defined, but the strategy work plan schedules the development of a water allocation plan for this zone in 2004. The new plan will allocate the water resource that is currently reserved.

The strategy permits up to 10 200 megalitres a year to be taken from the basin: 3200 megalitres a year from the western zone (equivalent to the reported sustainable yield) and 7000 megalitres a year from the central zone. The strategy notes that extraction at the maximum level for the central zone may draw down the groundwater by up to 20 metres over 290 years. The Northern Territory considers this to be an 'acceptable long term rate of loss from groundwater storage', given there are no known groundwater dependent ecosystems (DIPE 2002b, p. 12).

Because the strategy assumes the regional groundwaters have no cultural significance and no dependent ecosystems, it does not allocate groundwater for the benefit of the environment. The Ti-Tree Basin does, however, contain an intermittent wetland, Stirling Swamp, which occasionally forms from flood waters. In discussions with the Council, the CSIRO advised that this wetland is groundwater dependent and receives the discharge water from the Ti-Tree aquifers. In July 2004, the CSIRO commenced a joint project with the Northern Territory Government to determine the cultural and ecological water requirements in the water control district, including Stirling Swamp, riparian vegetation along the river and creek lines and terrestrial vegetation.

Primary responsibility for promoting, reviewing and updating the strategy lies with the Ti-Tree Water Advisory Committee. The Natural Resources Division of the Department of Infrastructure, Planning and the Environment must consult with the committee and stakeholders to ensure achievement of the water resource outcomes identified in the strategy and must assess water resources and provide the technical advice needed for informed decision making. Irrigators and the Power and Water Corporation are required to monitor water use and report in accord with the requirements of the Water Act.

There is a work plan for improving knowledge, information and management of the water resources in the water control district. Among other tasks, it foreshadows monitoring and reporting on hydrological parameters, investigating and determining the environmental and cultural significance of water resources, and initiating pump monitoring by all licence holders. The Northern Territory intends to use this information to update and extend its water allocation strategy.

Best available science

The Ti-Tree strategy sets allocations using an estimate of long term average recharge from direct rainfall (approximately 2 millimetres a year or 2 megalitres a year for each square kilometre) plus an additional estimate of flood water recharge.[3] The plan uses an estimate of total recharge for the basin (10 200 megalitres a year) to set extraction limits. The Northern Territory Government advised that it set extraction limits using CSIRO data sourced from Harrington *et al*. (1999).

There are differences between the CSIRO's estimates of recharge and those the Northern Territory used to set extraction limits for the basin. These result from differing assumptions about the area of freshwater, rainfall and flooding. As a result of the way in which the Northern Territory applied the CSIRO data, the permitted extraction under the Ti-Tree Basin water allocation plan is almost 10 times the CSIRO estimate of total recharge (10 200 megalitres a year compared with 1140 megalitres a year). The CSIRO study considered that extraction of more than 1000 megalitres a year from the Ti-Tree Basin would be unsustainable and could lead to lateral inflow of saline water and deterioration of the water resource.

The Council discussed this issue in a meeting with Northern Territory Government officials and the CSIRO. The CSIRO accepted that recharge is difficult to estimate and margins of error in the order of 30 per cent are not uncommon. It advised that it had used one method for estimating recharge, while there are a number of different approaches available. It also stated that small changes to key parameters would align its figures more closely with the Northern Territory's. The Northern Territory and the CSIRO undertook to investigate this matter over the next twelve months and report on the outcome of their investigation for the 2005 NCP assessment.

In addition, the Northern Territory advised that it did not use the universally accepted hydrological model MODFlow, but developed an in-house model for assessing the Ti-Tree Basin hydrology. Inputs included the results of the CSIRO investigation, as well as water levels in monitoring bores across the control district over the past decade. The Northern Territory did not provide any information on its model.

The strategy provides for monitoring and reporting on water quality, but does not consider the water quality implications of groundwater extraction or discuss data quality, data reliability or confidence levels in determining the water allocations. There is no evidence to indicate that the scientific methods and outputs, including the Northern Territory's in-house flow model, were peer reviewed.

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[3] The water allocation strategy cites no references, but states that recharge figures were based on 'a severe distillation of rigorous and extensive assessment work to date' supplemented using 'extrapolations, approximations and guesswork' (DIPE 2002a, p. 6).

Balancing economic, environmental and other interests

As discussed above, the stated objective of the Northern Territory Government in the Ti-Tree strategy is to set extractions to achieve the best long term use of water, balancing social and environmental protection needs while allowing for economic growth. The water allocation plan reserves most of the surface water for the environment (because the ephemeral nature of the stream flow means that there are few alternative uses for the surface water). In the central zone, permitted water extraction may draw down the aquifer, although the territory considers the extent of drawdown to be acceptable. The plan reserves some groundwater for later allocation, which could be used to accommodate future expansion of irrigation and/or for providing extra water to the environment or for other purposes.

The CSIRO work (Harrington *et al.* 1999) indicates that the sustainable yield of high quality water in the basin may be only about 10 per cent of the sustainable yield assumed in the water allocation plan. While the CSIRO analysis indicates that any long term drawdown in the groundwater level could have adverse consequences, from the lateral movement of saline groundwater, it accepted that, even if extraction of groundwater exceeds recharge, there are unlikely to be significant short term environmental consequences. The Northern Territory Government and the CSIRO are investigating this issue.

The Northern Territory advised that it will reassess the water sharing arrangements in the Ti-Tree strategy taking account of any new information gained, including from its work with the CSIRO. In making a decision on whether to alter the water allocations, the Northern Territory has undertaken to consider (through the normal water planning consultative processes) any trade-offs between setting allocations at the estimated recharge compared with permitting drawdown to accommodate economic or social interests.

Because the Northern Territory had no evidence of groundwater dependent ecosystems, it provided no specific groundwater allocation for the environment under the Ti-Tree strategy. While this is inconsistent with the precautionary principle (particularly given the CSIRO advice that Stirling Swamp receives the discharge from the Ti-Tree aquifers), the CSIRO accepts that over the short term the provisions in the strategy are unlikely to compromise the health of any groundwater dependent ecosystems in the basin. Moreover, by reserving water for future allocation, the plan provides some water to the environment for the lifetime of the water allocation plan within the strategy (Government of the Northern Territory 2004). In accord with the strategy the Northern Territory is conducting further investigations (which commenced in July 2004) to establish the extent and nature groundwater dependent ecosystems. It will consider an environmental allocation as part of the first review of the strategy.

Monitoring and adaptive management

The Water Act (s34) requires the Controller of Water Resources to implement a continuous program for assessing water resources. This program includes the investigation, collection, collation and analysis of data on the occurrence, volume, flow, characteristics, quality, flood potential and use of water resources. In addition, the strategy work plan proposes the monitoring of key parameters, the development of a water allocation plan for the eastern zone, and investigation of the potential to develop the more saline water that is currently excluded from the water allocation plan. It provides for regular reporting in newletters, fact sheets and seminars, and through the provision of an annual report to the Minister for Transport and Infrastructure, Lands and Planning and Parks and Wildlife. The work plan also proposes a review of the strategy within five years.

Stakeholder consultation and transparent processes

A committee comprising government and relevant community interests oversees the process for developing water resource strategies (including water allocation arrangements) in the Northern Territory. The process includes opportunities for stakeholder involvement. The Council understands that the Ti-Tree Region Water Resource Strategy took several years to develop and involved considerable consultation and negotiation.

Despite the time taken to develop the strategy, there is no public information on the hydrology modelling, the consultative process, stakeholder comments or the committee's responses to any comments received. The absence of information on the hydrology modelling and source references for the information used to determine available water and estimate the sustainable yields for each zone in the Ti-Tree Water Control District might have adversely affected the robustness of stakeholder contributions. The Northern Territory Government advised, however, that during development of the strategy the committee and other stakeholders had access to relevant information.

In addition, the strategy provides for regular reporting on catchment health in newletters, fact sheets and seminars. It also provides for the advisory committee to report annually on the status of the water allocation strategy to the Minister for Transport and Infrastructure, Lands and Planning, and Parks and Wildlife, although this report is not made public.

Comments from stakeholders

In a submission to the 2004 NCP assessment, the Arid Lands Environment Centre expressed dissatisfaction with the Northern Territory's progress in implementing the CoAG water reforms in the arid zone. The environment centre stated:

> *NCP assessments since 1999 demonstrate a consistent lack of attention by the NT Govt to research into environmental water requirements in the arid zone …*
>
> *In the absence of a scientific basis for determining environmental water requirements, water allocation planning in the arid zone is based on a contingency policy of depleting no more than 80 per cent of aquifer storage over a specific planning time frame (currently 100 years). In the Australian Natural Resources Atlas produced in 2001 by the Australian Land and Water Audit, the Mereenie aquifer which provides drinking water to Alice Springs was listed as over-allocated, that is, allocation for extraction exceeded sustainable yield. The 2001 NCP assessment accepted the NT Govt's stance that it considers none of its groundwater resources over-allocated because it defines sustainable yield as 'the groundwater extraction regime, measured over a specific planning time frame, that allows acceptable levels of stress and protects dependent economic, social and environmental values'.*
>
> *Clearly the determination of 'acceptable levels of stress' for arid zone aquifers should be addressed as a high priority.*
>
> *Subsequent NCP assessments in 2002 and 2003 have ignored the question of research into arid zone environmental water requirements and have made no reference to the question of aquifer over-allocation, stating only that there are no stressed or over-allocated surface water systems.*
>
> *Given the extraction regime outlined by the 80 per cent policy, and the documented depletion of the Mereenie aquifer, the Arid Lands Environment Centre considers that as a matter of priority the NT Govt should instigate research into environmental water needs in the Alice Springs region, specifically the degree of groundwater dependence of riparian vegetation and associated fauna in the Todd River, the Emily Plain and other floodout areas, and also the impact of the current groundwater extraction regime on a basin-wide basis, including the impact on any groundwater dependent or partially groundwater dependent ecosystems in groundwater discharge areas such as salt lakes associated with the Amadeus Basin.* (Arid Lands Environment Centre submission, pp. 1–2)

The Northern Territory Government acknowledged that it has insufficient scientific information on its arid zone groundwater dependent ecosystems to assist in developing a uniformly consistent method for determining environmental water requirements. Instead it uses a risk assessment approach. Under this approach the Northern Territory accords ecosystems dependent on shallow groundwater systems the highest priority. Water requirements for these ecosystems, such as the river red gum population around Alice Springs, are incorporated into existing water management processes.

The Northern Territory considers that its current water use and development proposals impose only a low risk of compromising the health of ecosystems located near deeper aquifers. It is proposing not to undertake any further research on many of the aquifers in the Alice Springs area as these are too deep for any vegetative dependency. Similarly, the Northern Territory reported no evidence to indicate that groundwater extraction has an impact on arid zone water holes. It will, however, identify priorities for research into groundwater outflow as part of the Alice Springs Regional Water Resource Strategy. It is also investigating the environmental water requirements for groundwater dependent ecosystems in the Ti-Tree Basin and will report on the outcomes or progress with its research for the 2005 NCP assessment.

In relation to the Mereenie Sandstone Aquifer, the Northern Territory Government advised that it is not practicable or cost effective to establish a uniform extraction framework over the whole aquifer. It pumps water at Roe Creek Borefield only, and its strategy is to continue to lower the groundwater level at this site to induce a greater flow elsewhere in the system. It estimates that it is cost effective to draw down the aquifer to approximately 300 metres, but at the current rate of extraction of less than 10 gigalitres a year, this would not occur for a very long time.

Discussion and assessment

The National Water Initiative committed signatory governments (including the Northern Territory) to substantially complete water allocation arrangements by 2005 for all stressed and overallocated river systems and groundwater resources on governments' 1999 implementation programs. The Northern Territory listed four water control districts on its 1999 implementation program, and proposes to implement management strategies (including water allocation plans that set the volumes of water available for consumptive and environmental uses) for all four districts by 2005. Adherence to this timetable would accord with the Northern Territory's commitments under the National Water Initiative.

The Northern Territory has completed only the water management strategy for the Ti-Tree Basin. In this strategy, the stated objective is to set extraction limits to achieve the best long term use of water, balancing social and environmental needs while allowing for economic growth. While the strategy sets extraction limits in the western zone based on the Northern Territory's estimated aquifer recharge rates, it also allows for possible long term net loss in aquifer storage (by up to 20 metres over 290 years). The Northern Territory is aware of differences between its estimate of recharge and those made by the CSIRO. Both the Northern Territory and the CSIRO agree that it is difficult to estimate recharge and will work together to develop a robust estimate of the annual recharge of the Ti-Tree basin by the time of the 2005 NCP assessment.

Most of the basin's surface water is reserved for identified water dependent ecosystems. The strategy does not identify a groundwater dependent

ecosystem, but the Northern Territory Government has commenced a number of its research projects to determine whether there are ecologies that depend on groundwater. It will update its water allocation plans on the basis of new information gained.

The Ti-Tree strategy raises some questions about the transparency of the Northern Territory processes. The strategy provides no public information on the hydrology modelling, consultative process, stakeholder comments or the committee's responses to any comments received. The absence of information has made it difficult to determine whether the strategy is based on the best available science and whether this has affected the robustness of its consultative processes. The Northern Territory is, however, working to improve its estimate of recharge to the basin and is conducting research jointly with the CSIRO to determine the water needs of basin ecosystems. The Northern Territory Government will make this information publicly available. This aspect of the Northern Territory's processes should be further considered in the 2005 NCP assessment.

Notwithstanding the questions about elements of the Ti-Tree strategy, the Council considers that the Northern Territory has satisfactorily addressed CoAG water planning obligations, including appropriate allocations to the environment, for this 2004 NCP assessment. The Northern Territory's work on estimating recharge to the Ti-Tree Basin aquifers, research into groundwater dependent ecosystems and its progress in completing water allocation plans that employ robust evaluations of the science and other public interest benefits for the remaining three water systems covered by its 1999 implementation program should be considered in the 2005 NCP assessment.

9.4 Water trading

Assessment issue: Trading arrangements in water allocations or entitlements are to be instituted to maximise water's contribution to national income and welfare, where systems are physically shared or hydrologic connections and water supply considerations permit trading. Under the 1994 CoAG water reform agreement, trading arrangements were to be finalised by 2005. The National Water Initiative extends to 2007 the timeframe for establishing institutional and regulatory arrangements that facilitate intra- and interstate trade, and requires the removal of certain barriers to trade (including the immediate removal of all restrictions on temporary trade).

In the 2003 NCP assessment, which considered intrastate trading arrangements, the Council found that the Northern Territory had removed legislative impediments to trading. In the 2001 NCP assessment, the Northern Territory advised that it had agreed in principle with Western Australia for that state's water trading arrangements to apply throughout the Northern Territory sector of stage 2 of the Ord Irrigation Project (if it proceeds).

(*continued*)

The Northern Territory is developing water allocation plans (which contain rules for trading) for four of its six water control districts, including the now completed Ti-Tree plan. In the 2003 NCP assessment, the Council found that the trading rules in the Ti-Tree plan reflect the physical and environmental constraints of the water source. The Northern Territory needs to ensure the trading rules in the remaining water allocation plans facilitate trading where water systems are physically shared or hydrologic connections and water supply considerations permit trading.

References: 1994 CoAG water reform agreement, clause 5; 1999 tripartite meeting; Intergovernmental Agreement on a National Water Initiative

The Water Act establishes water entitlements that are fully separated from land title. It permits permanent and/or temporary trading of water entitlements. Given the geographically dispersed nature of developed water resources in the Northern Territory, the Act limits trading to within a water control district. It also permits only the water allocated for consumptive beneficial uses[4] in a water allocation plan to be traded. Any other specific trading rules are specified in the water allocation plans. The Northern Territory maintains a publicly available register, which contains details of licence holders, quantities held and dates for renewal (but does not provide for third party interests to be registered).

The Northern Territory has agreed in principle with Western Australia for that state's water trading arrangements to apply throughout the Northern Territory sector of stage 2 of the Ord Irrigation Project (if it proceeds). There are no other regions in the Northern Territory where interstate trade could take place.

The Northern Territory's legislation does not provide for trade between consumptive and nonconsumptive water uses to prevent environmental and cultural water allocations from being traded to water irrigators and other water users. In addition, for the 2003 NCP assessment, the Northern Territory indicated that it will adopt two general restrictions on water trading in its water allocation plans:

1. For river systems, upstream trade will be approved only after it has been demonstrated that there will be no impact on the environmental provisions of the relevant water allocation plan.

2. For groundwater sources, trading will be restricted to within-aquifer transactions, reflecting physical and environmental constraints.

The water allocation plan for the Ti-Tree Water Control District (the only plan declared to date) restricts trading in groundwater to within-zone transactions. The restriction reflects the Northern Territory's management of groundwater resources within separate zones, as well as the need to limit the volume of extractions from each zone to a sustainable level. There are no constraints on trading within each zone.

[4] The Act lists agriculture, aquaculture, public water supply, manufacturing and riparian (rural stock and domestic) to be consumptive beneficial uses.

Reform progress

The Northern Territory has declared a water allocation plan for the Ti-Tree Water Control District and is developing the water allocation plans and trading rules for the other three districts covered by its 1999 implementation program (see section 9.2). It expects to complete these arrangements during 2005. There has been no trading in the Ti-Tree district.

Discussion and assessment

At current levels of development, water supplies in the Northern Territory are generally plentiful relative to demand. As a result, there is little, if any, demand for water trading and there has been no trade in licensed water entitlements.

The Northern Territory's water licence register is not accessible electronically and does not record third party interests. While there appears to have been little demand for water trading, and interstate trading is likely only if the Ord (stage 2) project proceeds, the National Water Initiative requires the Northern Territory to consider introducing a more sophisticated register. The initiative obliges governments to implement compatible, publicly accessible and reliable registers (including any encumbrances) by 2006.

In the 2001 NCP assessment, the Council accepted that the Northern Territory's prohibition on trade between consumptive and nonconsumptive water uses — to prevent environmental and cultural water allocations from being traded to water irrigators and other water users — is consistent with the 1994 CoAG water reform obligations.[5]

In the 2003 NCP assessment, the Council found that the general trading restrictions that the Northern Territory proposes to include in its water allocation plans, as well as the specific trading provisions in the Ti-Tree plan, reflect physical and environmental constraints, so are consistent with CoAG obligations. The Northern Territory needs to ensure the trading rules in the remaining water allocation plans facilitate trading where water systems are physically shared or hydrologic connections and water supply considerations permit trading.

Because the Northern Territory has finalised only the Ti-Tree water allocation plan, the trading of water entitlements is possible in only that district. The Northern Territory's expected timeframe of 2005 for finalising the water allocation plans for the three other districts covered by its 1999 implementation program accords with CoAG water planning and trading obligations, including obligations in the National Water Initiative.

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[5] Under the National Water Initiative, if water that is provided to meet environmental and other public benefit outcomes is held as a water access entitlement, it may be traded on the temporary market when not required for these purposes.

The Council considers that the Northern Territory has made satisfactory progress against its CoAG water trading obligations for the 2004 NCP assessment.