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Water Reforms in New South Wales

by

Stewart Smith

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EXECUTIVE SUMMARY

This paper describes the ecological sustainable development of water resources, discusses Council of Australian Government water reforms, and the NSW Government approach to implementing these reforms.

The *Protection of the Environment Administration Act 1991* defines ecologically sustainable development (ESD) as requiring the effective integration of economic and environmental considerations in decision making processes. To achieve ESD the following principles need to be implemented: application of the precautionary principle; maintenance of inter-generational equity; conservation of biological diversity and ecological integrity; and the improved valuation and pricing of environmental resources (pages 1-5). The effect of these principles on water reform is discussed.

In 1994 the Council of Australian Governments endorsed a strategic framework for the efficient and sustainable reform of the Australian water industry. The agreed reforms included changes to pricing of water, provision of environmental flows, rights to water and institutional reforms (pages 6-7).

In response to the COAG reforms, the NSW Government introduced reforms to the rural water industry in 1995 and 1997. These reforms largely follow the framework as outlined by the 1994 COAG Communique (pages 9-15).

On 1 May 1997 the Premier Hon Bob Carr MP publicly released details of the Government's Waterways Package. This largely covered reforms to water and sewage supply in the Sydney metropolitan area. The Waterways Package is reproduced in Appendix One.

In September 1997 Sydney Water also released its vision for waste water management in the Sydney metropolitan area. The vision, called Water Plan 21, covered four key areas of waste water management. These are: protecting the rivers; protecting the beaches and oceans; recycling water and biosolids; and reducing wet weather sewage overflows (pages 17-19).

1.0 Introduction

As a society we have a tendency to take for granted an endless supply of drinking water as well as expecting abundant water to be available for recreation, agriculture and industry. However, with an increasing population and an ever increasing push to export agricultural commodities, water managers can no longer guarantee that water will be available for everybody in the quantities that they desire.

In recognition of this in 1994 the Council of Australian Governments (COAG) released a Communique which outlined reforms to the water industry and a timetable for achieving those reforms. The implementation of these reforms has created difficulties for some sectors of the economy as they adjust to a new water regime.

However, it is possible that had a process for water reform not been initiated, and especially at such a strategic level as COAG, then riverine water quality would already have deteriorated to such an extent as to harm human life and ultimately render water useless for agriculture. But serious problems remain to be addressed.

This paper describes the ecological sustainable development of water resources, discusses COAG water reforms, and the NSW Government approach to implementing these reforms.

2.0 Ecological Sustainable Development and Water Resources

Ecological Sustainable Development (ESD) has been one of the fundamental platforms of natural resource management since the Earth Summit in Rio de Janeiro in 1992. What ESD actually is and how it is to be implemented is still subject to considerable debate. The *Protection of the Environment Administration Act 1991* defines ESD as follows: ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

(a) The precautionary principle namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

(b) Inter-generational equity namely, that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

(c) Conservation of biological diversity and ecological integrity.

(d) Improved valuation and pricing of environmental resources.

In the early 1990s, Prime Minister Hawke convened working groups to define strategies to achieve ESD in different sectors of the economy. A Cross Sectoral Working Group was

established and amongst other things considered strategies to ensure the ecological sustainability of the water industry.[1]

The Cross Sectoral Working Group noted two goals to achieve the sustainable development and management of water resources. These were: to create an awareness of the interdependence of the components that comprise natural ecosystems and develop a commitment to the need for an integrated approach to development and management; and to manage water and related resources in such a way as to maintain their essential biophysical functions and to achieve a balanced response to the economic, social and environmental aspirations of the community. With these goals the Working Group reinforced the concept that you cannot manage the water resource in isolation, especially in regards to land use, and that it is vitally important for any management system to safeguard water quality.

The Working Group also noted the following requirements of an effective water resource management strategy:

- The natural environmental integrity and health of hydrologic regimes, and the living systems which are supported by them, must be recognised and sustained. Environmental protection must be accepted as a major public policy goal.

- The watershed often is the most appropriate unit for water management. It is inherently integrative, recognising both the unity of natural processes and interdependencies of human uses: for example, upstream uses and downstream uses.

- The full economic value of water resources must be acknowledged and reflected in user charges. Efficient use and sound decisions are not achieved when water is considered a free good or supplied at a subsidised cost.

- The interdependencies of multiple water and land uses must be accommodated. While some uses are exclusionary, many are not. Furthermore, some responses to water problems (eg, vegetation management) satisfy multiple objectives.

- A broader range of solutions to water problems must be considered. While technological or structural responses have traditionally been favoured, behavioural and other nonstructural adjustments warrant much greater attention.

- Proposals for water resource development must be assessed in a comprehensive but efficient fashion, recognising short and long term environmental, social and economic consequences. Particular attention must be paid to the assessment of risk and uncertainty, and the irreversibility of impacts.

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1 See: Commonwealth of Australia, *Ecologically Sustainable Development Working Group Chairs, Intersectoral Issues Report.* AGPS, 1992.

- Water management must offer opportunities for public involvement at all stages in decision making, from setting goals to program or project implementation. Effective responses to water problems need broad public support.[2]

2.1 The Sydney Water Project

There has been little work done on interpreting the values of ESD and how they impinge on a water utility such as Sydney Water. Back in the early 1990s the then Water Board engaged four environment community groups to review the environmental performance of the Board[3]. The 'Sydney Water Project' was formed and a review of ESD and Sydney Water was undertaken. The following discussion is taken from this review.[4]

The Project noted that the United Nations Convention on Biological Diversity established procedures and protocols for the identification and monitoring of biodiversity. Article 7 of the Convention requires signatories to take the following steps:

- identify components of biodiversity important for conservation and sustainable use;
- monitor the components of biological diversity
- identify and monitor processes and categories of activities likely to have significant adverse impacts on the conservation and sustainable use of biodiversity (eg, drainage of wetlands, dam construction and pollution from sewer overflows).

One of the Project's recommendations was for Sydney Water to develop an inventory of biological diversity according to these steps. The inventory should consider components across the three conceptual levels of biodiversity, ie, ecosystems and habitats; species and communities and described genomes and genes of cultural or scientific importance. Another recommendation was for Sydney Water to develop a policy to maintain biodiversity.

The notion of intergeneration equity has ramifications for population policy. In order to satisfy the needs of more individuals in the next generation, we will need to reduce present rates of resource depletion and environmental degradation. The Project recommended that Sydney Water implement programs to improve environmental quality and reduce per capita demand for water.

The presence of algal blooms on the Hawkesbury Nepean River indicates that the ability of a natural system to assimilate human activity waste products has been exceeded. The

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2 Kreutzwiser,R.D. 'Water resource management' in Mitchell,B. (Ed*) Resource Management and Development*, Oxford, 1991, as cited in, Commonwealth of Australia, *Ecologically Sustainable Development Working Group Chairs, Intersectoral Issues Report.* AGPS, 1992, at 119.

3 These groups were: Friends of the Earth (Sydney); National Parks Association of NSW; Nature Conservation Council of NSW; and the Total Environment Centre.

4 Dowsett,D *et al*, *A New Course for Sydney Water. The Final Report of the Sydney Water Project*. 1995 at 31.

Project notes that a key objective of an ecologically sustainable society must be to limit the throughput of energy and resources, ie, 'close the loop'. This will involve reducing demand for primary resources and hence reducing the release of pollutants. The Project noted that Sydney Water has great potential to act on this part of ESD. Sydney Water should aim to minimise loss of valuable resources such as water and nutrients by eliminating the piping of all waste water to rivers and oceans. The Project concluded that 'closing the loop' with respect to material and energy cycles needs to be adopted as a criterion for assessing water supply and wastewater options. Increasing the size or degree of centralisation of the coastal sewerage networks and use of a deep ocean outfall may appear less desirable with application of this criterion.

Maintaining ecological and economic resilience is a feature of ESD. It has been suggested by commentators that in the water sector, resilience is enhanced by increased diversification of water supply and wastewater service options. The Project notes that Sydney Water's operations have been characterised by heavy investment in large, single purpose, long lived capital assets built according to the notion that economies of scale are achieved through bigger collection and treatment facilities. The Project recommends that the need to achieve resilience provides Sydney Water with a strong incentive for research and development into, as well as implementation of, alternative treatment technologies and configurations in water supply and wastewater services.

The proper pricing of natural assets and environmental values is a component of ESD. The Project notes that traditionally, the pricing of non-renewable resources has not reflected their true scarcity, replacement costs, or future costs of irreparable and cumulative damage to ecosystems. The Project recommends that the full environmental, social and economic costs must be taken into account in pricing water, and there is a need to incorporate environmental costs and values more fully into conventional economic decision-making tools such as cost-benefit analysis.

To achieve intergenerational equity the Project notes that Sydney Water will have to do the following:

- modify environmental impact assessment procedures to improve consideration of long term effects and to take a broader view of environmental risk.

- diligently maintain essential infrastructure such as water and sewerage pipes. This will avoid imposing maintenance and environmental costs associated with malfunctions on subsequent generations. Approval to amplify or duplicate water and sewerage infrastructure should be contingent on Sydney Water demonstrating that the existing system is operating optimally.

- rejection of inter-basin transfers of effluent and water as options for meeting increased demand for water and sewerage services. These burden future generations with potential environmental impacts and costs and are inequitable to those living either in the catchment of origin or in the vicinity of the disposal site for sewage.

- Sydney Water should establish ecological and environmental targets to measure progress towards ESD over time.

The Project notes that applying the principle of intragenerational equity will include actions to: provide for community access to information and public participation; transparency of decision making; provision of state of the environment reporting to monitor diversity; and preventing the transfer of environmental risks. The Project recommends that in the interests of intragenerational equity, Sydney Water's customers also need to be made aware of options which conserve water or reduce waste production, thereby lowering the costs or improve the quality of their water and sewerage services.

The Project recognises the importance of the precautionary principle in the pursuit of ESD. It is recommended by the Project that with respect to water and wastewater planning Sydney Water should:

- incorporate pollution prevention policy into all decision making about future options;
- no longer consider assimilative capacity of aquatic environments for wastes as 'given';
- establish targets for reducing the loads of domestic and industrial pollutants, and the total volumes of sewage, discharged to aquatic environments. The goal is for zero discharge of toxic and/or persistent pollutants, as well as a long term goal to cease sewage discharges to marine and riverine environments;
- incorporate pollution prevention in any risk assessment methodology.

Conclusion

What ESD actually is and how to go about achieving it is still open to considerable discussion. The above discussion provides one framework to guide public water supply policy for the future, and provides a yardstick to measure actions of water supply authorities to date. Implementing such a framework will require a new approach to infrastructure planning, with a considerable change in emphasis from building large infrastructure projects to one of smaller community based regional projects.

In summary, there are core values of ESD that are applicable for both urban and regional projects. These core values are continually referred to in the literature and can be described as: intergenerational equity, application of the precautionary principle, full costing for water provision, maintenance of biodiversity and community participation. It is these considerations that may be used to judge the sustainability of water reforms across the nation.

3.0 The Water Cycle

There can be no meaningful consideration of water management without an understanding of the water cycle. In regards to the landscape, the water cycle describes the inputs of water in the form of rain or snow, storage of water in the soil, and the outputs of water in either drainage beneath the plant roots to groundwater, runoff, streamflow and evapotranspiration. European settlement has had a considerable impact on the natural water cycle across Australia. This change has led to a deterioration in the quality of waters in streams and groundwater reservoirs, which may impact in the number of options for the use of these resources and restrict the capacity to meet existing demands.[5]

Australia has a variable climate, with drought and floods part of our 'normal' climate. It is this variability which has a major influence on the water cycle and our management of it. In particular, the frequent occurrence of drought has resulted in Australian cities and towns building large dams to store water for domestic use. The per capita quantity of stored water is much greater in Australia than many other countries. This means that the normal flow of rivers supplying dams is interrupted, with much reduced flows downstream of dams. The stored water is pumped to homes and industry, where as waste water it is then often pumped back into the rivers beneath the water supply dam. This means that we take water out of the river and then return it as waste water back to the river. The ecological ramifications of this are shown with the high bacteriological counts of receiving waters and the blooming of blue-green algae due to excessive nutrients in the water.

Rainfall across NSW is highly variable. Coastal areas may receive 800-2000mm per year, while inland areas may receive only 200-500mm. Approximately 75% of surface water used in NSW is for irrigating crops, about 5.2 million megalitres a year. Urban water use accounts for about 775,000 megalitres a year, with 75% of this consumed in the Wollongong to Newcastle urban area.[6]

The operation of the water cycle ensures our survival. It could be argued any major interference with the water cycle will ultimately have disastrous consequences for society. ESD aims to ensure that development will be able to continue indefinitely without the water cycle 'collapsing' as a life support mechanism.

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5 Commonwealth of Australia, *Ecologically Sustainable Development Working Group Chairs, Intersectoral Issues Report.* AGPS, 1992, at 112.

6 Environment Protection Authority, *New South Wales State of the Environment 1997*, at 217.

4.0 Council of Australian Governments Water Reforms 1994

As mentioned in the Introduction, many of the water reforms introduced over the last few years have arisen from the February 1994 Council of Australian Governments (COAG) meeting, which endorsed a strategic framework for the efficient and sustainable reform of the Australian water industry.[7] At its previous meeting in 1993, COAG commissioned a Working Group to report on the reform of the water industry, and it is this report that was endorsed by COAG.[8] Attachment A to the February 1994 Communique contained 11 agreed principles, each with many sub-points. Highlights of the Communique are summarised below.

In relation to water resource policy, the Council agreed:

1/ that action needs to be taken to arrest widespread natural resource degradation in all jurisdictions occasioned, in part, by water use and that a package of measures is required to address the economic, environmental and social implications of future water reform.

3/ in relation to pricing:-

(a) in general

(i) adopt pricing regimes based on the principles of consumption based pricing, full cost recovery and desirably the removal of cross subsidies which are not consistent with efficient and effective service, use and provision. Where cross-subsidies continue to exist, they be made transparent.

...

(d) rural water pricing

(i) that where charges do not currently fully cover the costs of supplying water to users, agree that charges and costs be progressively reviewed so that no later than 2001 they comply with the principle of full cost recovery with any subsidies made transparent as a community service obligation.

(ii) to achieve positive real rates of return on the written down replacement costs of assets in rural water supply by 2001

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7 Council of Australian Governments. *Communique*, Hobart 25 February 1994.

8 *Report of the Working Group on Water Resource Policy to the Council of Australian Governments.* ND.

(iii) that future investment in new schemes or extensions to existing schemes be undertaken only after appraisal indicates it is economically viable and ecologically sustainable.

4/ in relation to water allocations or entitlements,

(a) the State Government Members of the Council would implement comprehensive systems of water allocations or entitlements backed by separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and if appropriate, quality.

(b) where they have not already done so, States would give priority to formally determining allocations or entitlements to water, including allocations for the environment as a legitimate user of water.

...

(d) that the environmental requirements, wherever possible, will be determined on the best scientific information available and have regard to the inter-temporal and inter-spacial water needs required to maintain the health and viability of rivers systems and groundwater basins. In cases where river systems have been over-allocated, or are deemed to be stressed, arrangements will be instituted and substantial progress made by 1998 to provide a better balance in water resource use including appropriate allocations to the environment in order to enhance/restore the health of river systems.

(e) where significant future irrigation activity or dam construction is contemplated, appropriate assessments would be undertaken to allow natural resource managers to satisfy themselves that the environmental requirements of the river systems would be adequately met before any harvesting of the water resource occurs.

5/ in relation to trading in water allocations or entitlements:-

(a) that water be used to maximise its contribution to national income and welfare, within the social, physical and ecological constraints of catchments;

(b) that trading arrangements in water allocations be instituted once the entitlement arrangements have been settled. This should occur no later than the end of 1998;

...

(d) that individual jurisdictions would develop, where they do not already exist, the necessary institutional arrangements, from a natural resource management perspective, to facilitate trade in water, with the proviso that

in the Murray Darling Basin the Murray Darling Basin Commission be satisfied as to the sustainability of proposed trading transactions.

6/ in relation to institutional reform:-

...

(c) as far as possible, the roles of water resource management, standard setting and regulatory enforcement and service provision be separated institutionally, and for this to occur no later than 1998;

The endorsed COAG reforms as listed above provide a framework for change. In 1994, the NSW Coalition was in government and was part of the agreement for the above. Many of these reforms in NSW have since been implemented by the Labor government which came into power in 1995. The water policy reforms as described below follow in principle the reforms agreed to by COAG in 1994.

4.1 Government Responses to Rural Water Reform

In mid 1994 the NSW Premier John Fahey MP released a White Paper outlining reforms to the management of the State's rivers and waterways. The centrepiece of the Government's proposals was the establishment of the independent Catchment Assessment Commission to make recommendations to the Government on water quality objectives and uses for water for each catchment in NSW.[9] Once these water quality objectives have been agreed upon, the Government proposed developing Catchment Management Plans to translate the Commission's findings into management guidelines for each catchment. The Government emphasised that an outcome of the reforms would be better defined water rights and security of supply. The Hon George Souris, MP, then Minister for Land and Water Conservation concluded: "I am conscious of the pressing need for industry to have property rights issues resolved and plans in place. Therefore I will be asking the Catchment Assessment Commission, and responsible government agencies, to waste no time in the establishment of such rights."[10]

With a change in government in early 1995, reform of the water industry continued. Many of the reforms began in mid 1995 when the Murray Darling Basin Ministerial Council (MDBMC) agreed to place a cap on water extractions from the Murray Darling Basin Rivers at the 1993/94 level of development. In NSW, this also meant that the embargo on new extraction licences on regulated rivers was extended to unregulated rivers in the

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9 NSW Government, *White Paper, Review of Management and Regulation of Water in NSW*, May 1994, at 2.

10 Media Release, 29 May 1994, *State Government Moves to Better Define Water Rights*, the Hon George Souris MP, Minister for Land and Water Conservation.

Basin.[11] A moratorium was also placed on the permanent transfer of sleeping and dozer licences[12] from 1995/96 while arrangements for implementing the cap in each valley were established.[13]

The first step was to define the level of water use or development (referred to as the benchmark) in each valley of the Murray Darling Basin, and this process was completed or was near completion by the end of 1997. In July 1995 the Department of Land and Water Conservation also placed an embargo on new licences for most of the coastal unregulated streams in the State. The 1995 water reforms also involved:[14]

- delivering water to the Macquarie Marshes and the Gwydir wetlands;
- establishing a Healthy Rivers Commission to look at priority rivers in need of attention;
- developing interim water quality and river flow objectives for the State's rivers;
- introducing a water management charge for most users to fund urgent resource and asset management;
- referral of bulk water pricing to Independent Pricing and Regulatory Tribunal (IPART);
- establishment of the Water Advisory Council

The 1997 Rural Water Reforms

The Government has stated that the 1997 rural water reforms will achieve a better balance in water use by more explicit and careful sharing of water between the environment and water uses. The water sharing reforms fall into three main areas:[15]

- specific sharing arrangements on regulated rivers and the Barwon-Darling River
- defining longer term environmental outcomes for river systems
- managing unregulated river and groundwater systems to sustainable limits.

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11 Regulated rivers are those whose supply is controlled or augmented by releases from dams and weirs operated by the Department of Land and Water Conservation. Unregulated rivers are those whose flows are not controlled by releases from storages and weirs.

12 A sleeper licence holder has not used their water entitlements in three years; a dozer licence holder has partially used their entitlement.

13 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 1.

14 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 2.

15 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 2.

While most of the water reforms could be implemented using existing legislation, in October 1997 the Government introduced the Water Legislation Amendment Bill. The Bill was introduced to provide legislative backing to the management of groundwater and the integration of activities of the Sydney Water Corporation and the Hunter Water Corporation with the management of State wide water resource management.[16] The Bill proceeded through all stages and was assented to on 16 December 1997.

Action on Regulated Rivers

The State Government acknowledges that all the major rivers and the Barwon-Darling River are stressed in terms of high demand for water and poor water quality. The Government has decided that the existing environmental provisions in the Macquarie and Gwydir Rivers will remain. For the other rivers in NSW (excluding the Murray, lower Darling and Border Rivers, which are subject to interstate sharing arrangements) the management framework is as follows:

- the Government will define an appropriate environmental allocation over the next five years, known as environmental rules.

- the Government will ensure that the collective impact of the environmental rules in each valley will not exceed 10% of the average long-term water diversions under the benchmark.

- the Government will deliver an initial five year term of resource security to water users starting in 1998/99 and extending to 2002/03.

For each valley, the Government has drawn up environmental flow rules which will determine the share of water for the environment. A guaranteed limit of 10% will be set on the impact the rules can have on water available to users. A community based management committee will be established in each catchment to review these rules and make recommendations by March 1998. The committees will advise on these rules in the first year and make recommendations on adjustments over the remaining four years. A management plan will also be prepared for each river by July 1998 which will define water access rights and set the basis for the resource secure term to 2002/03.[17]

Defining Longer Term Outcomes for River Systems

The Government states that one of the central parts of the 1997 reform package is the release of options for environmental objectives covering river flows and water quality. Government working groups have developed proposed environmental objectives for each

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16 *NSWPD*, LA 22 October 1997,p 1211. The Hon Kim Yeadon, MP, Second Reading speech on the *Water Legislation Amendment Bill 1997.*

17 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 3.

catchment, and these are available for public comment until 1 May 1998.

The Government will establish interim water quality objectives for all rivers and interim river flow objectives for all unregulated rivers. River flow objectives for inland regulated rivers will be set during the five year water sharing period.[18] The Government has released a series of discussion papers on water quality objectives for each catchment or region. The development of these objectives is based on the National Water Quality Management Strategy (NWMQS). The Strategy includes the following steps to identify environmental objectives:

- identifying the environmental values of water bodies to be protected (eg, protection of drinking water, agricultural and recreational uses)
- establishing objectives that will achieve the desired level of protection
- establishing the appropriate mix of management strategies to achieve objectives
- undertaking scientific programs to improve decision making.

Under the NWQMS, five main environmental values have been identified which may be selected for an appropriate level of water quality protection. These are:

- aquatic ecosystems (including edible fish, crustaceans and shellfish)
- recreation and visual amenity
- drinking water supplies
- agricultural water supplies
- industrial water supplies

These values also have sub-values, for each of which the Strategy defines the key scientific indicators such as turbidity or nutrient levels in the water. The Government's discussion papers group the above environmental values into five broad options. Each successive option represents increasing levels of water quality improvement for human use. The options are as follows:

1/ Status Quo
2/ Basic River Health
3/ Basic River Health and Basic Human Uses
4/ Basic River Health and Advanced Human Uses
5/ Basic River Health and Raw Drinking Water Supply.

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[18] NSW Government, Environment Protection Authority, *Proposed Interim Environmental Objectives for NSW Waters: Coastal Rivers*, 1997, at 3.

The Government's 'water quality objectives' discussion papers[19] analyses these options for each catchment and provides a catchment map highlighting the options being considered.

There is no established national framework to develop river flow objectives. Interim flow objectives have been designed primarily to protect and rehabilitate riverine ecosystems through better management of river flows, diversions and works. Eight principles have been developed to attain sustainable and healthy rivers, as described below:[20]

- Adaptive management: water management should be adaptive and provide for business planning and investment decisions. Management adjustments should be clear so that they can adapt to expanding knowledge; river monitoring and changing community and economic values.

- Catchment focus: river flow provisions must suit the individual needs of each river system/catchment.

- Social and Economic Impacts: developing and carrying out strategies to achieve river flow objectives should consider the social and economic impacts.

- Natural flow regime: providing water to the environment should be based on mimicking natural river flow regimes as much as possible.

- Protect less affected rivers: rivers with flow regime and riverine ecosystems that have not been seriously affected by human use, should be protected. This does not mean no future development. Any development must be consistent with ecologically sustainable development.

- Rehabilitation: Highly stressed rivers require substantial rehabilitation through changes to the management of river flows, diversions and works.

- Interactions between ground and surface waters: these interactions must be considered in managing river flows.

- Environmental assessment: new or enlarged structures (such as dams) may be undesirable. Such proposals must show that structures will have clear benefits that outweigh adverse environmental impacts, and that there are no viable alternatives.

Fundamental to the water reforms is the basic premise that for a river to be a river, there must be flowing water (and somewhat paradoxically, to mimic natural variable flow regimes sometimes no flow). Some critics of the water reform policies value this running water, or

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19 For instance, see NSW Government, Environment Protection Authority, *Proposed Interim Environmental Objectives for NSW Waters: Coastal Rivers*, 1997.

20 NSW Government, Environment Protection Authority, *Proposed Interim Environmental Objectives for NSW Waters: Coastal Rivers*, 1997, at 13.

environmental allocation, in terms of lost agricultural production. It is of course virtually impossible to put a nominal figure on the value of a river 'running free'.

Water Rights

Point 4 of the 1994 COAG Communique stated that governments would implement systems of water allocations or entitlements backed by separation of water property rights from land title and clear specification of entitlements in terms of ownership, volume, reliability, transferability and if appropriate, quality.
In NSW water resources are presently shared by a system of water licences. Embargoes on the issue of new water licences have applied to nearly all the regulated rivers for almost 15 years, and more recently have been introduced in many unregulated rivers and groundwater systems. New users can only gain access to this water through the purchase of entitlements from existing licence holders.

In most unregulated rivers and groundwater resources, markets for water do not currently exist. To access water from these regions, land with an existing water licence needs to be purchased.

Where markets for water do exist, their effectiveness is often constrained by the limited information available to participants, the absence of a formal system for market players and limited market size. The Government notes that the formation of water markets increases the value of existing water licences, and the sale of unused water entitlements provides opportunities for licence holders with new options to generate cash flow.

The water management plans will provide an initial period of water resource security as follows: regulated rivers and the Barwon Darling River from 1998/99 to 2002/-3; for groundwater systems at risk from over-extraction from 1998/99 to 2002/03; and stressed and high conservation unregulated rivers from 2000/01 to 2004/05.

The Government has yet to finally determine rules and operating methods for access to water and water rights. It is hoped that water entitlements will be clearly defined with associated trading rules by May 1998.[21]

Water Pricing

Point 3D of the COAG agreement in 1994 committed governments to achieving full cost recovery of bulk water supply by 2001, with any subsidies made transparent as a community service obligation. In 1996 the NSW Government appointed the Independent Pricing and Review Tribunal (IPART) to review bulk water prices. The Government also introduced an interim water management charge, set at $1.35 per megalitre of water entitlement for irrigators and towns on regulated rivers, an annual fee of between $80 and $265 on unregulated streams, and $70 or $100 for groundwater uses, plus a fee of forty cents per

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[21] NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 5.

megalitre of licensed volume. The charge was not applied for unregulated users for that year and for those in drought declared areas. The charges were extended by IPART for the 1996/97 year. Around $9 million was raised in 1995/96 as a result of the charges, which is being used to fund community river enhancement projects.[22]

In October 1996, IPART released an interim report on suggested pricing principles for 1997/98, and after public hearings announced draft bulk water prices for 1997/98. The prices are based on both water entitlement and usage.

Institutional reform

Point 6 of the COAG agreement stated that as far as possible, the roles of water resource management, standard setting and regulatory enforcement and service provision be separated institutionally, and for this to occur no later than 1998. As a result of this the Government has established a 'water business' within the Department of Land and Water Conservation with State-wide responsibilities for:

- operation of bulk water delivery systems to rural customers;
- maintenance of water infrastructure, including dams and weirs on regulated streams, the foreshores around them and structures on unregulated streams;

The Government has stated that there is no intention to corporatise the business.[23] In addition, as part of the *Water Legislation Amendment Act 1997*[24], the taking and using of the State's water resources by Sydney Water and Hunter Water will require a licence from and be regulated by the Department of Land and Water Conservation.

5.0 Water Reform in Sydney

On May 1 1997 the Premier Hon Bob Carr MP publicly released details of the Government's Waterways Package.[25] The Waterways Package as released in 1997 has a long history. Its origins date back to 1988, when community concerns and media interest in beach sewage pollution led to an independent review of the then Water Board's Beach Protection Program by consultants Camp, Dresser & McKee. The consultants concluded that the Water Board was lacking a strategic approach to management of its wastewater assets, and recommended a $4-5 billion program to supplement the Beach Protection Program. In response to these sewage pollution concerns in December 1989 the

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22 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 6.

23 NSW Government, Department of Land and Water Conservation, *Water Reforms Securing our water future: Information for Water Users*. September 1997, at 8.

24 Act Number 128/97, assented to on 16 December 1997.

25 Premier's News Release "Carr Government to Clean Up our Harbours, Rivers and Beaches." May 1 1997.

Government announced a $6.25 billion 20 year 'Clean Waterways Program'.[26] Work commenced on this Program in early 1991.

The implementation of the Clean Waterways Program produced some confusion in the community as to how much had been spent and had been achieved. For instance, the Majority of the Joint Select Committee upon the Sydney Water Board noted that the Water Board was failing to properly account for the operation of the Clean Waterways Program in that its public reports contained inadequate, poorly defined or non-existent goals which therefore defy scrutiny and analysis. Others disagreed with this analysis. For example, the Minority of the Joint Select Committee noted that the Board had kept to the environmental objectives of the Clean Waterways Program, and had reported on the progress of the Program in a consistent fashion, although in a format which was not readily understood by the public.[27]

In March 1994 the Hon Robert Webster MP, Minister for Planning and Minister for Housing released the discussion paper 'Choices for Clean Waterways'. The discussion paper provided an opportunity to review the Clean Waterways Program and the Board sought community input to help decide priorities for future spending on wastewater projects. The Majority of the Joint Select Committee upon the Sydney Water Board considered that the release of the 'Choices for Clean Waterways' document indicated that there was no longer any Government commitment to the clean up of waterways. The Majority considered that the Clean Waterways Program should not be optional. In contrast, the Minority of the Committee noted that the 'Choices for Clean Waterways' document provided a useful introduction to the complex issues facing the Water Board, and that community discussion on the various methods of achieving water quality goals was a legitimate activity.[28]

The 1995 Annual Report of the Sydney Water Board noted that with the conclusion of the public consultation process with 'Choices for Clean Waterways', a draft waste water strategy would be developed. It is this strategy that has developed into the Waterways Package as released in 1997.

As part of the Waterways Package released in May 1997, more than $3.01 billion will be spent in Sydney, Blue Mountains, the Hunter and Illawarra between 1997 and 2020. The Premier noted that under the plan, Sydney Harbour has been given top priority to ensure that it is clean by the year 2000.[29] The Waterways Package is structured around environmental outcomes rather than focusing on specific technologies. It is hoped that this

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26 See: Parliament of NSW, *Joint Select Committee upon the Sydney Water Board. Report*. April 1994, at 2.

27 Parliament of NSW, *Joint Select Committee upon the Sydney Water Board. Report*. April 1994, at 17 and 23.

28 Parliament of NSW, *Joint Select Committee upon the Sydney Water Board. Report*. April 1994, at 5 and 25

29 Premier's News Release "Carr Government to Clean Up our Harbours, Rivers and Beaches." May 1 1997.

approach will allow methods to be tailored to achieve specific goals rather than pursuing technologies and infrastructure for their own sake. The key areas of the 1997 Waterways Package are reproduced in Appendix One. Many of the elements of the Waterways Package are reproduced in the release of Sydney Water Corporation's *Water Plan 21*, as discussed below.

Sydney Water Corporation 'Water Plan 21 - Summary Document'

In September 1997 Sydney Water Corporation released *Water Plan 21*. The Plan, incorporating most of the elements of the Government's Waterways Package, covers four key areas of waste water management. These are: protecting the rivers; protecting the beaches and ocean; recycling water and biosolids; and reducing wet weather sewage overflows to protect the rivers, ocean and harbour.[30] Each area is briefly discussed below.

The Plan identifies the following actions by Sydney Water to protect rivers from waste water: upgrade all Hawkesbury Nepean sewage treatment plants using world class technology, bringing 75 percent of the flow to near drinkable standard; state of the art disinfection at all Hawkesbury Nepean sewage treatment plants; and reuse pipeline to link Georges River sewage treatment plant to industrial reuse customers.[31]

The protection of beaches from waste water discharges will be achieved by: upgrade treatment at the three major ocean plants [to remove floatable grease and settleable solids]; upgrade treatment at Cronulla Sewage Treatment Plant [disinfection of waste water, allowing for reuse of treated waste water by industry], Illawarra upgrade and recycling scheme; and increased recycling from ocean plants.[32] Sydney Water's preferred option for the Illawarra is to phase out the treatment plants at Bellambi and Port Kembla and transfer the flows to Wollongong, which has a high level of treatment.

The third focus of *Water Plan 21* is on recycling water and biosolids. Presently, approximately 23 million litres of treated waste water is being recycled from Sydney Water's sewage treatment plants. Almost 1200 million litres of waste water is generated each day. Sydney Water notes that the greatest opportunity for recycling water is to treat it to drinking water standard and use it an alternative to building a new dam for water supply. It is noted in the Plan that the best areas for reuse of treated waste water are inland river areas and industrial areas.

As part of *Water Plan 21*, Sydney Water is committed to: build and operate a demonstration plant at Quakers Hill that will treat four million litres of waste water a day to drinking water standard; achieve a greater than 90 percent recycling of solids; continue a source control action plan; and promote ecologically sustainable technologies for industrial and agricultural

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30 Sydney Water, *Water Plan 21, A Summary*. 1997 at 2.

31 Sydney Water, *Water Plan 21, A Summary*. 1997 at 5.

32 Sydney Water, *Water Plan 21, A Summary*. 1997 at 8.

reuse.[33] Presently, every day approximately 55 tonnes of biosolids are removed from Sydney Water's sewage treatment plants. More than 90 percent of these are beneficially used in agriculture, forestry, composting and land rehabilitation. It is anticipated that through plant upgrades and population increases, the amount of biosolids collected will increase by 100 percent over the next 15 years.

The final part of *Water Plan 21* deals with reducing wet weather sewage overflows. There are approximately 3000 designed overflow points in Sydney Water's sewerage system. About 80 percent of the sewerage system lies in the metropolitan area and it overflows in frequency from 19 to 29 times a year. The Hawkesbury Nepean/Blue Mountains represent about 10 percent of the system and overflows occur 1 to 6 times a year. The Illawarra region, also representing about 10 percent of the system, has between 7 and 21 overflows per year.

The cost to reduce overflows ranges from $0.5 billion to over $5 billion, depending upon the desired level of reduction. The lower cost would reduce overflows to an average 12 times per year throughout the Sydney region, while the upper costs would reduce overflows to once per decade. *Water Plan 21* notes that reducing wet weather sewage overflows is the largest single cost issue for improving waterway quality facing Sydney Water. *Water Plan 21* proposes the following actions*:* sewer renewal and other improvements will stop 80 to 90 percent of wet weather sewage overflows; and a new storage tunnel from Lane Cove to North Head.[34]

The Plan identifies a staged approach to overflow treatment. The first stage includes: a five year $112 million program to repair cracks and leaks in the sewerage system in priority areas; preparing environmental impact statements for each of the 35 sewerage systems; and constructing the Northside Storage Tunnel before the 2000 Olympics.

The proposed Northside Storage Tunnel has created some controversy. As part of the release of the Waterways Package in May 1997, the Premier Hon Bob Carr MP established the Waterways Advisory Panel to investigate and report on whether Sydney Water's proposal to construct a sewage storage and transport facility to alleviate sewage overflow problems in the Northern Suburbs Ocean Outfall Sewer should proceed. The Advisory Panel recommended that the storage tunnel should proceed subject to conditions. The Panel also noted that management of stormwater entering the harbour is inadequate, uncoordinated and accountabilities are ill defined. The Panel recommended that a properly funded and structured program for stormwater management be developed throughout the Harbour catchment.[35]

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33 Sydney Water, *Water Plan 21, A Summary*. 1997 at 12.

34 Sydney Water, *Water Plan 21, A Summary*. 1997 at 15.

35 Waterways Advisory Panel, Report to the NSW Government on the Proposal by Sydney Water Corporation for Sewage Overflow Abatement in Sydney Harbour. 11 August 1997.

In response to concerns about the process which led Sydney Water to select a 'tunnel solution' to the problems of sewage overflow in Sydney Harbour, the NSW Parliament Legislative Council established a Select Committee on the Proposed Duplication of North Head Sewerage Tunnel. Non-government Members of the Committee concluded that the planning and construction of the Tunnel should be discontinued until a full and independent cost/benefit analysis of the Tunnel against other reasonably developed localised treatment options is conducted. However, Government Members of the Committee did not agree with this conclusion.[36] The Government gave approval to build the Tunnel in early 1998.

The Stormwater Trust Fund

As part of the Waterways Package, the State Government has committed $60 million over three years for a Stormwater Trust Fund. The Fund is intended to assist with the implementation of the Waterways Package stormwater commitments, and is also in response to the recommendations of the Waterways Advisory Panel report.[37] The Waterways Package requires local councils to develop stormwater management plans within 12 months.

Funds from the Stormwater Trust will be allocated to: assist councils and certain State Government agencies, either individually or in groups, to pilot innovation in stormwater management or to undertake remedial activities; providing assistance to councils for the preparation of stormwater management plans; and a State wide education program to be coordinated by the EPA. Membership of the Trust is comprised of the Director-Generals from the EPA, Department of Land and Water Conservation, Department of Local Government, Ministry of Urban Infrastructure Management and the President of the Local Government and Shires Association.

Stage 1 of the Trust's grant scheme will focus on providing funds ($13.5 million available) to trial innovative technologies and undertaking remedial actions that are sufficiently developed for early commencement to be possible. All stage 1 projects will need to be finished and show results by the end of December 1998. It is hoped that the outputs from stage 1 will deliver results that councils can draw upon in developing their Stormwater Management Plans. Stage 2 of the grant scheme will involve the implementation of Council Stormwater Management Plans.[38]

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36 For more information see: Parliament of NSW Legislative Council, *Report of the Select Committee on the Proposed Duplication of North Head Sewerage Tunnel*, 5 December 1997.

37 NSW Government, Environment Protection Authority, *Stormwater Trust Grant Guidelines (Stage 1*) 1997.

38 NSW Government, Environment Protection Authority, *Stormwater Trust Grant Guidelines (Stage 1) 1997.*

6.0 Conclusion

The reform of the water industry must be one of the most challenging issues facing all governments. The notoriously variable rainfall climate in Australia has meant that access to irrigation water is important for agricultural production. The value of production of irrigation industries is worth over a billion dollars each year to the NSW economy. It is with this in mind that governments must deliver water to productive users as well as to the environment. The COAG reforms at least provide a framework for governments to work towards achieving healthy, sustainable river systems.

APPENDIX ONE
The 1997 Waterways Package

1997 Waterways Package

The Need to Clean Up Sydney Harbour

The pollution of Sydney Harbour by sewage overflows during wet weather events has increasingly become a key issue of public concern. Overflows can make many Harbour beaches unsuitable for swimming after heavy rain and raise concerns regarding public health for recreational use of the Harbour.

Computer modelling of wet weather events has shown that Sydney Harbour is affected by wet weather sewage overflows up to 30 times a year. More than 80 per cent of the overflow volume reaching the Harbour is from overflows on the Northern Suburbs Ocean Outfall Sewer (NSOOS). This work has also identified key overflow points at lower Lane Cove (clearly the largest overflow), Quakers Hat and Tunks Park.

Options for significantly reducing overflows have been the subject of comprehensive investigation by Sydney Water since 1991. Recognised options for preventing overflows from the NSOOS to the Harbour involve the use of an interceptor tunnel to store and transport flows away from the Harbour.

The Government needs to be satisfied that it is implementing the best option to deal with the over whelming bulk of the water quality problems in Sydney Harbour.

It is therefore important that an objective process be established to demonstrate to the community that the Government has given proper consideration to the solutions developed by both Sydney Water and the private sector.

Sydney Water's Proposal - One Approach

Sydney Water has put forward a formal proposal for cleaning up the Harbour prior to the Year 2000 as part of a wider strategy to reduce sewage overflows throughout the Sydney region to 80 to 90 per cent containment.

Sydney Water's proposal involves the construction of a storage and transport tunnel from Lane Cove to North Head to transport the significant excess volumes of dilute effluent in wet weather. The proposed storage tunnel would capture wet weather sewer overflows from Lane Cove, Quakers Hat and Tunks Park, which are three of the largest overflow points on the NSOOS.

It would reduce overflow frequency from these points from up to 30 times a year to approximately twice a year. This would reduce faecal contamination of stormwater and enable excess flows to be treated rather than overflowing into the Harbour.

This would be achieved by redirecting the wet weather overflows into the storage tunnel which will store and transport excess flows to North Head STP for treatment. The result would be only a 0.5 to 2 per cent increase in annual volume at the STP, depending on final operation of the storage tunnel, with peak flows occurring in storms...

A Vision for Our Waterways

The Government has endorsed a strategy that addresses the community's key concerns and delivers essential environmental outcomes needed to protect greater Sydney's waterways up to the year 2020. The Waterways Package answers the need for a total vision for waste water across the entire Sydney region. It establishes clear priorities and water quality goals, and a time frame during which these goals will be delivered.

Clean up of the waterways is a high community priority. In order to deliver an effective program of improvements to the waterways that will meet growth demands with no negative impacts on the waterways, a long-term strategic plan is required.

It is important to recognise the contribution of the environment movement to the development of the Waterways Package. Sydney Water funded four environmental groups - the Nature Conservation Council of NSW, Total Environment Centre, National Parks Association and Friends of the Earth - to study and critically review its water and wastewater management, including the ecological impacts of its operations.

The environmental groups also conducted a public participation program which identified water degradation as a major public concern, particularly with respect to the Hawkesbury-Nepean river. Other public concerns identified included the need for extensive reuse of effluent and the need to reduce the environmental impact of increasing population pressure and associated urban sprawl. Each of these concerns is addressed in the Waterways Package.

The Benefits of the Waterways Package

The Waterways Package is vital to the future sustainability of the Sydney region. Benefits include:

- decreased reliance on ocean discharge;
- provide a-fundamental system configuration that promotes effluent recycling for industry and other commercial users;

- clean up Sydney Harbour by the year 2000;
- eliminate 80 to 90 per cent of sewage overflows Sydney-wide;
- prevent sewage pollution on bathing beaches from Palm Beach to Bombo;
- no sewage-related algal blooms in the Hawkesbury-Nepean River;
- no waste water discharge to the Georges River;
- meet urban growth demands while preventing environmental damage to the waterways;
- keep family water bills at or near CPI.

The Waterways Package is structured around environmental outcomes, rather than focusing on specific technologies. By taking this approach, it allows:

- methods to be tailored to the achievement of environmental goals, rather than pursuing technologies and infrastructure solutions for their own sake;
- the private sector to bid on how each outcome can best be achieved, so that the Government can maximise private sector innovation and control the outcomes to be delivered;
- cost/benefits to be maximised. The strategy holds prices to CPI while delivering major environmental gains.

The Waterways Package recognises that one third of Sydney's population will be living in river catchments by the year 2020. It responds to this by retaining a decentralised treatment system inland, that promotes reuse, allowing inland areas to accommodate their own growth. This reverses the traditional reliance upon ocean outfalls. For example, by implementing an innovative sewer mining scheme for the Georges River, flows to Malabar STP will decrease by 25 per cent.

The Waterways Package recognises the need to protect the aquatic environment without impinging on the land or air environments or community amenity. For example:

The entire strategy can be realised without major new land purchases or rezonings. This will ensure that community amenity is protected.

The strategy minimises energy and chemical use and, where possible, relies upon biological methods.

Plan of Action from 1997 to 2020
The Waterways Package extends the Government's agenda of environmental improvements to the year 2020. The strategy enables the Government to set the following water quality objectives for the next 20 years:

By 2000

Water quality in Sydney Harbour significantly improved - with a 90 per cent reduction in wet weather sewage overflows from key overflow points at Lane Cove Quakers Hat and Tunks Park;

Up to 50 million litres day reused for industrial and other purposes;

Continue 90 per cent recycling of biosolids;

Construction of $15 million 'Water Factory' to demonstrate innovate, cutting-edge technology and to promote commercial use of recycled wastewater;

a 35 per cent reduction in phosphorous and a 30 per cent reduction in nitrogen loads from STPs to the Hawkesbury-Nepean, compared to 1995 levels;

Sydney and Cronulla beaches safe for swimming.

By 2002

Elimination of sewage-induced algal blooms in the Hawkesbury-Nepean River;

All marine and riverine ecosystems in Sydney, Illawarra and Blue Mountains protected from identified ecological risks from toxics in sewage;

Waste water treatment and conveyance capacity expanded to meet growth demands in Georges river areas;

Illawarra beaches safe for swimming.

By 2005-2010

Treatment levels doubled at the three major ocean plants (North Head, Bondi and Malabar), significantly improving reliability and their ability to control pollution;

No grease on Sydney beaches;

New sewer mining pipeline connecting Georges River plants to industrial customers, reducing flows to Malabar STP by 25 per cent;

Significant progress towards preventing 80 to 90 per cent of wet weather overflows.

By 2020

An 80 to 90 per cent prevention of wet weather sewage overflows in metropolitan Sydney, with even higher levels of protection in other areas;

Increased recycling of waste water with a target of a 200 million litres per day of recycled water being used for commercial and industrial purposes;

Approximately 75 per cent of effluent treated in the Hawkesbury-Nepean catchment at near drinkable standard and capable of supporting reuse or river flows for environmental purposes

New customers accommodated while providing increased protection to the environment

Ongoing

Total water cycle management solutions, including sewer mining and demand management, to improve water resource management and help prevent the creation of waste water;

Comprehensive environmental monitoring to be conducted on a yearly basis to track improvements and identify emerging areas for action;

Full community involvement, with a $2 million community education program to build community awareness on issues such as demand management and source control;

Demand management and source control programs to reduce sewage volume and improve its quality, to be conducted in cooperation with industry;

Innovative reform of the water industry, allowing the Government to take advantage of private sector expertise without privatising public assets;

Continued improvements at inland treatment plants to accommodate ongoing growth