NATURE CONSERVATION COUNCIL OF NEW SOUTH WALES

WATER POLICY 2011

Navigating this document:

The Table of Contents provides ready reference to the many elements of the Draft Water Policy 2011, and easy access to any one specific element. The Index at the end of the document permits ready access to significant terms and concepts that may appear in a number of policy topics.

The Introduction, Objective, Policy Principles and Scope statements at the beginning of the Draft Water Policy 2011 give a clear indication of the thrust and breadth of the policy.

Thereafter, the four Policy Principles are elaborated in turn to provide the framework for the detailed policy statements.

A Glossary is also included to assist the reader.

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I. POLICY OVERVIEW

A. INTRODUCTION

In this Water Policy, the Nature Conservation Council of New South Wales (NCC) sets out principles and objectives that would ensure that environmental water needs, including those of water-dependent ecosystems and ecological processes, are given priority when decisions are made for future management and use of the water resources of NSW. It aspires to protect, enhance and restore the biodiversity and ecological integrity dependent on the water resources of NSW in the face of new and emerging threats to the environment.

The nature of rainfall and runoff across NSW is highly variable characterised by extended periods of wet and dry, for example the prolonged drought across NSW in the first decade of this century. Drought intensifies competition for dwindling water supplies in rural, regional and urban areas. The failing health of NSW water sources and their dependent ecosystems is exacerbated by the regulation of our rivers to deliver scarce resources contrary to natural flow regimes. These testing times present daunting challenges for water managers and users as demonstrated in this last drought. Seawater resources have now been exploited to augment urban drinking water supplies historically sourced from terrestrial fresh-water supplies. Wastewater was given new life through treatment processes to provide an additional source of non-potable water. Water managers and regulators struggled to keep pace with changes to accommodate these initiatives.

The NCC considers that in the process of meeting the competing water needs in this tumultuous time, regulators and water users alike overlooked the needs of the environment in NSW. The voice of the environment was not heard. The most recent NSW State of the Environment Report (2009) clearly indicates that the health of aquatic ecosystems across NSW remains in serious decline. A healthy environment underpins the social and economic fabric of NSW. Healthy ecosystems support the production of billions of dollars of goods and services essential for the wellbeing of local communities and businesses. Conserving our water sources and thus their dependent ecosystems is pivotal to the future prosperity of NSW.

The advantages we enjoy in our cities and from our wild places and agricultural lands are under threat from ongoing over-extraction of the water sources of NSW. Water must continue to be a public resource and remain under public ownership and control. The principles of the *Water Management Act 2000* (NSW) must be stringently applied to ensure that the ecological requirements of rivers, wetlands, floodplains, and groundwater systems (as defined in the *Management Act 2000*: see Glossary) have the highest priority in the allocation of water.

B. OBJECTIVE

To restore and secure long-term health for the rivers, wetlands and catchments of NSW by ensuring that our State's water resources are managed in a way that conserves nature, protects the environment and supports an ecologically sustainable society.

C. POLICY PRINCIPLES

Four core principles have been identified to guide water policy development and implementation.

1. Conservation of the biodiversity dependent on, and the ecological integrity of, the water resources of NSW.
2. Integrated catchment-based water resource planning and management across the whole of the water cycle to support sustainable ecosystems and an ecologically sustainable society.
3. Timely and meaningful community participation in water management and planning.

4. Transparency of process and accountability of decision-makers.

D. SCOPE

The Water Policy addresses issues related to the whole water cycle in NSW, being surface and groundwater (fresh-water) sources, estuarine waters and seawater, wastewater and stormwater. The Water Policy addresses water-related issues in catchments, and in rural and urban contexts within the State. It is focussed mainly on biodiversity conservation and ecosystem sustainability.

E. POLICY AND REGULATORY FRAMEWORK

As a natural resource, use and control of water in Australia is vested in the Crown. These Crown rights with respect to water reside with the Australian State and Territory Governments. However, the Commonwealth Government is able to exercise certain powers with respect to water as an extension of specific powers granted to it under the Australian Constitution and, in some circumstances, through the mechanism of cooperative federalism that relies on agreements reached with State and Territory Governments.

The Water Policy is written in the context of the Commonwealth and State Government regulatory and policy instruments relevant to water management and planning in NSW at the time of writing.

The main regulatory instruments referred to in the Water Policy are listed in Appendix A. From time to time these instruments might change, and this Water Policy might then require revision and updating. A Glossary is included at the end of the Water Policy to assist readers.

F. A LIVING DOCUMENT

It is the intention of the NCC that this Water Policy will be a living document, updated to reflect developments from time to time as far as the resources of the organisation permit. At the time of writing, the principle issues affecting the health of the water resources of NSW related to: proposed water reforms in the Murray-Darling Basin; implementation of long-awaited floodplain harvesting regulations; calls for urgent and improved wetland mapping; and, emerging issues associated with proposed coal seam gas extraction.

G. RELATED NCC POLICIES

The following policies of the NCC are related to aspects of the Water Policy and should be considered in conjunction with it: *Marine Policy 2004*, *Coastal Policy 2002, Non-renewable Resources Extraction and Processing (Mining) Policy 2000*.

II. POLICY STATEMENTS

1. THE ECOLOGICAL ASPECTS OF WATER

PRINCIPLE 1: Conservation of the biodiversity dependent on, and the ecological integrity of, the water resources of NSW.

To conserve the biodiversity, ecosystems, ecological processes and ecological integrity dependent on the water resources of NSW, environmental water needs must be met before water from the State's water resources is allocated to other uses. To ensure ecological integrity, water resource planning and management must be firmly grounded in the best available science and be undertaken in conjunction with water catchment planning. Where a water catchment straddles state boundaries, management and planning strategies should be applied consistently within the catchment and across those boundaries to conserve biodiversity and ecological integrity.

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1.1. Water Demand Management for a Sustainable Society

Objective:

To conserve the biological diversity and ecological integrity of inland and coastal hydrological systems.

Management Goals:

a. To return to ecologically sustainable levels of extraction:
   i. water accounting should include:
      - contributions to the water cycle from all sources including natural water sources, recycled water, stormwater and desalination of seawater, and
      - water captured by, and held in, artificial storages (such as artificial lakes) and water extractions required to maintain the levels of those artificial storages.
   ii. mandatory and publicly accountable targets should be set for the reduction of:
      - overall demand for rural and urban water,
      - per capita water use by all urban water supply authorities, with an overall ceiling on total allocation from dam storage systems, and
      - total annual volume of water use in irrigation areas.

1.2. Integrated Management of Major Surface Water and Groundwater Systems

1.2.1. Groundwater

Objective:

All groundwater systems should be managed sustainably to ensure the protection of groundwater dependent ecosystems in their entirety. The connectivity of groundwater and surface water systems must be considered in calculating extraction rates.

Management Goals:

a. Prevention of further over-extraction for irrigation, town water supply and other purposes.

b. Better understanding of the ecological, hydrological, and physical aspects of groundwater and groundwater dependent ecosystems.

c. Protection of groundwater recharge beds from inappropriate landuse, and mining impacts.

d. Prevention of groundwater pollution (e.g. from landfill and industrial leachate, fuel storage tanks, pesticides and nutrients); rehabilitation of groundwater quality is an extremely difficult and very expensive process.

e. A program to cap and pipe *all* bores should be completed as a priority for strategic pastoral land and water management and feral animal control, particularly in arid and semi-arid zones.

The NCC recommends:

i. Broad implementation of the NSW State Groundwater Dependent Ecosystems Policy.

ii. No allocation beyond ecologically sustainable limits to protect Groundwater Dependent Ecosystems and the natural elasticity of groundwater systems.

iii. Groundwater should not be used for flood irrigation.

iv. Where the groundwater capital resource has been substantially diminished, use of aquifers should be controlled to enable recovery.

v. Artificial recharge of groundwater systems should not be with water of poorer quality.

vi. Bores in National Parks should be capped and decommissioned.

vii. Use of groundwater should be metered.

viii. There should be no extraction that causes subsidence of land or waterways.

ix. No contamination or cross-contamination of aquifers through sinking and operation of bores.

1.2.1.1. Great Artesian Basin Aquifers

***Management Goals*:**

a. Identify and protect recharge beds.

b. Cap, pipe and meter all bores from aquifers.

c. Establish and protect the ecological values of aquifers (e.g. ancient/microbial life forms).

d. Fence and protect mound springs.

e. Maintain an updated bore data base.

f. Maintain bore flow monitoring and assessment of bore case and headworks status.

1.2.2. Surface water dependent ecosystems

1.2.2.1. Environmental Water Flows

Objective:

Natural water flows and water quality are essential to maintaining Australia's unique ecosystems as well as sustaining the ecological services that are essential to long term economic productivity. Adequate water must remain in the natural environment to maintain and enhance the biodiversity and ecological integrity of the water resources of NSW when extraction is permitted for other uses. Australian rivers have highly variable natural flows, on both a seasonal basis and between years. Human intervention should not change the pattern of these natural flow regimes.

Management Goals:

a. Determination of environmental watering requirements based solely on best-available science, free of political compromise.

b. Natural peak flows should be restored to reconnect and reconfigure channel and floodplain habitats.

c. Environmental flows should sustain and restore longitudinal connectivity, encourage vertical exchanges (i.e. surface and ground water exchanges) and maximise fish passage over dams to allow recovery of fish populations.

d. Management and releases of banked environmental water should be transparent.

e. Environmental assessment should be undertaken for any new projects that may alter the flow regimes in any river.

f. During low and no flow periods, pools should not be pumped and natural drying periods should be allowed.

g. Natural low flows, and conversely, natural high flows should be protected to allow mimicry of natural flow regimes and stream connectivity.

h. Adverse impacts of water storages on downstream water quality and temperature should be minimised.

i. Very low flows should be protected to a level that ensures stream connectivity at least 80% of the days that the water source is flowing and should allow sufficient water for passage of aquatic biota, including threatened fish species. Stream connectivity and free passage of biota should be protected at critical times for migration.

The NCC recommends:

i. Adequate funding for on-going research to improve understanding of environmental water requirements.

ii. Prevention of further degradation of rivers and wetlands due to extraction or regulation of water.

iii. Embargoes to be imposed on new entitlements to water for irrigation or other extractive uses in over-allocated systems. Further, significant reduction in entitlement applying to permanent and temporary transfers of annual allocation to bring extraction rates back to a sustainable level.

iv. Development of rules around the seasonality and timing of supplementary access to tributary inflows.

v. Cultural flows (as defined by Aboriginal people) and environmental flows have, to a large extent, the same outcomes; the NCC supports the claims of Aboriginal people for the rights to cultural flows. (See Glossary – cultural flows.)

vi. In areas where water supply is augmented from desalination of seawater (such as the Greater Metropolitan Region) water from natural sources that is 'saved' by such processes should be returned to the environment.

1.2.2.2. Wetlands

Objective:

There should be no further loss of wetlands in NSW. The viability of wetlands must be ensured by maintenance of sufficient river flows and groundwater supplies to mimic natural seasonal variation. Every wetland should have a management plan in place and fully funded to ensure that it is ecologically sustainable.

Management Goals:

a. Development of a more integrated approach to wetland conservation and management by taking steps to ensure that wetlands issues are given appropriate consideration by all government agencies during their assessment of development applications.

b. Local councils to be required by statute to prepare plans of management for wetlands under their care and control.

c. All plans of management to be consistent with the *NSW Wetlands Policy*.

d. All agencies, including and particularly local councils and catchment management authorities to report comprehensively on the state of wetlands in the NSW State of the Environment Reports.

e. Continued annual mapping and monitoring of all NSW wetlands.

f. All NSW Ramsar wetlands to have adequate funding set for their management plans.

g. Incentive schemes for promoting wetlands' protection and enhancement on private lands to be maintained.

h. Dedication of 20% of wetlands in NSW within a comprehensive and representative reserve system. This will assist in the management of acid sulphate soils, water quality and salinity.

i. Strengthening the NSW Aquatic Habitat Management and Fish Conservation Policy and Guidelines so as to achieve internal coherence for government decision-making.

j. Development and adoption of a State Environmental Planning Policy for the protection of inland wetlands.

The NCC recommends:

i. Advocacy for Ramsar listing of all wetlands likely to meet Ramsar criteria.

ii. Management projects and activities that will restore the extent and the quality of wetlands.

iii. All natural resource plans (estuary, water, native vegetation, bush fire, etc) to be required by statute to ensure that wetland values are enhanced and maintained.

iv. Pursuing the policy objective by writing to the relevant Commonwealth and State Ministers and Departments.

v. Publicising wetland policy issues via the NCC newsletter, website and media releases.

1.2.2.3. Riparian Areas

Objective:

Reversal of the chronic degradation of native riparian vegetation along NSW watercourses (listed as a Key Threatening Processes under the *Fisheries Management Act 1994* (NSW)).

Management Goals:

a. Protect riparian zones adjoining all recognised streams and watercourses by appropriate enforceable regulatory mechanisms.

b. Require all public land managers including local councils to have policies to rehabilitate or restore riparian areas on both community and operational public lands.

c. Require local councils to consider riparian vegetation and aquatic values in determining stormwater and flood mitigation works.

d. Promote riparian areas for their natural values and ecological importance.

The NCC recommends:

i. Protection of riparian zones adjoining all rivers, coastal lakes, lagoons, wetlands and estuaries by the application of the NorBE Tool. (See Glossary)..

ii. Effective control of the clearing of native vegetation in riparian zones by strengthening and enforcing the relevant legislation.

iii. Ensure that Water Management Plans, Catchment Action Plans and Vegetation Management Plans have regard to the impact of vegetation clearance along watercourses or in catchments.

1.2.2.4. Floodplains

Objective:

The integrated and strategic management of both urban and rural floodplains, embracing the ecological, social, economic, and cultural factors. This includes an emphasis on maintaining and enhancing the riverine and floodplain environments, including consideration of the needs of threatened species, populations and ecological communities, as part of flood modification measures.

Management Goals:

a. Floodplain harvesting to be regulated under the provisions of the *Water Management Act 2000* (NSW).

b. Floodplain harvesting must be managed in a manner that ensures the protection of floodplains and river systems from over-allocations of water.

c. The introduction of robust harvesting rules that govern when and under what conditions floodplain harvesting can occur. Not all flood events (particularly those that occur after prolonged dry periods) should necessarily be open to harvesting.

d. The inclusion of harvesting rules in water sharing plans.

e. Given the current uncertainty about ecologically sustainable levels of floodplain harvesting, and the predicted impacts of climate change, floodplain harvesting licences must have limited tenure to allow for the regime to adapt in the future.

f. Rigorous environmental assessment of all existing and future works and licence applications under the *Environmental Planning and Assessment Act 1979* (NSW).

g. Floodplain harvesting licences should be managed in similar way to supplementary licences given the rights that they provide are only contingent on opportunistic allocations of water.

h. Development of floodplain risk management plans that address existing, future and increasing flood risk for flood prone land on a strategic rather than an *ad hoc* or individual proposal basis.

i. Recognition of the potential implications of climate change on flooding behaviour.

j. Incorporation of the principles of ecologically sustainable development when managing risks associated with human occupation of the floodplain.

k. Preservation and restoration of natural water courses, shifting away from flood mitigation measures.

l. Prohibition of waste disposal on floodplain land.

m. Consider the Aboriginal and European cultural significance on the floodplain.

n. Consider removing floodgates to reduce acid discharges from disturbed acid sulphate soils.

o. Removal of redundant weirs and floodgates and investigation into modification of design where these structures are still required.

p. Elimination of any extraction from, or filling in of, floodplains.

q. Reduction of flood damage by ensuring that future urban and rural developments take account of natural and regulated water flows.

r. Active maintenance and conscientious management of all remaining floodgates, utilising the principles of ecological sustainable development.

s. Prevention of disturbance acid sulphate soils; a management strategy which includes 100% offset achieved against any acid drainage resulting from new development in mapped acid sulphate soils hot spots.

The NCC recommends:

i. Flood management which does not involve the removal of riparian vegetation or stream straightening.

ii. Strategic consideration of flood risk related development policies within the framework of the floodplain risk management plan, rather than on an ad-hoc basis at the development consent stage. This enables the effective consideration of cumulative impacts.

iii. Amendment of planning controls with respect to new types of development activity in flood prone land outside those identified as appropriate in the existing floodplain risk management plan.

iv. Incorporation of flow control facilities near stormwater outlets, with design mimicking natural ecosystems in order to provide environmental and recreational amenities to the community and to attract native wildlife and vegetation.

v. Local councils and relevant agencies develop and implement management plans and strategies for all acid sulphate soils areas that are already disturbed and/or producing pollution of waterways. Such strategies may include closing or modifying drains or other remedial works, and ensuring that all development applications identify there is no disturbance to or impact on acid sulphate soils or the groundwater ecosystem.

1.2.2.5. Murray-Darling Basin

Background:

Rivers and wetlands in NSW are under critical stress due to a history of unsustainable water extraction. The Murray-Darling Basin has lost 90% of its wetlands and native fish populations, and 80% of its waterbird populations and River Red Gums. In light of this, the Murray Darling Basin Plan and the $10 billion funding commitment provides a one-off opportunity to secure the long-term future health of the Basin through reducing consumptive water use in the Murray Darling Basin. The NSW Government has an important implementation role and must cooperate with the Federal Government to achieve a healthy river system for its dependent communities and environment.

Objective:

Return the river systems, aquifers and wetlands of the Murray Darling Basin to a healthy condition. Ensure formalisation of a statutory Basin Plan that maintains sustainable use of water resources in the Basin and consequently healthy working river systems. In turn, this will promote thriving, resilient and sustainable regional communities in the Basin.

Management Goals:

a. Scientifically rigorous environmental targets for gauging the health of environmental asset sites and ecosystem function and processes.

b. Sustainable Diversion Limits (SDL) that meet environmental targets for the Basin based on the best available science in order to meet the requirements of the *Water Act 2007.*

c. Determination of environmental watering requirements solely based on best-available science, free of political compromise.

d. Accreditation of Water Resource Plans within the 2014 time period.

e. On-going surveillance of non-Ramsar wetlands and regular gauging of their condition against

the condition of the indicator sites.

f. Valuation of ecosystem services included in any socio-economic analysis.

The NCC recommends:

i. The *Water Act 2007* (Cth) be maintained in its current (2010) form in the belief that it provides broadly for the delivery of a Basin Plan that is environmentally sound and scientifically rigorous.

ii. A cautionary approach be adopted to the use of only 18 environmental asset sites and 88 ecosystem function sites as indicators for the health of freshwater systems across the whole of the Basin.

iii. More accurate climate change considerations to reflect the projections for water availability in the future.

iv. Continuing research to achieve more accurate assessment of surface water and groundwater connectivity.

v. Acknowledgement of the extent to which wetlands have been lost, and the overall impact of this loss on the Basin systems.

1.2.2.6. Fish

Objective:

The amelioration and maintenance of aquatic ecosystems to support native fish species, many of which are threatened because of widespread habitat disruption and degradation. Management practices should attempt to restore the natural ecological, hydrological, and physical characteristics of inland and coastal river systems.

Management Goals:

a. Unnecessary weirs and other obstructions to fish passage and migration should be removed.

b. Multi-level offtakes should be fitted on to large storage dams so that the quality and temperatures of releases is as close to natural as possible.

c. Instream habitat diversity should be protected by appropriate means including maintaining snags, variable depths and substrates, undercut banks and shading by native vegetation.

d. River flows should be managed so that they mimic the variability of natural flows; natural flood and drought regimes should be restored as much as possible.

The NCC recommends:

i. Aquatic or semi-aquatic species that are not endemic to a specific river system should *not* be introduced to Australian rivers.

1.2.2.7. Threatened Species

Objective:

A state-wide vision for the recovery of threatened species, populations and endangered ecological communities. Effective implementation of this vision.

Management Goals:

a. Water Management Plans and Catchment Action Plans that:

- include the objective of facilitating threatened species recovery and preventing the continued decline of populations;
- facilitate implementation of threat abatement plans and recovery plans where threatened species occur;
- acknowledge Key Threatening Processes and reduce or ameliorate these impacts; and
- are consistent with the Fisheries Scientific Committee iterations, and address the issues related to Key Threatening Processes.

1.2.2.8. Wild and Heritage Rivers

Objective:

The establishment of a comprehensive, adequate and representative freshwater aquatic reserve system system in NSW, with protection for all waterways within existing terrestrial reserves.

Management Goals:

a. Broadscale protection of aquatic environments and riparian vegetation much of which have suffered from ad-hoc partial protection and serious neglect.

b. The creation of no-take Aquatic Reserves under the *Fisheries Act 1935* (NSW).

c. Environmental planning instruments that protect adjacent riparian vegetation and limit broader catchment impacts.

d. Integration of such a system with legislation to protect Wild Rivers and Heritage Rivers independently of the *National Parks and Wildlife Act 1974* (NSW).

The NCC recommends:

i. The enactment of a Wild Rivers Act with provisions similar to the *Wilderness Act 1987* (NSW) to specifically exclude development that will affect the wild upper reaches of designated rivers.

ii. The enactment of a Heritage River Act to protect the scenic, cultural and natural values of river courses and reaches.

iii. Active cooperation between the Queensland and New South Wales Governments through the Paroo River Agreement to protect the outstanding conservation significance of the Paroo River catchment, the last major free-flowing river in the Murray-Darling Basin;

iv. No additional water to be extracted from the Warrego catchment for irrigation purposes as part of the Water Resource Planning process for that catchment.

1.2.2.9. Protection of River Red Gum Habitat

Objective:

Due to the highly depleted nature of the river red gum system, all remnants must be protected in permanent conservation reserves, with the rights of Aboriginal people preserved in these areas.

Management Goals:

a. Full assessment of the ecological significance of the river red gum forests, including their role as climate change refuges in the only vegetated east-west corridor in south-west NSW; see the Natural Resources Commission: *Riverina Bioregion Regional Forest Assessment Report 2009*.

b. Restoration of natural flooding regimes. Red gum ecosystems depend on regular flooding for their survival. Several of the larger forests are listed as wetlands of international significance under the Ramsar Convention. Every year millions of waterbirds from around the world depend on these forest-wetlands to breed. Floods have become increasingly rare and, when they do occur, are generally shorter and less extensive due to over-extraction of water from the Murray-Darling Basin.

c. Improved Aboriginal rights to natural resources of red river gum systems, land and participation in the management of forests including advisory committees, capacity building initiatives and the protection of rights to hunt, gather and conduct cultural practice.

d. Logging and stock grazing to be completely banned in all publicly owned red gum forests. Logging strips the forest of mature hollow-bearing red gums that provide habitat and food to native hollow-dwelling bird species and hollow-dependant reptile and mammal species. Cattle compete with threatened species for food, destroy understorey vegetation and cause extensive erosion and pugging, particularly in sensitive wetland areas.

The NCC recommends:

i. Extension of the River Red Gum Protected Areas system to incorporate all substantial River Red Gum forest habitats; this should be trans-boundary.

ii. Effective controls to stop the clearing and the inappropriate disturbance of River Red Gum habitats.

iii. Every effort should be made to ensure adequate and appropriate environmental flows.

1.3. Extractive Uses

1.3.1. Dredging

Objective:

Dredging of any aquatic ecosystem for gold or other resources should not be permitted, as these processes are detrimental to habitat and water quality through disturbance of the substrate and release of heavy metals and other contaminants.

1.3.2. **Mining** (See also NCC NSW Mining Policy 2000)

Objective:

The extraction of non-renewable resources near or in aquatic systems (including aquifers, riparian areas and floodplains) to be constrained by the application of the precautionary principle in considering development applications in order to achieve the objectives of ecologically sustainable development.

Management Goals:

a. Mining should be prohibited in the Sydney Catchment Special Areas.

b. Prohibition of longwall mining in any urban water supply catchment to avoid non-natural instances of creek-bed subsidence and aquifer interference.

c. Protection from longwall mining under or close to streams, swamps and riparian/cliff corridors. Any proposal for such mining in the vicinity should require independent and public assessment by the NSW government and an expert committee, both at the initial EIS stage and for each set of panels.

d. Regulation of the mining industry that ensures the prevention of any type of ocean and/or riverine tailings disposal.

e. Regulation to ensure that mining companies control waste adequately and all mines conform to a closed-loop system.

f. Water intakes for the mine should be located downstream of the mine site and all mine site discharge points.

g. Regulatory management to ensure that pollution of riverine, groundwater and marine environments does not occur from waste rock dumps.

h. Water allocations that consider the environmental impact assessment of mining developments.

i. Water allocations charged at full cost-recovery rates, including externalities.

1.3.2.1. Coal Seam Gas Extraction

Background:

Coal and coal seam gas extraction are increasingly posing possible threats to surface and groundwater flows in rural and regional NSW. The impact of climate variability may exacerbate these impacts.

Objective:

Protection of the surface and groundwater resources and associated ecosystems from potential damage by Coal Seam Gas (CSG) extraction.

Management Goals:

a. Stringent application of the principles of ecologically sustainable development to all proposed CSG developments. Assume any excessive groundwater extraction associated with such developments will have adverse impacts.

b. Strictly enforced regulation to minimise and mitigate any groundwater impacts during gas production.

c. Require all applications for consent to develop CSG extraction operations to be subject to a 'neutral or beneficial effects' assessment (see Glossary).

d. Complete prohibition of the injection of BTEX chemicals (benzene, ethyl benzene, toluene, and three isomers of xylene) into the ground. These organic chemicals can all have some acute and chronic toxic effects. Additionally benzene is known to be a carcinogen. All are soluble in water, and thus are potential pollutants of water resources.

e. Protection of National Parks, drinking water resources, farmland and food production from CSG extraction. Exploration permits and assessment leases must not be granted in areas of current farming activity, and where they have been granted on active farmland they should be revoked.

f. Staged adaptive management of CSG development as further data and more sophisticated modeling becomes available.

g. Regional-scale multi-state and multi-layer modeling of cumulative effects of multiple developments.

h. Regional-scale monitoring and mitigation approaches should be developed to assess and manage the impacts.

The NCC recommends:

i. Reference to studies of the impacts of CSG extraction in the United States, where the practice has been established for many years, and environmental and human health impacts have been widespread.

ii. Review of the legislation that gives access rights to mining companies and energy companies onto freehold land without the consent of the titleholder, for the purpose of drilling, extraction and other mining activities; See *Mining Act 1992* (NSW), Part 8 Division 2 Section 141.

iii. No CSG extraction from productive farming regions (e.g. Liverpool Plains) by State planning instruments.

iv. Given the very high level of predictive uncertainty involved, regulation should minimise potential adverse impacts on water balances, by requiring re-injecting of adequately treated associated water back into appropriate permeable formations to re-establish pre-development pressure levels in aquifers.

1.4. Farming practices (See also NCC NSW Sustainable Agriculture Policy)

Objective:

All agricultural pursuits in NSW should be managed in a way that protects the biological and ecological integrity of inland and coastal hydrological systems. Ecologically sustainable management of water should be defined and made a statutory requirement and a fundamental determinant of land use.

Management Goals:

a. All extractions and discharges by users should be licensed and charged at a rate that reflects full environmental and management costs, while an exemption from charges is allowed for environmental flows for river health and nature conservation.

b. Assessment of the neutral or beneficial effects of farming activities should form a critical element in determining licensing conditions. (See Glossary for explanation of terms)

c. Restrict access by stock to rivers and streams, with watering points as far away from water sources as possible. Run-off from watering points should be directed into diversion ponds or artificial wetlands.

d. All feedlots, cattle yards, abattoirs, fish farms, piggeries, poultry and other intensive animal husbandry operations adjoining or likely to impact on aquatic ecosystems should be subject to assessment using the NorBE Tool and accordingly conditioned and licensed. (See Glossary).

The NCC recommends:

i. Audited tax incentives for fence and/or revegetation of riparian areas, creating a nutrient buffer strip.

ii. Development of regulation and policy that embrace the neutral or beneficial effects assessment to manage nutrient discharge to waterways from farm run-off.

1.4.1. Lake Bed Cropping

Objective:

Immediate protection and conservation of the ecological values of the few remaining medium-large uncropped ephemeral lakes.

Management Goals:

a. Prohibition of pesticide and fertiliser dependent crops on lakebeds.

b. Strict enforceable guidelines on cropping to be developed and enforced, based on recommendations in "*Guidelines for managing cropping on lakes in the Murray-Darling Basin"* (Briggs and Jenkins, 1997).

c. Buffer zones required between lakebeds and tree lines.

d. No destruction of lignum.

e. A percentage of each cropped lake to be retained in its natural state, (15% for lakes cropped once only after flooding and drying; 25% for lakebeds cropped repeatedly).

f. No construction of bund walls or other divisions on or adjacent to lakebeds, which impinge on natural flooding regimes.

g. Adequate funding for further research.

1.5. Engineering works

1.5.1. Public Dams

Objective:

No further construction of dams on waterways. Dams adversely affect the natural flow of rivers and create major hydrological, ecological, biological, geomorphological and physical problems.

Management Goals:

a. Water management authorities to place an emphasis on efficiency of water use and demand management.

b. Existing dams are managed in a way that sustains/restores all riverine ecosystems from the dam wall to the river mouth.

c. Review of all dam infrastructure on a 5 yearly basis, including a thorough assessment of the condition and status, with the provision for their potential removal.

1.5.2. On-farm storages

Objective:

More thorough integration of on-farm storages into Water Management Plans.

The NCC recommends:

i. Licensing landholders who capture and store run-off from their property for basic farming needs under the farm dams policy.

ii. Any proposed construction of a large on-farm water storage (greater than 15 megalitres) to be considered as 'designated development' and require consent under of the *Environmental Planning and Assessment Act 1979* (NSW.

All relevant large on-farm storages to be registered with the appropriate government agency. The landowners should be required to install and monitor piezometers and other relevant gauges that identify impacts on water levels and quality. Information gathered from this should be incorporated into any Farm Management Plan that exists for that property, and also into the monitoring results of the Water Management Plan for that catchment.

1.5.3. Other types of infrastructure

Objective:

Any infrastructure that impedes or diverts river flows or floodwaters on floodplains, or speeds movement of river or floodwater, should be subject to appropriate environmental impact assessment. This includes works such as weirs and locks, flood mitigation and drainage works, levee banks, channel maintenance, water harvesting infrastructure and recreational lakes (such as Penrith Lakes).

Management Goals:

a. An environmental impact assessment under the *Environmental Planning and Assessment Act 1979 (NSW* be required for all instream works or activities.

b. The number of existing weirs and locks should be reduced to the essential minimum. Further to this, the NSW Government's 1997 Weir Review Policy is supported.

c. All essential weirs on rivers and tributaries downstream of major dams and waterfalls should be equipped with fishways suited to all migratory fish of all age classes native to that river reach. Where this is not possible, other structural and operational mechanisms should be developed such as allowing inundation of weirs to allow fish passage and migration.

The NCC recommends:

i. Applications for works that will impede flows should be advertised in downstream, valley basin and statewide media and public comment should be taken into account.

ii. Contributions to, and extractions from, the water cycle relating to such infrastructure should be fully included in water accounts for the relevant catchment.

1.5.4. Environmental works

Objective:

Environmental Works can have significant benefits but should never be a substitute for water; proposals for works should be examined on a case by case basis with the objective of achieving effective environmental outcomes, not degrading natural hydrological regimes or eroding environmental flows. (Important: see 'Efficiency' in the Glossary).

Management Goals:

a. Adoption of a precautionary approach requiring that any proposed engineering work is designed to achieve optimum environmental objectives, not 'maximum efficiency' which often has negative environmental consequences; e.g. pumps maim fish and invertebrates, pipes reduce groundwater recharge.

b. Improvement of fish passage and habitat.

c. Increasing management flexibility to better mimic natural wetting and drying patterns and to prevent unseasonal flows.

d. Protect overbank flows from replacement by engineering 'efficiency measures'. Overbank flows promote essential lateral connectivity for fish and other biota that move between the river, wetlands and the floodplain, as well as providing multiple environmental benefits across wide areas – including groundwater recharge, nutrient cycling, carbon processing, acid sulphate reduction, germination/reproduction and recruitment of biota, and direct watering of plants.

The NCC recommends:

i. Modification of outlet valves on existing dam structures to enable environmental flows to accumulate and be delivered in meaningful volumes.

ii. Further installation of multi-level offtakes to address cold-water pollution.

iii. In some specific cases, the use of a combination of environmental water and works to deliver water to important environmental assets in highly modified areas of the Murray-Darling Basin.

1.6. Water quality

Objective:

Improvement of water quality across the full spectrum of aquatic systems in NSW, to enhance the resilience and sustainability of the State's water resources for future generations.

Management Goals:

a. Incorporation of local water quality objectives into all Water Management Plans and incorporation of the objectives set out in those Water Management Plans in other statutory and non-statutory landuse and environmental management instruments. These objectives should be consistent with community agreed Interim Environmental Objectives derived in accordance with the "guideline trigger values" contained in the current *ANZECC Guidelines, 2000.*

b. Implementation of sufficient adaptive management provisions within Water Management Plans to respond to new water quality information as it arises.

c. Continuing development of an administrative framework for proposing, enforcing and monitoring environmental standards for water quality and river flows.

d. Continued development of national water quality standards, through SEWPAC and Water for the Future.

e. Ongoing reduction of pollution and sedimentation of aquatic ecosystems from point and non-point sources, by rural and urban landuse activities.

f. Management of stored water volumes to prevent poor quality water being released during droughts. Some major storages are becoming salt sinks and have extreme blooms of blue-green algae .

g. Improved catchment management above existing major water storages.

The NCC recommends:

i. Water quality management should ensure that water quality targets are met in relation to pH, total nitrogen, chlorophyll a, turbidity, salinity and total phosphorus, dissolved oxygen, chemical contaminants, faecal contamination.

ii. Minimisation of water contamination to the greatest extent possible, including mitigation measures to prevent the spread of contaminated water by excluding extraction within a one kilometre radius of a contaminated site.

iii. Allocation of sufficient research funding to establish the relationship between factors such as water extraction and the presence of arsenic in coastal aquifers.

iv. No agistment of cattle on the foreshores of major water storages.

v. Foreshores to be revegetated with native species.

vi. Licensing of industrial operators that encourages progressive reduction of discharges and polluted run-off from all industrial sites. An expansion of load-based licensing to provide incentives for polluters to reduce inputs to rivers is supported.

vii. Continuation of EPA licensed systems ensuring safe disposal of chemical containers.

viii. New developments for residential, industrial, recreational and commercial purposes to prevent erosion risks and pollution by stormwater run-off and enable treatment of run-off. Local Councils to identify and implement means of achieving this aim from existing urban areas.

ix. The impact of endocrine disruptors on waterways decreased and ultimately eliminated.

x. Mandatory set back limits when fertilisers are being applied in the vicinity of rivers.

xi. Mandatory soil conservation measures to avoid nutrients attached to soil particles being washed into waterways.

xii. Prohibit the use of industrial waste such as fly ash, cement dust and slag as soil conditioner or fertiliser, as it threatens the ecological health of the soil and surrounding waterways. The practice of dumping industrial waste on agricultural land is also a disincentive to close-loop practices by industry.

1.6.1. Pesticides and Herbicides

Objective

Strictly regulated and minimal use of pesticides and herbicides to reduce the risk of pollution of both surface and groundwater.

Management Goals:

a. Mandatory information programs established for all urban and rural land managers to assist in the understanding of and application of relevant ecological principles, in order to minimise the use of pesticides and herbicides and the consequent risk of water pollution.

b. Elimination of the use of organochlorine, organophosphate and carbamate pesticides, as they are acutely toxic to the central nervous system of non-target insect pests and to vertebrate animals, including humans.

c. Ensure that the pesticide registration process only accepts applications that reduce environmental impacts by comparison to older pesticides.

d. Ensure that any new chemicals only affect the target pest, degrade quickly in the environment and not produce toxic by-products.

e. The community has a right-to-know about all pesticide applications that are taking place in their vicinity.

f. Ensure that all ingredients of pesticides and herbicides are presented on the label.

g. All urban and rural land managers should be encouraged and assisted to understand and apply relevant ecological principles, in order to reduce contamination of water systems.

The NCC recommends that the National Registration Authority (NRA):

i. Urgently review pesticides that are have been identified as endocrine disruptors.

ii. Ensure that testing is undertaken on whole formulations rather than individual ingredients.

iii. Review pesticide/herbicide registration and labelling carried out, in order to decrease the current unacceptable contamination of rivers and floodplain ecosystems with pesticides and herbicides.

The NCC recommends that the Commonwealth Government:

i. Ensure that ecological risk assessments of pesticides conducted by Environment Australia account for the synergistic effect of mixtures of chemicals on natural ecosystems i.e. the toxicity of the mixture can far exceed the sum of the individual toxicity of a chemical. Establish an adverse health events reporting scheme and pesticide usage database.

1.6.2. Algal Threats to Lakes, Rivers and Waterways

Objective:

Protect water sources from algal blooms by eliminating eutrophication caused by pollution.

Management Goals:

a. The presence of blue-green algae is accepted as a key measure of water quality in water catchment management.

b. Mandatory set back limits when fertilisers are being applied in the vicinity of rivers.

c. Mandatory soil conservation measures to avoid nutrients attached to soil particles being washed into waterways.

d. A public register of algal blooms in waterways, rivers and lakes, stating location, date, extent, species and dangers.

The NCC recommends:

i. There should be statutory reporting for all dams and extraction regimes indicating blue-green algae levels.

ii. Catchment management plans should include blue-green algae monitoring and management as key environmental requirements.

iii. Healthy water should not be used for 'flushing' algal blooms downstream, rather, the causes of algal blooms should be dealt with at the source.

iv. Public risk warnings whenever there is contamination of waterways with toxic algae and cyanobacteria.

v. The NCC expressly publicise these risk warnings whenever they are given.

2. WATER RESOURCE PLANNING AND MANAGEMENT

PRINCIPLE 2: Integrated catchment-based water resource planning and management across the whole of the water cycle to support an ecologically sustainable society.

Since the early 1990s water management policy in Australia has been driven by national initiatives agreed between the Commonwealth and all State and Territory Governments. The most recent of those initiatives was settled in 2004 in the form of the National Water Initiative. The linchpin of that initiative was the long-standing objective of governments to establish a consistent system of water entitlements across all Australian jurisdictions that would facilitate and support a market of intra- and inter-state water trading.

The Water Management Act 2000 (NSW), introduced in NSW in 2000, included a water management framework that would permit trading of NSW access licences either in their entirety or the individual components of those licences (see Glossary). The successful creation of a scheme of water trading beyond the bounds of the State as contemplated in the NWI, however, relied on the development and implementation of compatible frameworks in other States.

The ambitious objectives and timetable set out in the NWI were ambushed by unrelenting drought across the State from 2004 until late 2010. In that period rural water planning was trying to adapt to conditions where no water was available for allocation. The outcome of the Murray-Darling Basin Plan process to August 2011 is stark evidence of the failure of all parties to the NWI, and the basin States themselves, to deal with the pressing issues of that degraded water system under the nationally agreed initiative and through their own water management mechanisms.

At the same time as the rural issues came to a head, urban water managers were focused on securing continuing supplies of drinking water to city dwellers. Major sources of water that were not dependent on rainfall were exploited for the first time across Australia. Desalination of seawater emerged as the would-be saviour of the cities. The NCC made its position clear with respect to the introduction of desalination of seawater as a component of urban water supply mixes. However, with desalination now providing some 15% of Sydney's drinking water supply the NCC has developed this policy on the assumption that desalination will continue to be a significant part of the urban water cycle in the State, already providing a significant proportion of the drinking water needs of over 20% of Australia's population.

It is of critical importance that Water Management and the Policy governing it are based on science not on dogma or opinion. Peer reviewed science is the way that humankind establishes the majority of 'facts' and 'knowledge'. It is quite distinct from faith, belief and opinion, (i.e. dogma) which often do not convey facts. Science enables humankind to 'predict' with greater accuracy, and thus to 'manage'. Prediction of consequences is the basis for Policy. (See Science in Glossary).

This section of the NCC Water Policy builds on the water management and planning principles and objectives set out in the previous policy (2002). Recognising that the implementation of the WMA 2000 has taken a path that was not anticipated when the act was first presented to the public, the policy calls for inclusion of the public in water management processes so that the government and the people of NSW can work together to deliver a system of water management that embraces the principles of ecologically sustainable development. Finally, it advocates increased transparency of processes associated with the development and implementation of water management policy and regulation, and full accountability for those who are responsible for exercising the State's rights to control the use and flow of water.

References to 'the State' in the discussion of Principle 2 that follows are references to NSW unless otherwise indicated.

Policy Issues:

2.1. The State's Water Resources

Objective:

Vigorous pursuit of the objectives of the *Water Management Act 2000* to deliver a system of integrated, catchment-based management of the State's water resources for the benefit of both present and future generations.

Management Goals:

a. Development of an inclusive definition of the 'State's water resources' that recognises the importance of new water sources as components of total water balances. The State's water resources would thus include rainwater, wastewater, recycled water, greywater, blackwater, desalination of seawater, stormwater and groundwater.

b. Vesting of the State's rights to the control, use and flow of water in a single entity – a water manager – in a way that will ensure that water management transcends political discord.

c. Water management and planning to be undertaken on the basis of water balances for water management areas that take into account all contributions to, and all extractions from, all water resources of each area.

d. Water management planning to adopt, and commit to meeting, the objectives of nationally agreed water reforms.

e. Water planning to be transparent and statute-based.

2.2. Adaptive Management

Objective:

Application of the principles of adaptive management to respond to monitoring and improvements in understanding of ecological water requirements.

The NCC recommends:

i. Regular review of water management plans to take account of, and to respond to, changing circumstances, new data and emerging technologies to ensure ecological sustainability.

ii. Water management plans to include specific provisions for review and, if necessary, amendment in the following circumstances:

- Possible reductions in available water, likely to arise from climate change or other catchment/landuse practices that may increase water use (e.g. increased cover of native perennial vegetation);
- Provisions for specified amendments relating to threatened species, flow provisions, environmental health water or the impact of a significant water quality incident;
- Exercise of native title rights to water allocations;
- Where a monitoring or research program recommends arrangements for increased environmental flows (as a result of better information); and
- Where flows are adaptively managed within the ten year tenure of the Water Sharing Plans as provided for by the *Water Management Act 2000* Section 5(2)(h).

iii. Processes for the regular review and, if necessary, amendment of water management plans that are open, transparent and consultative and do not rely on the exercise of Ministerial discretion for initiation.

2.3. Basic Landholder Rights

Objective:

Integrated water planning and management in accordance with statutory water management plans.

Management Goals:

a. Extraction and use of water under basic landholder rights to be measured and monitored and taken into account in total plan extraction limits in the water sharing provisions of statutory water management plans.

The NCC recommends:

i. Basic landholder rights should be dealt with in relevant water management plans, as they relate directly to the allocation of water.

ii. Future growth in basic landholder rights should be managed sustainably. In particular, parameters that outline '*reasonable use'* should be defined, with adequate environmental protection provisions in place.

iii. Access to basic landholder rights by landowners in new developments should be limited.

iv. Consideration of the creation of a tradeable basic landholder licence to replace the existing provisions relating to basic landholder rights in section 52 of the *Water Management Act 2000* (NSW).

2.4. Water Management Committees

Objective:

Effective engagement of water users and other stakeholders in water planning and management to improve certainty and build confidence in reform and management processes; to ensure transparency in decision-making; and to ensure sound information is available to all sectors. This objective is in accordance with the ambitions of the National Water Initiative.

Management Goals:

The establishment of water management committees in accordance with the provisions of the *Water Management Act 2000* (NSW).

The NCC recommends:

a. Appointment by the Minister of water management committees for each of the State's water management areas.

b. Amendment to the *Water Management Act 2000* (NSW) to require the participation of water management committees in the preparation, amendment and implementation of all water management plans.

c. That the membership of such committees be as set out in section 13 of the *Water Management Act 2000* (NSW).

2.5. Water Management Plans

Objective:

Application and implementation of the water management planning provisions of the *Water Management Act 2000* (NSW) on a catchment basis in a way that is open and transparent, and includes timely and meaningful consultation with all interested parties.

Management Goals:

a. Development and implementation of Water Management Plans that are consistent with, and promote, the objectives of the *Water Management Act 2000* (NSW).

b. Water management and planning that integrates, and is consistent with, other appropriate planning instruments such as Catchment Action Plans and Vegetation Management Plans.

The NCC recommends:

i. Environmental health should be reinstated as first priority, basic landholder rights second, and the extractive regime ***last***.

ii. The definition of environmental water in section 8 of the Act should be amended to reflect the intention expressed originally in the Act, that water required for fundamental ecosystem health should be committed to that purpose and not be available for other uses in any circumstances.

iii. Water planning to involve the community and water management committees.

iv. Water planning to be undertaken in accordance with Part 3 of the *Water Management Act 2000* (NSW) and not under Part 4 as Minister's plans as has been the case since the introduction of the Act.

v. If native title rights to extract water are granted pursuant to a determination under the *Native Title Act 1993,* relevant Water Management Plans or plans made by the Minister should be reviewed and, if necessary, amended in order to take into account the water that is being extracted pursuant to native title rights.

2.6. State Water Management Outcomes Plan

Objective:

To set an over-arching policy context, targets and strategic outcomes for the management of the State's water sources.

The NCC recommends:

i. That the State Water Management Outcomes Plan (SWMOP) that expired in December 2007 be reviewed and revised, and a new SWMOP be established to continue to guide the water management planning process in NSW.

ii. That a new SWMOP include new water sources (seawater, wastewater and stormwater) and new water products (desalinated seawater, recycled water) in its framework so that it can guide water planning and management in urban and rural areas.

iii. Targets within the SWMOP should ensure that the total volume of water specified on licences is reduced to no more than 100% of the long-term average annual diversion limit in surface water systems, and to no more than 100% of the sustainable yield in groundwater systems.

2.7. Water Access Entitlements

Objective:

To conserve the biodiversity dependent on, and the ecological integrity of, the water resources of NSW through the implementation of a system of entitlements to water that gives priority to environmental water needs.

Management Goals:

a. The principles of ecologically sustainable development (ESD) must form the basis for the management of the State's water resources. Implementation of the water access regime under the *Water Management Act 2000* (NSW) must recognise, incorporate and apply ESD principles.

b. Use of a system of limited and conditional water entitlements that may be traded on the market within clear rules, with a set tenure, providing that such entitlements exist within a short limited term, (generally not longer than five years), and a secure statutory framework that ensures the continuation and enhancement of all flows through streams and aquifers that are needed to meet environmental or other public purposes.

c. Use of a range of mechanisms to ensure that environmental water requirements are met. These mechanisms to include:

- The changing and/or restriction of water access (e.g. off-allocation access);
- Providing incentives to improve water efficiencies (including demand management, property plans, wastewater re-use, structural changes to water delivery systems) with some or all of the water saved returned to the environment;
- Provision of structural adjustment to assist irrigators to become more efficient or to encourage inefficient users of water to move out of the industry;
- Introduction of industry levies, using the money gained to assist in increasing water efficiencies and structural adjustment;
- Introduction of iterative and enforceable (water efficiency) targets[1] for environmental flows;
- The compulsory reduction of 5% of entitlement at the end of the term of each licence[2], with the withdrawn volume going towards environmental flows; and
- NCC does not recognise or support any claims for compensation by irrigators and farmers as a consequence of the reduction of their access to water, or the withdrawal of their access to water, or the non-renewal of their entitlements to water, when these actions arise from the proper operation of statutory or administrative rules for the protection of the environment.

The NCC recommends:

i. The Commonwealth and NSW Governments should be called on to ensure that water remains a public resource.

ii. The use of this public resource for short-term financial gain at the expense of the health of the environment and the welfare and economic prosperity of future generations should be vigorously opposed.

iii. Over-extraction of the water resources of NSW should be vigorously opposed where it has caused or is likely to cause harm to the environment, the State's water resources, or the public interest.

iv. The *Water Management Act 2000* (NSW) should be administered by the NSW Government in a way that will secure the health of the State's freshwater ecosystems as well as the health of the agricultural sector for generations to come.

2.8. Water and Licence Allocation

2.8.1. Allocation of Water

Objective:

Water continues to be deemed a public resource and remain under public ownership and control. The principles of the *Water Management Act 2000* (NSW) are stringently applied to ensure that the ecological requirements of rivers, wetlands, floodplains, and groundwater systems have the highest priority in the allocation of water.

Management Goals:

a. Sustainable water budgets or water balances should be the basis for water allocations for each catchment.

[1] This would consist of achievable annual environmental flow targets over a 5 or 10-year period. These targets would be enforceable at each iteration.

[2] This concept is similar to one that is used in share-managed fisheries. See FMA 1994 Section 74

b. General purpose water accounting (see Glossary) also known as double entry book-keeping, must be used in constructing water budgets, consistent with the principle of the National Water Initiative.

c. Available water determinations are phased down to a maximum of 100% of the licensed yearly entitlement.

d. All entitlements to water are strictly limited in duration and extent to ensure that environmental and social needs can be met.

e. All new access licences are embargoed where extraction threatens the ecological values of the water source.

f. Supplementary water harvesting is phased out.

g. There should be no extraction of ordered water from tributary inflows.

h. A moratorium on any increase in the extraction of regulated or unregulated river water or groundwater from any valley in NSW. The cumulative effects of current water extraction should be thoroughly assessed and publicly considered prior to the lifting of the moratorium.

i. Timing of extractive use should be modified to allow environmental flows to mimic natural flows.

j. Minimisation of artificially increased summer flows for irrigation purposes.

The NCC recommends:

i. Meters and gauges should be introduced for **all** users of surface and groundwater (including extractions made under basic landholder rights).

ii. Annual allocation announcements should be conservative to encourage water use efficiency.

iii. Announcements should take long-range forecasts into account and not be triggered solely by opportunistic inflows to storages.

iv. 'Rain rejection flows' (see Glossary) should not be allowed. Water ordered and delivered should be debited from water users allocations whether used or not.

v. Increased production arising from increased efficiency of water use should be encouraged with savings returned to the environment.

2.8.2. Allocation of Licences

Objective:

Terms and conditions attaching to the grant of an access licence should be consistent with the principles of ecologically sustainable development within a catchment.

Management Goals:

a. Water Management Plans should guarantee the allocation and use of water on an ecologically sustainable basis to meet the needs of river flows, water quality and wetland management objectives.

b. Water Management Plans should have adaptive management provisions that provide flexibility to respond to new information as it arises.

c. Water Management Plans should be subject to a mandatory requirement for public exhibition with public comments to be taken into account both in the development of the plans and in any process of amendment.

d. Water Management Plans should be publicly reviewed every five years.

The NCC recommends:

i. A sleeper licence for surface groundwater should not be transferred or sold. Unused allocations should be withdrawn immediately and should not be reallocated. (See Glossary).

ii. Inter-valley transfer of access licences or allocations should be prevented.

iii. Intra-valley trading of access licences should only be permitted where environmental impact assessment demonstrates that the proposed trade will not cause any increase in adverse impacts.

2.9. Monitoring and Performance Indicators

Objective:

Performance indicators are an essential tool to monitor the outcomes of water management processes. Performance indicators should determine the baseline data which will be used to assess the adequacy and performance of water management processes and in turn direct on-going adaptive management.

The *Integrated Monitoring of Environmental Flows* (IMEF) program has for more than a decade provided a valuable basis for critically appraising the effectiveness and adequacy of current rules for environmental flows. Water management planning processes should include sufficient flexibility to change planning provisions where monitoring results clearly indicate a need to increase environmental allocations.

Management Goals:

a. Monitoring programs should:
   - evaluate the effectiveness of the planning processes in achieiving the plan's vision, principles and objectives;
   - ensure compliance with strategies and proposals within the planning process; and
   - improve knowledge regarding the resource and its dependent ecosystems.

The NCC recommends:

i. That the performance indicators listed in the following table should be incorporated into the current planning processes and management.

Biological Performance Indicators	**Chemical Performance Indicators**	**Physical Performance Indicators**	**Habitat Performance Indicators**
• Invertebrates - require seasonal monitoring (spring/autumn) Need to monitor: - hyporrheic - sediment	• Water quality (ANZECC guideline "trigger values") Need to monitor: - pH - BOD	• Department, universities, & community role • Erosion • Siltation • Bank stability • Flows	• Estuarine health (seagrass, mangroves) • Riparian veg extent and health • Aquatic veg extent and health

Biological Performance Indicators	**Chemical Performance Indicators**	**Physical Performance Indicators**	**Habitat Performance Indicators**
- water column - surface - vegetative • Fish - need to monitor 4 times a year Need to monitor species and abundance (i.e. fish, oysters, crustaceans etc) • Birds - need to monitor species and abundance (including breeding events) • Mammals/vertebrates - need to include threatened species and species of local significance • E.coli, bacteria, viruses, algae • Weeds and pests such as carp	- Turbidity - TDS - Temperature - Total Nitrogen - Total Phosphorus - Pesticides - Salt	• velocity • quantity • seasonality • Depth to water table • Bench wetting • Floodplain inundation • Duration & frequency of cease to flow • Subsidence • Riffle/pool connection • Water usage • Success of demand mgmt strategies • Extraction density	• Snags • Identify Dependant Ecosystems • Dependant Ecosystems condition & extent • High priority • Med priority • Low priority • CAMBA and JAMBA requirements • wetlands

ii. A review of Water Management Plans to be triggered if performance indicator targets are not met. If a new threatened species, populations or ecological community is identified, their location should be managed as a high priority site. This should trigger immediate monitoring and protection and be incorporated into future planning and management.

iii. That the results from a monitoring process must be ecologically acceptable before further development of a water source is permitted. It is important that performance indicator targets are clear, defined and quantitative.

iv. Facilitation of adequately resourced, independent auditing of Water Management Plans administered under the *Water Management Act 2000* (NSW).

v. Baseline data are gathered on a yearly basis during the 10 year tenure of a plan. The results should be incorporated into any review.

vi. That the review of Water Management Plans assesses the results and trends of any monitoring programs and make adjustments to ensure good adaptive management.

vii. Where monitoring results clearly indicate a need to increase environmental allocations, the allocations should be increased without delay.

viii. Monitor 100% of licensed installations for extraction of water sources (including stock and domestic bores) with verifiable and timed volumetric metering.

ix. That any monitoring regime continues and is publicly reported on an annual basis. Monitoring results should be maintained in a central database that is publicly accessible.

2.10. Urban Water

Background:

In 2004 the NSW Government introduced the *Metropolitan Water Plan 2004* which embodied the Government's strategic approach to water management in the greater Sydney area, the most populated urban area in Australia. The 2004 strategy has since been replaced by the *Metropolitan Water Plan 2006* and then the *Metropolitan Water Plan 2010* ('MWP 2010'). The MWP 2010 is a statement of Government policy. It is not a statutory plan prepared under the *Water Management Act 2000* (NSW) or any other legislation. The MWP 2010 was formulated on the basis of the following seven community planning principles developed in the consultation processes undertaken during the review of the 2006 plan:

1. Provide water that is affordable and safe to drink.
2. Ensure enough water to meet both the environmental and human needs — one not more important than the other.
3. Ensure a dependable long-term water supply for current and future generations.
4. Maximise water efficiency and recycling, especially capturing stormwater and invest in research and innovation.
5. Restore clean healthy waterways and ensure health of catchments by reducing pollution.
6. Ensure government and community take joint responsibility for water management.
7. Share water — taking into consideration all relevant sectors and regions.[3]

The NCC supports these principles — with the exception of Principle 2.

In relation to Principle 2 the NCC recommends:

i. In future reviews of the urban water strategy embodied in the MWP 2010, the return of water to natural sources to meet environmental needs should be given priority over water allocation from natural water sources to meet human needs.

ii. Seawater extracted from the coastal waters of the State for treatment and use as drinking water or water fit-for-purpose (see Glossary) should be included in the water sharing provisions of a water-sharing plan for the coastal waters.

[3] Office of Water (NSW), *2010 Metropolitan Water Plan* (August 2010), 20.

2.10.1. Demand Management Strategy

The NCC recommends:

i. Urban water utilities (whether public or private operators) should be licensed under the *Water Management Act 2000* (NSW).

ii. An urban water utility access licence should include a water allocation that is tied to a relevant water-sharing plan. The water allocation should incorporate demand management objectives and should be regularly reviewed to adapt to changing water supply options through changing technology and the development of new water supply options.

iii. Water allocations for urban water utilities should include water obtained from natural water sources and from new, non-rainfall dependent sources.

2.10.2. Urban Stream Restoration

The NCC recommends:

i. Programmes for urban stream restoration should be undertaken to improve and protect natural streams, including those in the area covered by the MWP 2010.

2.10.3. Private wastewater systems

The NCC recommends:

i. A cohesive, comprehensive, statute-based management and monitoring system for private wastewater diversion, treatment and use be put in place.

ii. Small-scale domestic wastewater diversion, treatment and use should be accommodated in the overall management scheme.

iii. Operators of private wastewater systems should be required to comply with the Australian Guidelines for Water Recycling.

iv. Enforcement provisions should be included in the management scheme to ensure that no adverse impacts on the environment or public health and safety arise from licensed operations.

2.10.4. Licensing of Private Water Service Providers: *Water Industry Competition Act 2006* (NSW)

Background:

The *Water Industry Competition Act 2006* (NSW) ('*WICA 2006*') introduced a scheme of licensing for private water service providers. The licences granted under the *WICA 2006* are distinct from the water access licences granted under the *Water Management Act 2000* (NSW). *WICA 2006* licences authorise the licensee to provide specific services — either water network operation or retail water supply. They do not grant access to water sources.

The NCC recommends:

i. A single form of operating licence should apply to both public and private water service providers.

ii. All operating licences should require operators to apply the principles of ecologically sustainable development.

iii. Operating licence conditions should require operators to strictly adhere to nationally agreed water quality guidelines.

2.11. Water Pricing

Objective:

Water pricing regimes should be transparent and reflect full cost recovery. They should incorporate externalities and include operation, maintenance, appropriate asset replacement, future capital expenditure and environmental protection costs associated with water use.

Management Goals:

a. Greater integration of costs including externalities into water pricing to achieve environmental benefits.

b. Greater use of pricing and allocation incentives to promote efficiency of water use.

c. Efficiency gains paid for with public money return water to the environment.

d. Fiscal incentives to limit stock access to waterways and to encourage native vegetation retention.

2.12. Water Markets & Trading

Background:

Water trading is an important element of the National Water Initiative. To implement this reform initiative in NSW, the *Water Management Act 2000* provides that access licences and water allocations (often referred to in general terms as 'water entitlements') issued under the Act may be traded. (See Glossary)

Objective:

To ensure that water trading does not adversely impact the ecological and hydrological health of water resources in NSW.

Management Goals:

a. Water entitlements that may be traded on the market must remain a limited and conditional form of entitlement within a clear set of rules, with a set tenure.

b. Such an entitlement must exist within a secure statutory framework that ensures the continuation and enhancement of all flows through streams and aquifers needed to meet environmental and other public purposes.

c. Transfer of water allocations is to account for both the water pumped directly from rivers or aquifers, as well as those volumes diverted from rivers via irrigation or other channels measured at the offtake point, including seepage and evaporation associated with those diversions.

d. Any transfer of licensed yearly entitlement, flow share or water allocation must be subject to environmental assessment under the *Environmental Planning and Assessment Act*.

e. Water trading should not increase degradation through activating a sleeper licence or a dozer licence , (see Glossary) further concentrating water extraction at critical times of the year.

f. A levy on water trading to be imposed and used to fund river health to sustain long term productive viability for rural businesses.

The NCC recommends:

i. Consideration be given to:

- creation of a scheme of water entitlements for domestic, commercial and industrial water users, and
- development of a system of trading for urban water entitlements to support strong initiatives to reduce water consumption in urban areas.

ii. That water must continue to be deemed a public resource and remain under public ownership and control.

2.12.1. Native title rights (See also NCC Aboriginal Interests and Nature Conservation Policy 2007)

Participation in the water market is an essential element of ensuring fair rights to the Aboriginal people to access, protect and benefit from, water in their country; this is particularly pertinent where rivers are regulated and wetlands of significance to Aboriginal people are denied water. Consequent to the *Water Management Act 2000*, the NSW Aboriginal Water Trust was established to provide benefits to Aboriginal people in relation to their spiritual, social, customary and economic use of land and water. It provides funding to help increase the level of participation by Aboriginal people in the water market and to assist water related enterprise where water is central to a business enterprise.

The NCC recommends:

i. Supporting the concept underlying, and the objectives of, the NSW Aboriginal Water Trust.

3. PUBLIC INVOLVEMENT AND COMMUNITY PARTICIPATION

PRINCIPLE 3: Timely and meaningful community participation in water management and planning

Local communities are to be engaged in all aspects of water resource management and planning from policy development to water policy implementation and monitoring.

Policy Issues:

3.1. Water policy, planning and management processes
3.2. Education and Awareness
3.3. Aboriginal Consultation

3.1. Water policy, planning and management processes

Objective:

Open and transparent policy development, planning and management, processes that involve a process of community consultation; that will establish community ownership of the problems associated with water management; and that will allow the community to take ownership of the solutions to those problems.

The NCC recommends:

i. Water management committees should be involved in the full cycle of policy development and statutory processes.

ii. Agencies responsible for management and regulation should have strong commitment to full public participation.

3.2. Education and Awareness

Objective:

Develop and foster awareness at the political, institutional and community levels of the elements of the water cycle and its significance in successful achievement of ecological sustainable development.

Management Goals:

Development and implementation of clear and transparent administrative processes that will ensure consistent, integrated management of water in NSW.

The NCC recommends:

i. Effective and comprehensive communication of the nature of the water cycle, government policies and regulatory requirements across government departments to foster interagency cooperation and knowledge transfer.

ii. Ongoing education of the community to increase community awareness of the benefits of ecologically sustainable development.

iii. Improved community access to relevant information (regional telecentre, government data, government policies and publications).

iv. Public involvement in water policy and administration should:

- Be widened and extended beyond the limited third party enforcement rights in respect of water quality breaches;

- Involve the setting of water quality objectives in addition to that of the guidelines; and
- Be an integral part of environmental auditing process (e.g.. provide for public reporting of unacceptable activities by government agencies and private bodies which adversely affect water quality).

v. The Government should develop new, and continue to support existing, legal and environmental education programs for urban and rural communities, including Streamwatch and Waterwatch.

vi. In order to minimise use of pesticides and herbicides and the consequent risk of water pollution, all urban and rural land managers should be encouraged and assisted to understand and apply relevant ecological principles.

vii. The NCC should be appropriately represented at all levels of community involvement (boards, advisory councils, committees, task forces, etc).

viii. There should be clear public involvement procedures for licences for extractions and discharges and setting of standards.

3.3. Aboriginal Consultation

Aboriginal communities have made it clear that they need time and resources to decide how they want to contribute and be heard in the water management process. Participation may be different from community to community and there may be different processes for different types of Aboriginal rights in water. For example, NCC has supported the formation of a State-wide Water Management Trust to deal with the economic rights to water that arise from the water management planning process. We have also supported regional representation and support for communities engaging in the spiritual, cultural and traditional use of water by Aboriginal communities.

The NCC recommends:

i. Ongoing support for engagement of the Water Management Trust in relation to rights arising from the water management planning process.

4. DECISION-MAKING

PRINCIPLE 4: Transparency of process and accountability of decision-makers.

Water resource management and planning processes to be open and transparent and decision-makers to be fully accountable.

Policy Issues:

4.1. Water Management Planning
4.2. Formal Role of the Nature Conservation Council of NSW
4.3. Role of Governments
4.4. Standard setting
4.5. Associated Legislation and Legislative Reform
4.6. Aboriginal Rights to Water

4.1. Water Management Planning

Objective:

Development and implementation of clear and transparent administrative processes to deliver integrated water management in NSW.

Management Goals:

To encourage and influence the development and implementation of clear and transparent administrative processes for water planning and management in NSW.

The NCC recommends:

i. All water management frameworks should:
   - include appropriate mechanisms for review of administrative actions and decisions;
   - provide for regular monitoring and review to ensure efficient and effective regulation;
   - adopt adaptive management to incorporate, and respond to, changing needs and changing technologies; and
   - adhere to the principles of ecologically sustainable development.

ii. All access licences and other entitlements should remain under public control and be open to free inspection and regular review.

iii. An unrestricted freedom of information system should apply to all aspects of the public ownership and control of water.

iv. Directors of public bodies making decisions about water use should be selected on the basis of a range of relevant expertise, including nature conservation policy and ecology.

4.2. Role of the Nature Conservation Council of NSW in Water Resource Decision-Making

The Nature Conservation Council of NSW should pursue statutory rights to nominate as appropriate, one or more representatives to water-related statutory bodies.

4.3. Role of Governments

Background:

As a natural resource, use and control of water in Australia is vested in the Crown. In NSW these Crown rights with respect to water reside with the NSW Government.

Objective:

The NSW Government should adhere to the principles of ecologically sustainable development in the exercise of its rights to the control, use and flow of water in NSW.

Management Goals:

Creation of a single water manager to allocate water (including wastewater for recycling).

The NCC recommends:

i. Whole-of-government coordination that ensures all regulations relating to water, including existing legislative provisions and international treaties to which Australia is a party, are adhered to when making decisions about water resource management.

ii. The water manager should be constrained by, and made subject to, water quality and river flow objectives. Advice on water quality standards should be provided in a public manner to government by expert government and non-government agencies, such advice then forming the basis for the subsequent political decisions on the standards that are to be adopted.

iii. Water allocations should be reviewed to ensure the sustainability of river and associated ecosystems. The Government should provide sufficient financial resources to conduct appropriate reviews.

iv. A 'catchment focus' in the management of water quality by the catchment management authorities should be promoted, retaining a number of manager/operators who compete openly in achieving Government Water Policy, to enhance the possibility of more efficient outcomes even if this involves some duplication of management functions.

v. Town water suppliers should be appropriately licensed as water network operators or water retail sellers and be required: to be more publicly accountable; to demonstrate that proposed changes in town water usage will have neutral or beneficial effects on environmental flows; and, to apply conservation principles to town water catchments in particular the protection and retention of native vegetation.

4.4. Aboriginal Rights to Water (See also NCC Aboriginal Interests and Nature Conservation Policy 2007)

The NCC recommends:

i. Legislation should be developed to ensure that Aboriginal people have:

- Traditional rights to access clean and healthy water.
- Traditional rights to access birds, fish, crustacea and other traditional foods which require clean healthy rivers, with sufficient water to function as an ecosystem.
- Cultural, spiritual and identity aspects of water, rivers and wetlands.
- Native title rights.
- Participation in the water market.

III. DEFINITIONS AND GLOSSARY

access licence:

entitles a holder to:

- specified shares in the available water within a specified water management area or from a specified water source (the **share component**) and
- take water
    - at specified times, at specified rates or in specified circumstances, or in any combination of these, and
    - in specified areas or from specified locations (the **extraction component**). (Source: *Water Management Act 2000* (NSW) section 56)

An access licence does not confer a right on any person to:

- use water for any particular purpose (that is conferred by a **water use approval**)
- construct or use a water supply work (that is conferred by a **water management work approval**)

(**Water use approvals** and **water management work approvals** (and activity approvals) are dealt with in Ch3, Pt 3 of the *Water Management Act 2000* (NSW).

An **access licence** ceases to be in force on the date that the cancellation of the licence is recorded in the Access Register (*Water Management Act 2000* (NSW) section 69).

aquifer:

a geological formation or group of formations capable of receiving, storing and transmitting significant quantities of water. Aquifers include confined, unconfined and artesian types, (Source: Australian Drinking Water Guidelines)

Australian Drinking Water Guidelines (ADWG):

The 2004 edition of the *Australian Drinking Water Guidelines*, published by the National Health and Medical research Council (NHMRC) and Natural Resource Management Ministerial Council (NRMMC) (Source: Recycled Water Guidelines)

biodiversity (biological diversity):

The variety of life forms, including the plants, animals and microorganisms, the genes they contain and the ecosystems and ecological processes of which they are part. (Source: Recycled Water Guidelines)

blackwater:

water containing human excrement. (Source: Recycled Water Guidelines)

CAMBA:

Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and Birds and their Environment (Australian Treaty Series 1988 No 22)

catchment:

area of land that collects rainfall and contributes to surface water (streams, rivers, wetlands) or to groundwater. (Source: Recycled Water Guidelines)

In urban areas, a catchment will include those areas of land that collect runoff and contribute to wastewater sources.

coastal waters of the State has the same meaning as it has in Part 10 of the *Interpretation Act 1987* (NSW) [Source: *Water Management Act 2000*]

Conservation:

all the processes and actions of looking after the natural environment in order to retain its natural significance. Conservation always includes protection, maintenance and monitoring.

cultural flows:

Aboriginal people have coined the term 'cultural flows' to speak to policy-makers accustomed to 'environmental flows', the terminology of science.

When Aboriginal people talk about cultural flows, they mean the completely natural flow of water, according to the season, in much the same manner as science uses the term environmental flow but with clear distinctions between them. However they assert that cultural flows belong to the Aboriginal people, so they can benefit from the river system (including groundwater) in accordance with their law and custom, and by participating in decision-making. The rivers' seasons and cycles are to be respected, and in turn economic needs will be provided for as part of the reciprocal relationship. Cultural flows provide for many of the traditional foods and medicines to Aboriginal people, sustaining biodiversity by enriching habitat and maintaining important cultural heritage sites located in water bodies.

Environmental flows are described in policy as an ongoing responsibility to manage water as closely as possible to natural river hydrology. The government draws on the expertise of scientists to determine the best-practice management of rivers. The traditional owners use the term 'cultural flows' to indicate their different goals from those of science.

If a river is in good health, through 'cultural' or 'environmental' flows, it can provide spiritual, cultural, economic and social benefits to all who depend on it.

Department:

The relevant NSW Government department responsible for the development and implementation of water management and planning policy

direct drinking water (potable) reuse:

The discharge of recycled water directly into a drinking water treatment facility or into a drinking water distribution system. (Source: Recycled Water Guidelines) (See also ***indirect drinking water (potable) reuse***).

dozer licence:

a dozer licence is one that has a history of very little use of its water allocation.

drinking water:

Water intended primarily for human consumption (Source: Recycled Water Guidelines)

ecological integrity:

a term used to describe ecosystems that are self-sustaining and self-regulating. For example, they have complete food webs, a full complement of native species that can maintain their populations, and naturally functioning ecological processes (energy flow, nutrient and water cycles, etc). (Source: Parks Canada)

ecologically sustainable development (ESD):

requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the following principles and programs:

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

   In the application of the precautionary principle, public and private decisions should be guided by:

   i. careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and

   ii. an assessment of the risk-weighted consequences of various options,

b. inter-generational equity — namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,

c. conservation of biological diversity and ecological integrity — namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration

d. improved valuation, pricing and incentive mechanisms — namely, that environmental factors should be included in the valuation of assets and services, such as:

   i. polluter pays — that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

   ii. the users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

   iii. environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems. (Source: *Protection of the Environment Administration Act 1991* (NSW), s 6(2))

efficiency:

the NCC is wary of the use of the words 'efficient' and 'efficiency' in the environmental context. In many cases the meaning of efficiency as applied to human uses of water can result in negative outcomes for the environment. For example, pipes may be described as more efficient irrigation infrastructure than channels, for they reduce water loss; however this improved efficiency results in less water being returned to the environment through seepage and evaporation.

In considering matters pertaining to water use, 'environmentally effective', 'environmental effectiveness', or 'effective environmental outcomes' will generally purvey a more accurate meaning of 'benefit to nature' than efficient or efficiency.

effluent:

the out-flow water or wastewater from any water processing system or device. (Source: Australian Drinking Water Guidelines)

environmental flows:

Environmental allocation for surface water rivers, streams or creeks. (Source: Recycled Water Guidelines)

environmental works:

Infrastructure specifically built to deliver water to achieve environmental outcomes, for example regulators, channels, fishways

estuary means:

(a) any part of a river whose level is periodically or intermittently affected by coastal tides, or
(b) any lake or other partially enclosed body of water that is periodically or intermittently open to the sea, or
(c) anything declared by the regulations to be an estuary,

but does not include anything declared by the regulations not to be an estuary. [Source: *Water Management Act 2000*]

fit-for-purpose:

water of a quality that is fit for the intended use (Source: Recycled Water Guidelines)

flood irrigation:

A range of irrigation methods are used in Australia including flood, furrow, spray/sprinkle, trickle/Drip. All things being equal, flood and furrow irrigation tend to be far less environmentally effective in terms of water use methods, being susceptible to high rates of water loss through evaporation. Despite this, both flood and furrow irrigation are commonly used, with flood irrigation used for rice and pasture production and furrow irrigation being the predominant method for grapes, trees, horticultural and field crops, particularly in the irrigation systems comprising older infrastructure.

greywater:

wastewater from the hand basin, shower, bath, spa bath, washing machine, laundry tub, kitchen sink and dishwasher. Water from the kitchen is generally too high in grease and oil to be reused successfully without significant treatment. (Source: Recycled Water Guidelines)

groundwater:

water contained in rocks or subsoil. (Source: Recycled Water Guidelines)

indirect drinking water (potable) reuse:

the discharge of recycled water directly into groundwater or surface water with the intent of augmenting drinking water supplies. (Source: Recycled Water Guidelines)

integrated catchment management:

The coordinated planning, use and management of water, land, vegetation and other natural resources on a river or groundwater catchment, based on cooperation between community groups and government agencies to consider all aspects of catchment management. (Source: Recycled Water Guidelines)

JAMBA:

Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds and Birds in Danger of Extinction and their Environment (Australian Treaty Series 1981 No 6)

lake includes:

(a) a wetland, a lagoon, a saltmarsh and any collection of still water, whether perennial or intermittent and whether natural or artificial, and

(b) any water declared by the regulations to be a lake,

whether or not it also forms part of a river or estuary, but does not include any water declared by the regulations not to be a lake. [Source: *Water Management Act 2000*]

managed aquifer recharge:

the intentional recharge of water to aquifers for subsequent recovery or environmental benefit. (Source: Recycled Water Guidelines)

Minister:

the Minister responsible for the administration of relevant NSW water laws from time to time

Neutral or Beneficial Effects (NorBE):

The State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 (NSW) requires developments that are to take place in the Sydney drinking water catchment that fall under Part 4 of the *Environmental Planning and Assessment Act 1979*(NSW) to satisfy an assessment that they will have neutral or beneficial effects on water quality.

The *Neutral or Beneficial Effect on Water Quality Assessment Guideline 2011* (***NorBE Guideline***) prepared by Sydney Catchment Authority supports the implementation of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011. It provides clear direction on what a neutral or beneficial effect means, how to demonstrate it, and how to assess a planning application against the neutral or beneficial effect on water quality test in the *Neutral or Beneficial Effect on Water Quality Assessment Tool 2011* (***NorBE Tool***) set out in Appendix 1 to the NorBE Guideline. The guideline also provides the decision-making framework for the NorBE Tool. For more information, see <http://www.sca.nsw.gov.au/>.

Different provisions apply to developments that fall to be undertaken in the Sydney drinking water catchment by public authorities.

potable (drinking) water:

water suitable on the basis of both health and aesthetic considerations for drinking or culinary purposes. (Source: Recycled Water Guidelines)

rain rejection flows:

water flows that result from the cancellation of water orders (as a result of unexpected rainfall) after the water has been released for use

recycled water:

water generated from sewage, greywater or stormwater systems and treated to a standard that is appropriate for its intended use. (Source: Recycled Water Guidelines)

Recycled Water Guidelines (RWG):

The Recycled Water Guidelines comprise:

- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks*
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Augmentation of Drinking Water Supplies*
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Stormwater Harvesting and Reuse*
- *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Managed Aquifer Recharge* [Source: Environment Protection and Heritage Council].

reuse:

using water that would otherwise be discharged to wastewater or stormwater systems, for domestic, commercial, agricultural or industrial purposes.

river includes:

(a) any watercourse, whether perennial or intermittent and whether comprising a natural channel or a natural channel artificially improved, and

(b) any tributary, branch or other watercourse into or from which a watercourse referred to in paragraph (a) flows, and

(c) anything declared by the regulations to be a river,

whether or not it also forms part of a lake or estuary, but does not include anything declared by the regulations not to be a river. [Source: *Water Management Act 2000*]

science:

Peer reviewed science is the way that humankind establishes the majority of 'facts' and 'knowledge'. It is quite distinct from faith, belief and opinion, (i.e. dogma) which often do not convey facts.

Science enables humankind to 'predict' with greater accuracy, and thus to 'manage'. Prediction of consequences is the basis for Policy. Decision-makers create policy by prioritising facts and knowledge and their consequences according to sets of social values.

It is of critical importance that the 'Water Rules' and Policy are based on science not on dogma.

sewage (wastewater):

material collected from internal household and other building drains. Includes faecal waste and urine from toilets, shower and bath water, laundry water and kitchen water. (Source: Recycled Water Guidelines)

sewer mining:

process of extracting wastewater directly from a sewer (either before or after a sewage treatment plant) for reuse as recycled water. (Source: Recycled Water Guidelines)

sleeper licence*:*

licences which have been issued but do not have history of water usage.

stakeholder:

a person or group (eg an industry, a government jurisdiction, a community group, the public etc) that has an interest or concern in something. (Source: Recycled Water Guidelines)

stormwater:

rainwater that runs off all urban surfaces such as roofs, pavements, car parks, roads, gardens and vegetated open spaces.

surface water:

All water naturally open to the atmosphere (eg rivers, streams, lakes and reservoirs). (Source: Recycled Water Guidelines)

wastewater: (see ***sewage)***

water allocation:

the quantity of water available to be taken under a water access licence as shown in the licence's water allocation account (Source: National Water Commission Dictionary)

water accounting

Catchment Water Budgets are an essential tool in regulating extraction from water resources, but a pre-cursor is reliable data on inputs and outputs. The basis of recording data for Water Budgets is known as **general purpose water accounting,** (in the vernacular as double entry book-keeping,) and it is analogous to financial book-keeping.[1,2] Basically all elements of water input into a catchment are recorded as a credit, and all water outputs are recorded as debits. The difference between the inputs and the outputs is the water balance.

One of the objectives of the National Water Initiative (NWI) is to standardise the practice of water accounting in Australia so that consistent and comparable information about water resources is available for decision-makers at every level.[3]

The elements of a general purpose water accounting report are: water assets, water liabilities, net water assets, changes in water assets, and changes in water liabilities.

A general purpose water accounting report must present:

a) water assets separately from water liabilities;

b) changes in water assets separately from changes in water liabilities; and

c) physical water inflows separately from physical water outflows.

Hence it is regarded as double entry reporting/book-keeping.

All 'material' information must be included in a general purpose water accounting report. Information is deemed material if its omission from, or misstatement in a report could influence the decisions of users of the report.

With the exception of physical water flow information, general purpose water accounting reports must be prepared using the accrual basis of water accounting.

Applying the accrual basis of water accounting means that the transactions are recognised when the decisions or commitments that give rise to them occur. This may not be the time at which water is physically transferred.

Water assets are recognised in the Statement of Water Assets and Water Liabilities only when:

a) it is probable that future benefits associated with the water will be derived

by the reporting stakeholders, and

b) the water's volume can be faithfully quantified.

Water that meets this definition includes water in storages behind dams and water within lakes and other natural surface features. It also includes dead storage water, conveyance water and the extractable portion of groundwater. The total volume of groundwater is often not regarded as a water asset because a significant portion of the groundwater may be non-extractable due to physical or regulatory limitations.

The essential characteristic of a water liability is that there exists a present (not future) obligation.

References:

1. Eamus, Hatton, Cook and Colvin; Ecohydrology (2006) CSIRO Publishing, Chpt 3
2. Tropical Rivers and Coastal Knowledge; Water Resource Assessment. Go to:
http://www.track.gov.au/research-projects/401
http://www.track.gov.au/sites/track.boab.info/files/uploads/TRaCK_MaterialBudgets_Project4_1_Web.pdf
3. The Exposure Draft of Australian Water Accounting Standard 1:

Preparation and Presentation of General Purpose Water Accounting Reports (ED AWAS 1) and associated model reports are available online at: http://www.bom.gov.au/water/wasb
Published by the Water Accounting Standards Board (Bureau of Meteorology) 2010.

water recycling:

a generic term for water reclamation and reuse. It can also be used to describe a specific tyoe of 'reuse' where water is recycled and used again for the same purpose (eg recirculating systems for washing and cooling), with or without treatment in between. (Source: Recycled Water Guidelines)

water source means the whole or any part of:

(a) one or more rivers, lakes or estuaries, or
(b) one or more places where water occurs naturally on or below the surface of the ground,

and includes the coastal waters of the State. [Source: *Water Management Act 2000*]

water trading (NSW provisions):

An **access licence** may be transferred (*Water Management Act 2000* (NSW) s 71M) (some **access licences** can be transferred for a specified period only: *Water Management Act 2000* (NSW) s 71N). The **share component** and the **extraction component** of **access licences** n the same water management area or water source can also be transferred on certain conditions (*Water Management Act 2000* (NSW) s 71Q). **Water allocations** are also separately tradeable in certain circumstances (*Water Management Act 2000* (NSW) s 71T).

Interstate transactions relating to **access licences** and **water allocations** require agreement between the relevant State Ministers.

The Minister may compulsorily acquire an **access licence** 'in the public interest' (*Water Management Act 2000* (NSW) s 79).

IV. REGULATORY FRAMEWORK

The regulatory framework (including important policy and other non-statutory documents as well as statutes) relating to water management and planning in NSW at the time of writing includes:

Commonwealth Instruments:

Australian Guidelines for Water Recycling: Managing Health and Environmental Risks

Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Augmentation of Drinking Water Supplies

Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2): Stormwater Harvesting and Reuse

Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2)

Intergovernmental Agreement on a National Water Initiative (June 2004)

National Water Commission Act 2004 (Cth)

Water Act 2007 (Cth

NSW Instruments:

Catchment Management Authorities Act 2003 (NSW)

Coastal Protection Act 1979 (NSW)

Coastal Waters (State Powers) Act 1980 (NSW)

Environmental Planning and Assessment Act 1979 (NSW

Fisheries Act 1935 (NSW)

Fisheries Management Act 1994 (NSW)

Hawkesbury-Nepean River Act 2009 (NSW)

Interim NSW Guidelines for Management of Private Recycled Water Schemes

Metropolitan Water Plan 2010

National Parks and Wildlife Act 1974 (NSW)

NSW Coastal Policy 1997

NSW Government Coastal, Estuary and Floodplain Management Programs

NSW Government Statement of Intent: Coastal Lakes 2003

NSW Guidelines for Greywater Reuse in Sewered, Single Household residential Premises

Protection of the Environment Administration Act 1991 (NSW)

Public Health Act 1991 (NSW)

State Environmental Planning Policy (Infrastructure) 2007 (NSW)

State Environmental Planning Policy (Major Development) 2005 (NSW)

State Environmental Planning Policy No 71 – Coastal Protection

State Water Management Outcomes Plan Order 2002 (NSW) (expired)

Sydney Water Act 1994 (NSW)

Sydney Water Catchment Management Act 1998 (NSW)

Water Act 1912 (NSW) (in part)

Water for Life: Water Education Plan for Greater Sydney 2008–2012

Water Industry Competition Act 2006 (NSW)

Water Management Act 2000 (NSW)

Wilderness Act 1987 (NSW)

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