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Water Quality in NSW - An Overview

by

Stewart Smith

Briefing Paper No 4/95

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INTRODUCTION

Water is one of the fundamental resources that we depend upon every day. The state of our waterways (rivers and oceans) is dependent on the way we use the land. If the catchment[1] is managed in accordance with the concepts of ecologically sustainable development, then the water quality of rivers and oceans is likely to be good. Conversely, if catchments are managed improperly, water quality is likely to be poor.

Currently some of the waterways in NSW are showing signs of environmental stress, with nutrient overload, blue-green algae blooms, sewage contamination and river bank erosion examples of major problems.[2] This seems to indicate that our catchment management could be improved. A Federal Environment Department study on the state of the marine environment found that not one estuary in NSW had excellent water quality and that at least 64 per cent of estuaries in the State were considered to have poor water quality.[3]

Traditionally, environment protection agencies have concentrated on point source pollution, or end of pipe pollution sources. Much of this has been controlled, and it is only recently that greater attention has been paid to diffuse pollution sources such as stormwater. Whilst diffuse sources are much more difficult to control, the benefits to the environment are significant.

In response to these problems, the State government and relevant agencies have introduced a variety of reforms to policy and administrative procedures. In 1989 the State Government introduced the concepts of total catchment management (TCM) into legislation with the passing of the Catchment Management Act. TCM is defined as the coordinated and sustainable use and management of land, water, vegetation and other natural resources on a water catchment basis which balances resource utilisation and conservation.[4] More recently, fundamental changes to the administration of water and water quality have been proposed by the government, which will be discussed towards the end of this paper.

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1 The catchment is the area of land surrounding a body of water, where all the water that falls onto the land drains into that body of water.

2 Environment Protection Authority (1993) New South Wales State of the Environment. EPA Chatswood, Sydney.

3 Woodford,J. "Our coastline in perilous state, say eco-testers." *The Sydney Morning Herald*, January 17 1995, p.1. Article on the *State of the Marine Environment Report for Australia*.

4 Catchment Management Act 1989.

This paper is the third in a series of papers on water by the NSW Parliamentary Library Research Service. The Briefing Note "Stormwater quality and urban living"[5] discusses the effects of urban runoff on water quality, with an emphasis on the effect of dogs on water quality. The Briefing Note "Water Resources and Water Strategies"[6] provides an historical overview of the water resources of the State. This paper takes a selective view of water quality and analyses some of the major problems affecting the States waterways.

BLUE-GREEN ALGAE BLOOMS

Blue-green algae (cyanobacteria) are microscopic single celled organisms that live naturally in waterways. In excessive numbers algal blooms result, which can have a detrimental effect on human health, stock and the environment.[7] Algal blooms are symptomatic of the problems facing many river systems, and are now a major water quality problem in NSW.[8]

Algal blooms have been recorded since the 1800's in Australia, however over the last couple of years they have increased in number. The following factors have led to this development:

- drought
- high summer temperatures
- river flows reduced by irrigation
- inputs of nutrients from sewage works
- inputs of nutrients from agriculture.

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[5] Smith,S. (1994) "Stormwater Quality and Urban Living" NSW Parliamentary Library Briefing Note No. 33/94.

[6] Wilkinson, J. (1995) "Water Resources and Water Strategies." NSW Parliamentary Library Briefing Note No. 002/95.

[7] The Parliament of the Commonwealth of Australia, Senate Standing Committee on Environment, Recreation and the Arts (1993) Water Resources - Toxic Algae.

[8] Department of Water Resources (1992) The Cyanobacteria (Blue-green algal) Bloom in the Darling/Barwon River System, November - December 1991.

The combination of these factors has created perfect conditions for algal blooms.[9] In November 1991 an algal bloom over 1000km long on the Darling/Barwon River system created headlines across the country. Often associated with western or inland rivers, a bloom may affect any aquatic (ie non-saline) environment, for instance the Hawkesbury Nepean River has also been affected. The Environment Protection Authority has recently concluded that the potential for algal blooms remains high, particularly in the 40 kilometre section downstream of Windsor.[10] Similarly, an algal warning has recently been released for the Karuah River by the Hunter Regional Algal Coordinating Committee.[11] Algal blooms may also be a problem in water storage areas.

Whilst the above factors may lead to an algal bloom, what actually triggers a bloom is still not clear. Clarity of water, allowing sunshine to reach the algal cells and fuel growth, reduced river flow and degradation of the river environment are all important, as is the presence of high levels of nutrients. In dry conditions, most nutrients come from point source discharges such as sewage plants. In wet weather, and especially floods, agriculture runoff is the most significant source of nutrients.[12]

The toxicity of blue-green algae blooms varies greatly. Different types of algae produce different types of toxins, with different effects. Some forms break down liver cells and produce the symptoms of gastro-enteritis in humans, and can kill domestic and farm animals through necrosis of the lungs, kidneys, adrenal glands and intestine.[13] Testing needs to be done for each bloom to determine its toxicity.

There are several relatively simple solutions to curb the incidence of algal blooms. Reducing the level of nutrients in rivers by removing phosphorus from sewage plant effluent and minimising the amount of phosphorus in runoff from surrounding land is one way. For instance, some dairy farms in the Hunter Valley have developed techniques that reduce the amount of phosphorus entering the river system, by applying smaller amounts of phosphorous more

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[9] Creagh, C. (1992) What can be done about toxic algal blooms? *Ecos* 72, winter 1992.

[10] Environment Protection Authority (1994) Water Quality, Hawkesbury-Nepean River System, June 1990 to June 1993. Environment Protection Authority.

[11] "Algal alert on river" *The Newcastle Herald* 26 November 1994.

[12] *Ibid* p.16.

[13] *Ibid* p.16.

often and introducing buffer zones between river banks and pasture.[14] The stagnation of rivers is exacerbated by the removal of water for irrigation and domestic use. A greater allocation of water for the environmental health of rivers is desirable.

In response to the outbreak of toxic algal blooms, the government established the NSW Blue-Green Algae Task Force, which developed an Algal Management Strategy. In September 1992 the Task Force was disbanded and replaced by the State Algal Co-ordinating Committee. This Committee is now responsible for implementing the Management Strategy, which aims to minimise the occurrence and impacts of blue-green algae blooms.[15]

Marine areas are also prone to blooms. Phytoplankton are microscopic animals that form the food base of the open ocean. They encompass a huge diversity of organisms, with some able to produce toxins.

Blooms of phytoplankton in the marine environment are a natural phenomenon and occur on the continental shelf along NSW in the summer/spring most years. "Red tides" are a particular type of bloom that become so dense that they discolour the sea. There has been an apparent increase in the incidence, intensity and geographical distribution of red tides in Sydney waters in the last 10 - 15 years.[16]

Over this same period, there have been substantial long term increases in nitrate and phosphate concentrations in nearshore waters off Sydney, and it is possible that the deep ocean outfalls have an effect on nutrient concentrations and phytoplankton populations.[17] According to the Joint Select Committee on the Water Board, the Water Board has insufficient information to definitely refute suggestions that discharge of sewage from the deep ocean outfalls can cause algal blooms or long-term changes in nutrient status.[18]

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[14] Buckler,S. (1994) "Mixing ferts lifts dairy returns 12pc" *The Land,* 22 December 1994, p.15.

[15] Total Catchment Management (1993) TCM Annual Report 1992-93.

[16] Environment Protection Authority (1993) New South Wales State of the Environment 1993.

[17] Mercer,C. (1994) Estuaries, beaches and coastal waters. Ecological implications of Water Board activities. An initial report for comment prepared for the Water Board as part of the Sydney Water Project. National Parks Association of NSW.

[18] NSW Parliament, Joint Select Committee (1994) Report Upon the Sydney Water Board. April 1994.

The monitoring of the long term changes of offshore water nutrient status is important, and has ramifications for determining treatment levels for the coastal sewage treatment plants. The international trend is for increasingly stringent requirements for organic carbon and nutrient removal at coastal treatment plants.[19]

TOXIC SUBSTANCES AND WATERWAYS

The accumulation of heavy metals and organochlorins[20] in waterways has been of concern for some time. These toxic substances enter waterways from urban runoff, industrial discharge and leaching, and sewer outflows. Many toxins settle down in the sediment of waterways and some may enter the food chain and accumulate in the flesh of marine animals.

Studies by the State Pollution Control Commission have shown that dioxin[21] levels in Homebush Bay are at high levels, and are able to enter the food chain and will ultimately accumulate in commercially important fish species, thus posing a threat to human health.[22] In response to this threat the government has banned fishing in the area. In this case the dioxins have escaped from a nearby industrial site. The authors of the SPCC Homebush Bay report recommended the remediation of the bay to be imperative, to prevent further movement of pollutants to the Parramatta River and continued contamination of marine life. To date, no action has been taken.

This example demonstrates the fragility of rivers and streams. Toxic substances can leach into the environment and enter the base of the food chain relatively easily.

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[19] *Ibid*, p. 62.

[20] Organochlorins are carbon based chemicals that contain chlorine. Examples include PVC plastic and dioxin.

[21] Dioxins have a reputation for being extremely toxic, based primarily on tests on guinea pigs. Because dioxins bioaccumulate in the food chain, the major source of human exposure is through ingestion of food containing dioxins, especially fish, meat and dairy products. Once ingested, dioxins distribute to organs according to fat content and readily accumulate in body fat. Females decrease their dioxin load through lactation.

Information from:

(1993) Dioxin Toxicity in *American Family Physician*. Vol. 47, No. 4, p. 855.

[22] Rubinstein,N. and J. Wicklund (1991) Dioxin Concentration of Sediment and marine fauna in Homebush Bay. State Pollution Control Commission.

Industry has a big responsibility to dispose of toxic wastes in an environmentally acceptable manner. Sydney Water licences industrial discharges into the sewage system through Trade Waste Policies. Over time, these trade waste policies are used to progressively restrict the amount of toxic products entering the sewage system.

A recent report claims that less than 60 percent of companies with a trade waste licence meet July 1994 Trade Waste Policy standards.[23] This report continues that toxic substances are being released into public waterways, as the deep ocean outfalls are exceeding their licence limits on restricted substances, including mercury, chlordane, dieldrin and heptachlor. A Water Board spokesperson claimed that these chemicals were out of Water Board control as they leached into the sewers from years of build up in the soil.[24]

A CSIRO report has found that during wet weather, the deep ocean outfalls discharge each day 110 tonnes of grease, 460 tonnes of suspended solids and 125 kilograms of organochlorins.[25]

The Environment Protection Authority conducts an Environmental Monitoring Program to determine the effect of the outfalls on the environment. A draft report concluded that six of the 20 most common species of fish caught by recreational anglers have been affected by the outfalls.[26] Other findings include the exposure of more of the environment to low levels of contamination (compared to the cliff face outfalls), and the accumulation of contaminants in sediments and fish found near the outfalls. Dr David Leece of the EPA said in response that there is no major short term ecological impact on the environment caused by the outfalls. However, there may be some effects in the longer term.[27] The deep ocean outfalls have a design life of 100 years.[28]

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[23] Mercer, C. (1994) Estuaries, beaches and coastal waters. Ecological implications of water board activities. An Initial Report for comment prepared for the Water Board as part of the Sydney Water Project. National Parks Association of NSW.

[24] Woodford, J. "Toxic waste rules broken -Report" *Sydney Morning Herald*, 15 November 1994.

[25] *Ibid.*

[26] Woodford, J. "Sydney faces new outfalls threat" *The Sydney Morning Herald* 29 August 1994, p.2.

[27] *Ibid*

[28] Information From Customer Relations Unit, Northern Region, Water Board.

Whilst the final results of the Environmental Monitoring Program have yet to be published, the Sydney Morning Herald reported the EPA Board releasing the findings of the Program. The Herald quoted John Niland, Chairman of the EPA Board as saying "I don't think that there's any doubt in the EPA board that we need to phase out the outfalls. We can't keep treating the oceans the way we have....the next stage is the complete phase-out of the deep ocean outfalls."[29]

WATER QUALITY FOR SWIMMING

Beachwatch reports that since the commissioning of the deep ocean outfalls, there has been a dramatic increase in the water quality of Sydney's beaches.[30] Visible sewage pollution was recorded less than 5 percent of days in the 1993-94 summer season, with most beaches clean every day. This is a great improvement compared to when the cliff face outfalls were operational.

Stormwater is now the greatest source of contamination of beaches, with Beachwatch noting that sewer overflows contribute the greater impact on water quality.[31] Whilst beaches are clean, it should be noted that some of the coastal lagoons on Sydney's northern beaches are very polluted. Manly Council has placed "No Swimming" signs around Manly Lagoon in recognition of its poor water quality. Community and school Streamwatch[32] groups have found sewage contamination in creeks entering Curl Curl Lagoon to be similar in scale to sewage problems in the Ganges River, India.

There are a variety of problems with sewage being present in recreational waters. Viruses entering the sewage system can ultimately contaminate water and the environment. Over 150 types of enteric viruses are potentially present in raw sewage, depending on time of the year and viruses circulating in the community. They may cause a variety of diseases in humans including skin,

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[29] Woodford, J. "Scrap ocean outfalls, says EPA" *The Sydney Morning Herald* January 6 1995, p.1.

[30] Beachwatch (1994) Summer Season 1993-94. Environment Protection Authority.

[31] For more information on stormwater issues, see: Smith, S (1994) "Stormwater Quality and Urban Living" NSW Parliamentary Library Briefing Note No. 33/94.

[32] Streamwatch is an environmental education water quality monitoring program for high school students initiated by the Water Board, and now extends across the State. Students and community groups can measure eight different water quality parameters, including faecal coliforms, which indicates sewage pollution.

eye and respiratory infections, fever, meningitis, myalgia and gastroenteritis.[33]

Despite overwhelming evidence that viruses enter, survive and are easily transported in the environment, viral standards for drinking and recreational waters have still not been established. The absence of faecal bacteria in water does not indicate the absence of pathogenic viruses because viruses survive longer than bacteria in aquatic ecosystems and are more resistant to disinfection techniques such as chlorination. The need for stricter microbiological standards becomes apparent with the introduction of communities using recycled water. For instance, Rouse Hill housing development in western Sydney uses recycled effluent, known as grey water, for gardens.

Water quality in the major rivers of Sydney is variable. The tributaries of the Hawkesbury Nepean River are dominated by sewage effluent, whilst this impact is less pronounced on the mainstream water body.[34] The Hawkesbury Nepean River is the main recreational water source in Sydney's western suburbs, and plans to virtually double the population in its catchment (presently 800,000) will mean that not only will the demand for recreational use of the river will grow dramatically, but so also will the amount of sewage discharged into the river.[35] It is generally recognised (although not necessarily by members of the public) that the only area of the Hawkesbury Nepean River suitable for swimming is the mainstream and tributaries of the Hawkesbury below Lower Portland.[36] (Lower Portland is at the confluence of the Colo River and Hawkesbury, well downstream of the towns of Windsor, Penrith and Camden.) Recent EPA analysis of water quality in the Hawkesbury Nepean River confirms this.[37]

The Government has recently announced the extension of Beachwatch to include Harbourwatch, so as to provide daily information about popular

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[33] Grohmann,G. *et al* (1994) "Viruses: The Hidden Hazard" in *Todays Life Science* Vol. 6 No. 8.

[34] Pearson,B. (1994) Rivers. Ecological implications of Water Board activities. An Initial Report for comment prepared for the Water Board as part of the Sydney Water Project. Nature Conservation Council.

[35] Environment Protection Authority (1994) Using Economic Instruments to Control Pollution in the Hawkesbury Nepean. Environmental Economic Series.

[36] *Ibid*, p.36.

[37] Environment Protection Authority (1994) *op. cit.* p.106.

harbour swimming locations.[38] Harbourwatch relies heavily on the correlation of faecal coliform levels with rainfall, and in cooperation with local councils forecasts the suitability of sites for immediate recreational activities.[39] For both Beach and Harbourwatch, the public can ring for a recorded message, which is updated daily, on the state of the waterways.

A regular water pollution testing and reporting mechanism such as Beachwatch is not in place for major recreational rivers such as the Hawkesbury Nepean. This summer (1994/95) the Environment Protection Authority is to commence a water monitoring program at 12 popular swimming locations along the Hawkesbury Nepean River. Testing is to occur once a month, to provide an indication of the likelihood of the level of pollution at that part of the river. Results are to be provided to local councils, catchment management committees and possibly the local media.[40]

The Urban Stormwater Pollution Task Force identified water quality monitoring as essential. The report stated:

> Water quality monitoring must be encouraged and the community must be involved and made aware of the results. It is a yardstick for the community to judge government programs and funds spent. If the water is too polluted to swim in, then the system is a failure.[41]

THE MANAGEMENT OF WATER AND WATER QUALITY

In the driest continent on earth, the management of water is of prime importance. In NSW several government agencies are responsible for the management and regulation of water. The Briefing Note "Water Resources and Water Strategies"[42] provides an historical account of the administration of water in NSW. Some would say that due to the poor state of many of our

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[38] Gilmore,H. "Harbour beaches in check" *The Sun Herald*, 17 April 1994, p.2.

[39] Environment Protection Authority (1994) Harbourwatch. A Pollution Monitoring and Reporting Program for the Port Jackson Catchment Waterways. Determination and reporting of water quality for immediate recreational purposes.

[40] Information from John Dengate, Environment Protection Authority, Public Relations Section.

[41] Environment Protection Authority, Urban Stormwater Pollution Task Force (1994) Improving the quality of Urban Stormwater in New South Wales. page 92

[42] Wilkinson, J. (1995) *op. cit.*

rivers and waterways that this management history has failed to adapt to changing environmental pressures. The following section provides an overview of contemporary water management, especially in relation to water quality.

TOTAL CATCHMENT MANAGEMENT

One of the problems experienced by government in attempting to improve natural resources management is the number of government agencies involved in land and water planning. Total catchment management (TCM) provides the philosophical and practical framework under which other relevant government policies and agencies operate. The principles of TCM provide a mechanism for co-ordination and co-operation.

To implement catchment management of natural resources in 1989 the NSW Government passed the Catchment Management Act. The objects of the Act are:

- to coordinate policies, programs and activities as they relate to total catchment management
- to achieve active community participation in natural resource management
- to identify and rectify natural resource degradation
- to promote sustainable use of natural resources
- to provide stable and productive soil, high water quality and protective and productive vegetation cover within each of the State's water catchments.[43]

To achieve these objects the Act provides for a network of Catchment Management Committees and Catchment Management Trusts, controlled by a State Co-ordinating Committee.

Catchment Management Committees are comprised of land holders in the area, persons having an environmental interest, nominations from local government, officers of government departments who have an interest in the area, and, where a catchment extends into another state or territory, government officers from that state (Section 14). There are currently 27 regional catchment management committees and three catchment management trusts.

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[43] Catchment Management Act 1989, S. 5(1).

The function of the committee and the resources available to it are of prime importance if total catchment management is to be achieved. The functions are:

- to promote and co-ordinate the implementation of total catchment management policies and programs
- to advise on and co-ordinate the natural resource management activities of authorities, groups and individuals
- to identify catchment needs and prepare strategies for implementation
- to co-ordinate the preparation of programs for funding
- to monitor and report on progress and performance of total catchment management strategies and programs
- to provide a forum for resolving natural resource conflicts and issues
- to facilitate research into the cause, effect and resolution of natural resource issues
- such other functions relating to total catchment management as are directed by the Coordinating Committee.[44]

It can be seen that the powers of a catchment management committee are limited to such key words as advise, promote, co-ordinate and monitor. In effect, they have no real power to enforce catchment management decisions.

Whilst funding to projects to be determined by CMC's appears to be increasing, the resources committed to CMC's themselves appear to be limited. For instance, the Sydney Northern Beaches Catchment Management Committee is serviced by a "half person" per week to help with administrative and support duties. Other concerns include the dominance of government agencies, the need for a higher profile in the community, and the lack of recognition of the role of TCM groups in government.

However, one of the successes of TCM has been the grouping together of government agencies and the community under the one common framework.

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[44] Catchment Management Act 1989 S. 15(1)

By contrast, Catchment Management Trusts have a greater role to play. A Trust may be established after the responsible Minister considers: whether the degradation of the natural resources is adversely affecting the community; land holders and users have a joint responsibility to deal with the degradation; and there is clear support by land holders, users and the community for the formation of a Trust (Section 21(2)).

A Trust can provide and operate works and buildings, purchase or hire property, enter into consultancy contracts, generate revenue by levying and recovering catchment contributions and more (Section 27(1)). However, there is no scope to compel a Trust to carry out its functions (Section 27(4)).

The Trust therefore has the ability to levy catchment contributions to fund activities outlined in a corporate plan, which it must devise within the first year of operation.

STATE RIVERS AND ESTUARIES POLICY

Within the framework of TCM, the State Government has formulated four State policies. These include a State Groundwater Policy, State Trees Policy, State Soils Policy and a State Rivers and Estuaries Policy.[45] The objective of the Rivers and Estuaries policy is:

To Manage the Rivers and Estuaries of NSW in ways which

- Slow, halt or reverse the overall rate of degradation in their systems
- Ensure the long-term sustainability of their essential biophysical functions
- Maintain the beneficial use of these resources

These objectives are to be achieved through the application of the following principles:

- Those uses of rivers and estuaries which are non-degrading should be encouraged
- Non-sustainable uses which are not essential should be progressively phased out

[45] NSW Water Resources Council (1993) The NSW State Rivers and Estuaries Policy. New South Wales Government.

- Environmentally degrading processes and practices should be replaced with more efficient and less degrading alternatives

- Environmentally degraded areas should be rehabilitated and their biophysical functions restored

- Remnant areas of significant environmental values should be accorded special protection

- An ethos for the sustainable management of river and estuarine resources should be encouraged in all agencies and individuals who own, manage or use those resources, and its practical application enabled

Whilst the policy indirectly relates to ecologically sustainable development, it does not explicitly refer to it.

The policy intends that the above principles will guide resource management planning and decision making which affect the condition of the State's rivers and estuaries. Two types of State of the Rivers and Estuaries Reports are proposed, including two year regional reports and a four yearly State of the Rivers and Estuaries Report. The reports are designed to assess the success of the policies and associated activities.[46] The relationship between these reports and the biannual EPA State of the Environment Report, which includes a chapter on water resources across the State, is at present unclear.

WHAT ROLE CAN THE ENVIRONMENT PROTECTION AUTHORITY PLAY?

The *Clean Waters Act* provides for a system of classification of waters by reference to six prescribed categories. These are indicated in Table 1.

An indication of the effectiveness of this classification scheme is provided in a State Pollution Control Commission guide to classified waters.[47] The Cooks River in Sydney is classified as Class R: Restricted Waters (ie, safeguard the quality of water for recreational purposes). Clearly the Cooks River does not at present meet this standard. The classification of waters under the *Clean Waters Act* in this case has not achieved its objectives.

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[46] *Ibid*, p.34.

[47] State Pollution Control Commission (1980) An Atlas of Classified Waters in New South Wales.

TABLE 1 CLASSIFICATION OF NSW WATERS	
Class S:	Specially protected waters High level of protection for water to be used for public water supplies
Class P:	Protected waters Waters flowing into those used for potable supplies, water adjacent to oyster leases, sensitive aquatic environments
Class C:	Controlled waters Waters in remote part of catchments, large well flushed estuaries. Discharges permitted subject to approved treatment and adequate dilution
Class R:	Restricted waters Limitations imposed on discharges similar to Class C. *An R Classification will safeguard the quality of waters for recreational purposes and ensure that the conservation of aquatic life and water associated wild life is adequately provided for.* (italics added)
Class O:	Ocean outfall waters Unconfined coastal waters
Class U:	Underground protected waters

With the restructure of the SPCC into the EPA with the *Protection of the Environment Administration Act 1991*, the EPA is required to: develop environmental quality objectives, guidelines and policies to ensure environmental protection (section 9(1a)); may advise public authorities on performance targets relating to environmental protection (section 11(1)); and the EPA may direct any public authority to do anything within the powers of the public authority which will contribute to environment protection or direct the public authority to cease doing anything which adversely affects the environment (Section 12(1a&b)). If a dispute arises, and the respective Ministers cannot resolve it, the Premier must commission a public inquiry and make a decision.

Leading environmental lawyer and academic David Farrier believes that these powers are broad enough to give the EPA the power to take a leading role in the control of diffuse pollution by regulating land uses.[48] However, the

[48] Farrier, D. (1994) The Environmental Law Handbook. Planning and Land Use in New South Wales. Redfern Legal Centre Publishing.

administration of water and the determination of suitable water quality may no longer be part of the realm of the Environment Protection Authority.

NSW GOVERNMENT WHITE PAPER - THE MANAGEMENT AND REGULATION OF WATER IN NSW

In May 1994 the NSW Government released a White Paper on the management and regulation of water in NSW.[49] The paper proposes wide ranging reforms of the management of water. The centrepiece of the Government's proposals is the establishment of an independent Catchment Assessment Commission, to make recommendations to Cabinet on water quality objectives and the uses of water for each major catchment in New South Wales.

The proposed Catchment Assessment Commission has the following characteristics:

- it will function as an independent body, similar to a Commission of Inquiry
- its purpose is to make recommendations on water quality objectives, which would establish the desired uses and values of water in the catchment, eg, recreational, agricultural, environmental
- it is to determine uses of water (including environmental allocations) for each of the 46 catchments in NSW, taking into account equity considerations and the existing rights of current water uses.
- fulfilling the above conditions will provide the necessary conditions for the establishment of a system of secure and tradeable property rights in water
- the Commission will indicate how the prescribed water quality objectives could be achieved, and suggest broad strategies for meeting ecological, social and economic demands on a river.
- final determinations on the Commissions's recommendations will be made by Cabinet, with the outcome being clear, agreed water quality objectives to which government agencies would be held accountable.

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[49] New South Wales Government (1994) NSW Government White Paper. The Management and Regulation of Water in NSW. May 1994.

- Catchment Management Plans are to be developed for each catchment, which are designed to translate the Catchment Assessment Commission's findings into management guidelines for the catchment.

- the management plans are to be developed through a co-operative government / community approach, clearly outlining government agency roles

- Each Chief Executive Officer of an agency operating in a catchment will be required to "sign off" on the catchment management plan, with the commitment to the plan reflected in the CEO performance agreement with the appropriate Minister. Government agencies will be required to report publicly on its performance in meeting the plan through annual report, Public Accounts Committee and the State of the Environment Report.

- the Water Resources Council to be replaced by a Council of Chief Executive Officers of relevant agencies, reporting through the Cabinet Office to the Premier. (The Water Resources Council was established in 1989 to promote greater coordination and cooperation between the different organisations involved in the water industry, comprised of government departments, water users and environment interests, reporting to the Minister for Natural Resources.)[50]

- the Council has the responsibility for overseeing compliance with catchment management plans, based on reports from the EPA, and the development of high level policy matters.

- the new Office of Water is to service the Council of Chief Executive Officers, and act as a "steward" for overseeing the water resource. The Office is not to have specific powers however.

In October 1994 the Office of Water was established, however to date the Catchment Assessment Commission is yet to be formed.

COMMUNITY CONTRACT FOR BEROWRA CREEK

In late April 1994, the Directors of the Department of Planning, Environment Protection Authority, Hawkesbury Nepean Catchment Management Trust, Water Board and Hornsby Council all signed a contract to commit their

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[50] Farrier, D. (1994) *op. cit.* p.403

respective government agencies to a plan of action to clean up Berowra Creek. Their initial goal was for a popular swimming location to be safe for swimming, canoeing and boating.[51]

Berowra Creek shows many of the signs of environmental decay, including sedimentation of the creek bed, excess nutrients leading to algal blooms and faecal coliform pollution. In response to these problems, Hornsby Council placed a moratorium on development applications in an area serviced by the Hornsby West sewage treatment plant. The Minister for Planning Hon. Robert Webster MLC established a Technical Working Party of relevant government agencies and the Hawkesbury Nepean Catchment Management Trust to look at ways to reduce the pollution levels in the river. The Community Contract was the result, with clearly defined objectives and responsibilities for each government agency.

This contract is interesting in that the process is similar to the proposed Catchment Assessment Commission, in terms of establishing objectives and defining responsibilities for action.

REPORTING BACK

There should be no reason why the government and public are left unsure about the state of our rivers and beaches. Table 2 lists government organisations that deal with water quality or water issues, and are required to report on their performance in their respective area. Of special note is the requirement of Local Councils to prepare as part of their Annual Report a section on the state of their environment. Most Councils will have a substantial water quality component to their report, and are an important level of government for environmental monitoring and reporting.

[51] A Cleaner Berowra Creek. Public Exhibition. Pamphlet.

TABLE 2 GOVERNMENT ORGANISATIONS THAT DEAL WITH WATER	
AUTHORITY	**REPORT**
Environment Protection Authority	Beachwatch Harbourwatch State of the Environment Report - biannually Annual Report
Catchment Management Committees (16)	Annual Report
Catchment Management Trusts (3)	Annual Report
State Catchment Management Committee	Annual Report
State Rivers and Estuaries Report	Biannual regional reports Four yearly State of the Rivers and Estuaries Report
Office of Water	Annual Report - to be confirmed
Sydney Water	Annual Report
Catchment Assessment Commission (46)	Reports for each catchment
Local Councils (177)	Annual Report to include state of the environment.

CONCLUSION

The history of land use in the State has led to ecosystem decline, reflected in the poor state of many of our rivers. The separation of land use decision-making and awareness of its ramifications on water quality have resulted in algal blooms and waterways unsuitable to swim in. Traditionally, government agencies have worked independently of each other, each going about their own agenda with little consultation with other agencies or the public. TCM is an attempt to rectify this.

It could be argued that TCM and the Catchment Assessment Commission could be strengthened by recognising and adopting the principles of ecologically sustainable development, which will help provide an overall framework to ensure the long term viability of the States waterways. Factors that could be

regarded include:

- the precautionary principle - that if there are threats of serious environmental damage, then lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

- inter-generational equity - that present generations should ensure the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations

- the need for conservation of biological diversity and ecological integrity

- the need for improved valuation and pricing of environmental resources[52]

If all members of a TCM group work towards this common goal, supported by government, then there is a chance that the waterways may be clean by the Year 2000.

[52] Environmental Defenders Office (1994) Inland Rivers. Regulatory Strategies for Ecologically Sustainable Management.