

AUDITOR-GENERAL'S REPORT

PERFORMANCE AUDIT

Protecting Our Rivers

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Contents

Foreword

Executive Summary	1
Recommendations	7
1. Introduction	11
1.1 Introduction	12
1.2 Water Quality	13
1.3 Improving Water Quality	16
1.4 Principal Legislation	18
1.5 The Audit	18
2. Developing a Strategic Approach	21
2.1 Overview	22
2.2 Policies and Strategy for Water Quality	22
2.3 Water Quality Objectives	26
2.4 Water Management Plans	27
3. Allocating Management Responsibility	29
3.1 Overview	30
3.2 Commonwealth - State Arrangements	30
3.3 NSW Agencies	31
3.4 Committees	34
3.5 Local Government	36
4. Managing River Protection	39
4.1 Overview	40
4.2 Regulation	41
4.3 Better Practice Management	43
4.4 Economic Incentives	45
4.5 Protection of Water Levels	47
4.6 Land Use Planning	48
4.7 Protection Zones	50
4.8 Restoration and Remedial Works	51
4.9 Education	52
5. Information to Plan and Assess Progress	55
5.1 Overview	56
5.2 Monitoring Programs	57
5.3 Assessment Reports	61
Appendices	65
Appendix 1 Terms Used in this Report	66
Appendix 2 About the Audit	68
Appendix 3 Common Water Quality Issues	69
Appendix 4 State Agencies in the Protection of River Water Quality	70
Performance Audits by the Audit Office of New South Wales	71

The Public Sector Employment and Management (General) Order 2003

Subsequent to the completion of this report the Government announced various changes to the structure of the New South Wales public sector.

Insofar as this report is concerned the changes principally affect the (former) Department of Land and Water Conservation, which has been abolished. In the main the functions of the Department are transferred to the Department of Sustainable Natural Resources.

Comments, including recommendations, relating to the (former) Department of Land and Water Conservation, would need to be considered by the Department of Sustainable Natural Resources.

References to the Environment Protection Authority are unaffected.

Foreword

As the driest populated continent, Australia's water resources are particularly vulnerable to misuse and mismanagement.

In the past, the fragility of our rivers was not always understood. Or, if understood, it was often ignored. The growth of our agricultural, mining and manufacturing industries gave us economic benefits and contributed to the standard of living Australians enjoy today.

But that economic growth was often based on practices that degraded our rivers. While the environmental costs of those practices may have been ignored, they cannot stay hidden indefinitely. Many of the costs are now surfacing in the form of threats to agriculture from increasing salinity and reduced river flows, degraded quality of drinking water - particularly for our country towns - and diminished tourism and recreational use.

With environmental matters, correcting past mistakes can be very costly - in some cases prohibitively so. Those past mistakes should be a valuable lesson, guiding those responsible to act firmly to avoid a repeat.

Managing the quality of our rivers is primarily a State responsibility. There are many stakeholders involved, often with different views. While some river quality problems may be common to different catchments, there are also issues that are unique to each catchment.

Because of the complexity of the task, it is essential that managing river quality starts with a clear, overarching strategy. Without this strategy, those responsible for individual plans and actions will lack direction and their efforts will be compromised.

This report follows on from my August 2002 report on the clearing of native vegetation. The basic principles for managing these two issues are similar. I hope that this report contributes further to a better understanding of the issues to be addressed.

R J Sendt
Auditor-General

May 2003

Executive Summary

Executive Summary

Water policy is one of the most complex and challenging issues of all public policy. The issues of property and water rights are examples of the complexity of water policy.

A number of different government entities have a role in water quality management. This increases the complexity of management in terms of effective integration of actions and strategies and clear delineation of responsibilities.

Water Quality

According to the NSW *State of the Environment Report 2000*, for example, the quality of water in many NSW rivers is poor. Most signs of stress were observed in:

- highly urbanised catchments, and
- catchments where agricultural crops are predominant.

Whilst progress has been achieved in controlling point source pollution and certain diffuse sources such as stormwater and sewage overflows, more effort is required on diffuse sources such as those arising from agricultural practices.

Recent water reforms seek to ensure sufficient water remains in the river system to sustain river 'health'. River 'health' is a complex issue involving the provision of environmental flows, protection of river water quality, aquatic biodiversity and habitat, and management of native vegetation and land.

The Audit

Whilst all aspects of river health are important, this audit focused on water quality. More specifically, the audit examined whether the quality of river water in New South Wales is efficiently and effectively protected.

Protection:

- implies no further decline in the condition of the rivers
- may include regulation, promotion of best practice guidelines, economic incentives or education
- may also involve works to restore the condition of rivers.

Audit Opinion

The Audit Office is of the opinion that responsibility for protecting the quality of river water is not clearly delineated.

The current arrangements lack the structure to ensure success. There is no lead entity to co-ordinate efforts to protect river water.

New South Wales has no overarching water quality or river health strategy and no water quality management plans to ensure:

- clear outcomes and responsibilities for protecting river water quality
- integrated decision-making to protect areas of greatest risk to water quality.

There are significant gaps in the monitoring and evaluation of water quality. Based on the information currently available it is not possible for anyone to gauge in a comprehensive way:

- the health of NSW rivers
- the main risks to those rivers and the sources of risk
- strategies to manage those risks.

The protection of river water has predominantly focused on controlling point source pollution. There is no framework, management or regulatory, which addresses the risks from diffuse pollution such as agricultural run-off.

Findings

... it is important to understand the extent of the problem

The extent of the water quality problem and the extent to which it can be, or needs to be, solved are not clear. For example:

- much salinity results from the inherently saline soils derived from deposited marine sediments
- turbidity arises from the naturally muddy banks of many inland rivers
- many pesticides and herbicides break down quickly, whilst others persist.

... the response

The Government has developed strategies and policies designed to improve water quality in rivers.

Legislation also provides agencies in New South Wales with the authority to respond to, and manage, environmental threats to river water.

And progress has been made, particularly in regulating and reducing point source pollution of rivers in urban areas. But more needs to be done.

... strategy

In 1992 the Commonwealth introduced a *National Water Quality Management Strategy*, which sets national guidelines on water issues. The Guidelines:

- were not mandatory on the states and territories
- do not set State policy, priorities, institutional responsibilities or management arrangements.

New South Wales has not developed its own water quality or river health strategy. While progress has been made on water sharing plans, there are no water quality management plans to set clear outcomes and responsibilities.

The Government has set water quality objectives and targets, but their effectiveness is not clear.

The *State Water Management Outcomes Plan* provides a basic policy framework for dealing with the protection of water quality. However, it focuses on operational aspects of water resource management. It includes little specific information in relation to:

- long term objectives for water quality
- allocation of management responsibilities
- prioritisation and the use of multiple mechanisms, both regulatory and non-regulatory, to achieve water quality protection
- monitoring and performance assessment.

... legislation

The *Water Management Act 2000* and the *Protection of the Environment Policies of the Protection of the Environment Operations Act 1997* provide explicit provisions to protect river water.

The provisions of these Acts have yet to be fully utilised.

... more management information needed

There are gaps in the monitoring and evaluation of water quality in New South Wales. There is no comprehensive program for data collection and analysis that feeds into management decisions.

This is despite the fact that there are numerous programs across government agencies undertaking various types of monitoring.

Currently DLWC does not have a performance monitoring framework to demonstrate progress in giving effect to the principles of the *Water Management Act 2000*.

The *State Water Management Outcomes Plan* provides the basis for a framework and states that a performance assessment strategy will need to be established within six months of its gazettal (at the end of 2002).

... fragmentation of control and accountability

Several Ministers, over a dozen agencies, over a hundred committees and over a hundred local councils have responsibilities to protect the quality of river water. None has any direct responsibility or accountability for outcomes.

There is no overarching framework to co-ordinate the management of rivers between persons and agencies.

There is no clear delineation of responsibilities at State level in relation to the management and protection of river water. Accountability is fragmented and unclear. There is no lead entity to provide:

- leadership and direction
- oversight
- co-ordination of effort and resources
- conflict resolution
- accountability in implementing the Government's objectives.

No entity routinely audits river water quality or the efforts of state agencies in relation to water quality.

... Catchment Blueprints will need more work

The Commonwealth and State Governments both agree that rivers are best managed on a catchment basis.

The development of *Catchment Blueprints* commenced in 2000 and is intended to be the primary mechanism to integrate planning for natural resources.

The *Blueprints* are a recent and significant development in protecting river water but contain many aspirations, assumptions and broad statements of intent. Much work needs to be done before the *Blueprints* are effective in protecting river water.

... implementing the Blueprints

DLWC places considerable reliance on catchment committees to give effect to the principles of the *Water Management Act 2000* and implement the *Blueprints*.

In support, DLWC has provided a natural resource manager to assist the committees and project manage implementation of the *Blueprints*.

The main role of the catchment committees is, however, to provide advice to the Minister for Land and Water Conservation.

DLWC's reliance on the committees should be measured, as the committees have neither the governance structure nor resources to implement the principles of the *Water Management Act 2000* or the *Blueprints*.

... more cost efficient measures needed

Funding of particular water quality initiatives is an often used means to achieve improvement. Other options, and mix of options, could be used to a greater extent than is currently the case.

These include:

- extending regulation to limit more dispersed forms of pollution, such as from rural properties
- linking access by farmers to water to accreditation schemes requiring better practice farming
- using economic incentives, including a Government pricing strategy for the pricing of water to reflect the environmental impact of its use and the decreased degradation of the asset where this occurs
- targeting education programs on a catchment basis
- identifying important undisturbed river segments of high conservation value and establishing reserves to ensure their protection.

Land use planning can be strengthened to improve water quality outcomes by:

- integrating the many natural resource related plans with those plans developed under the EP&A Act. Proposals to remedy this have been included in the Government's Planfirst framework
- incorporating water quality objectives in regional planning strategies under Planfirst
- developing land use planning guidelines for catchment planning. The State Catchment Management Co-ordinating Committee is examining this through its Planning and Policy Subcommittee
- requiring that developments in sensitive catchment areas have a neutral or beneficial effect on the quality of water.

But there is no comprehensive plan for the deployment of these measures to protect river water quality.

Recommendations

It is recommended that:

the Government establish:

- a lead entity with an appropriate governance structure and resources for implementing the State's objectives for water quality
- an independent environmental audit of river water quality.

the lead entity develop:

- a framework for the co-ordinated management of rivers with those persons, bodies, agencies or organisations with responsibility for protecting rivers
- a State River Health and Water Quality Strategy to supplement the State Water Management Outcomes Plan and to replace the *State Rivers and Estuaries Policy*. This strategy needs to clearly define the role of water quality objectives, call for a formal risk assessment of rivers, and strengthen systems for water quality monitoring, tracking, analysis and reporting
- a comprehensive plan to limit and reduce pollutant levels, particularly diffuse source (especially agricultural), in accordance with the water quality objectives, including the use of regulatory instruments, education, economic incentives and use of integrated measures including land use planning, protection zones, and best practice management.

Response from the Environment Protection Authority

Thank you for the opportunity to provide a formal response to the Performance Audit on Protecting the Quality of Our River Water.

As you know the Environment Protection Authority (EPA) has devoted a significant amount of time and effort to assist the Auditor-General's Office in preparing this report. We believe the report now reflects much better the modern natural resources directions that are necessary to tackle the complexities of river and water management rather than just the water quality component. We do support a renewed emphasis on water quality management within the broader natural resources and water management context.

The report appropriately recognises the complexities of water quality management and that significant progress has been made improving water quality through point source controls and stormwater programs. The EPA agrees that there remains much to be done. The recognition that more work is needed on diffuse sources, particularly those arising from agricultural practices will assist in developing programs to address these issues.

The Government's recent announcements on establishing new Departments to effectively integrate land use and natural resources planning under one Minister will clearly address many of the issues raised in the audit report. The EPA will be working collaboratively to ensure this is achieved.

*(signed)
LISA CORBYN
Director General*

Dated: 10 April 2003

Response from the Department of Sustainable Natural Resources

The Department of Sustainable Natural Resources (the Department) appreciates the opportunity to provide a formal response to the performance audit report of river water quality in New South Wales. The Department concurs with the key recommendation that the Government establish a central coordinator for the State's objectives for water quality, in response to the audit finding that responsibility for protecting the quality of river water is not clearly defined. Further to this, the Department would support the development of a State Water Quality and River Health Strategy. The recent establishment of the Departments of Sustainable Natural Resources and Urban and Transport Planning under one Minister will provide the opportunity to clarify responsibilities and address many of the issues raised in the report.

While the report was fair and factually correct, the Department would like to stress a few key points in response to this audit.

Firstly, the main driver of reform is the need to integrate river flows with water quality to stop the deteriorating quality of riverine environments. The Department is in the process of implementing Catchment Blueprints and Water Sharing Plans for the State, and feels that through these mechanisms we have made significant progress in the management of river water.

The Water Management Act 2000 provides for the sustainable and integrated management of the water sources of the State. Thirty-five Water Sharing Plans developed in 2002 under the Act protect each water source and its dependent ecosystems through allocation of water for environmental purposes, which will have water quality benefits.

Secondly, the Department acknowledges that the Catchment Blueprints will be refined. This audit was undertaken before the Blueprints had been gazetted, and were still being revised. Additionally, the Blueprints are designed to be reviewed at regular intervals, both to determine their effectiveness and to provide the opportunity to re-prioritise key actions.

Thirdly, the provisions of the Water Management Act 2000 have not yet been fully utilised because the implementation of the Act is in its early stages, and the complete Act has not yet been triggered. These provisions will be important achievements for protecting water sources against potential adverse impacts of land-based activities. In the meantime, the relevant sections of the Water Act 1912 and the Rivers and Foreshores Improvement Act 1948 will still be applicable.

The Department agrees that an independent environmental audit of river water quality should be conducted, building on the monitoring and evaluation framework being developed for the National Action Plan for Salinity and Water Quality. It is important that the environmental audit includes the identification of baseline data for key water quality performance indicators.

The Department welcomes the Audit Office findings and recommendations and is committed to continue using this report as a basis for further improvement.

*(signed)
Chris Guest
A/Director-General*

Dated: 14 April 2003

1. Introduction

1.1 Introduction

The management of natural resources in Australia is primarily the responsibility of the states and territories.

The Commonwealth Government contributes to the funding of natural resource management in New South Wales.

Community Concern

Since 1994, community attitude surveys found that the community rates water quality as the single most important environmental issue (*Source: EPA, Who Cares about the Environment? 2000*).

Water quality and river health are intricately linked with river flows.

This relationship is emphasised by:

- the New South Wales *State of the Environment Report 2000*
- the Commonwealth's *State of the Environment Australia 2001*
- and the water reforms of the *Council of Australian Governments*.

Water use in Australia increased by 65% between 1985 and 1997.

Many wetlands have decreased in area due to reduced flows. Water quality decreases with reduced flow, as the effects of salinity, blue-green algae and other forms of pollution become more marked.

Water quality is, therefore, only part of a broader river and water management program.

NSW Rivers System

New South Wales has an extensive river system. The Murray and the Darling rivers, for example, both exceed 2,500 kilometres in length.

Coastal rivers include the Hawkesbury Nepean, Shoalhaven, Georges River, Clarence, Bega, Hunter and North Coast rivers. Inland rivers include the Murray, Darling, Murrumbidgee, Lachlan, Barwon, Bogan, Macquarie, Castlereagh, Namoi, and Gwydir rivers.

Rivers provide water for agriculture, industry and domestic use and sustain ecosystems that provide economic, recreational, aesthetic, social and cultural benefits.

Management

The Commonwealth and State Governments both accept that river systems are best managed on a catchment basis, covering the land area drained by a river and its tributaries.

In New South Wales water management is:

- addressed through integrated planning by agencies on a catchment basis with the help of community groups
- undertaken by agencies, particularly the Department of Land and Water Conservation (DLWC), by local councils and by individuals
- regulated by agencies, particularly the EPA (pollution), DLWC (water extraction), NSW Health (drinking water), and by local councils.

Penalties

The Government reaffirmed the offence provisions of the *Environmental and Offences Act 1989* for water pollution by:

- carrying these forward to the Protection of the Environment Operations Act 1997
- strengthening the penalties applicable (up to \$1 million) for a corporation with provisions for gaol sentences and
- prosecuting offenders resulting in penalties of \$3.3 million since 1992.

The Water Management Act also has penalties for breaches of water use and water access rules as defined in water management plans and licences.

There are also offence provisions relating to the carrying out of “controlled activities” in contravention of an approval. Controlled activities are specified in water management plans and can be related to activities having either water quality or water quantity impacts.

1.2 Water Quality

Water Uses

Water quality is a relative issue linked to its intended use.

The *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC 2000) identify various environmental values and uses of water quality:

- drinking water
- primary industries, including irrigation, stock watering, farm use
- industrial water
- recreation, aesthetics, including primary and secondary contact, visual appreciation
- protection of aquatic ecosystems, including freshwater and marine ecosystems, production of fish and shellfish, wildlife protection
- cultural and spiritual values.

In terms of volume, irrigation consumes most water in New South Wales. Irrigated production in Australia is worth around \$8 to \$9 billion per annum of which New South Wales contributes around \$2 to \$3 billion.

Assessments

An assessment of water quality typically considers its salinity, turbidity (muddiness), nutrient and blue green algae levels and the implications thereof; for example:

- salt damages crops, soils, water supply systems and makes water unsuitable to drink
- turbidity can suffocate life in a river, block irrigation sprays and pipes, and also leave water unsuitable to drink
- nutrients such as phosphorus and nitrogen, which come from sewage waste, agricultural activities and detergents, fertilise the growth of blue-green algae that can lead to serious water quality problems.

Water Pollution

There are many sources of water pollution including:

- run-off from agricultural land
- drainage from irrigation schemes
- stormwater run-off from urban areas
- effluent from sewage treatment works
- contamination from industries.

Thermal pollution, being the release of cold or warm water from dams, can render large stretches of river unsuitable for native fish.

Other aspects of pollution include dissolved gases, acidity, pesticide and other chemical residues, bacterial indicators and pathogens, metals, and blooms of the minute flora and fauna the water contains.

Impacts

Polluted water affects the health of:

- humans
- crops
- farm livestock
- riverine plants and animals.

Polluted water is costly to the community. For example:

- the cost of treating polluted water before it is fit for human consumption can be very high. Remedial action places a burden on certain sections of the community least able to afford it, such as small towns
- salinity reduces the lifespan of domestic and industrial equipment, urban infrastructure and soil structure
- tourists are less likely to visit an area where the water is perceived to be polluted.

*Australian Catchment,
River and Estuary
Assessment*

In March 2002 the *Australian Catchment, River and Estuary Assessment* reported on the condition of Australia's rivers using an aquatic biota index and an environment index. The Assessment was based on the departure from pre-European settlement conditions.

The Assessment showed that NSW has the poorest aquatic biota condition, with approximately 50% of the river length assessed as impaired.

Aquatic Biota Index Results (% of River Impaired)			
	Significantly	Severely	Extremely
NSW	34	13	3
Queensland	17	2	1
ACT	29	7	0
Victoria	20	3	1
Tasmania	20	3	2
South Australia	12	1	4
Western Australia	29	6	1
Northern Territory	10	2	0

Source: Commonwealth Government, *Australian Catchment, River and Estuary Assessment*, 2002 p80

The Assessment also showed that NSW has most highly modified condition, with only three percent of rivers classed as largely unmodified.

River Environment Index Results (% of River Modified)			
	Largely Unmodified	Moderately Modified	Substantially Modified
NSW	3	68	29
Queensland	13	71	16
ACT	16	71	13
Victoria	20	60	20
Tasmania	37	59	4
South Australia	4	61	35
Western Australia	7	78	14
Northern Territory	88	10	2

Source: Commonwealth Government, *Australian Catchment, River and Estuary Assessment*, 2002 p81

1.3 Improving Water Quality

Improvements and Reform Programs

Emphasis on improving water quality gathered momentum during the 1970s when pollution by industry was targeted. EPA advises, for example, that for the Parramatta, Georges and Cooks Rivers:

- suspended solids and biological oxygen demand pollutant loads were reduced by 93% and 99% respectively between 1972 and 2001
- the number of premises licensed to discharge pollution to these waters reduced from 466 in 1972 to 50 in 2002 (79%).

In the 1990s diffuse sources of pollution were tackled with the Urban Stormwater program, which EPA advises has prevented 8000 tonnes of rubbish from entering NSW waters.

In 1995 the NSW Government introduced a program of water reforms (following a national program of water reforms agreed by the *Council of Australian Governments*). The program included:

- water allocations for the environment, and definition and allocation of water on a more sustainable basis
- implementation of a *National Water Quality Management Strategy*
- legislative reform, stronger education programs and improved monitoring.

The *Water Management Act 2000* arose from these reforms and provides for water management planning, largely through advisory committees. The legislation is based on water management principles, including the need to protect water quality.

Attention was also focused on pollution reduction programs that required poorly performing sewage treatment plants be upgraded. A licensing program, based on pollutant 'loads', was also introduced to provide an incentive for industry to reduce pollutant loads. EPA advises:

- the impacts from some 750 tonnes of pollutants are being mitigated through load reduction agreements under the load based licensing schemes
- the salinity-trading scheme in the Hunter River has virtually halved salinity since 1995.

But the quality of water in some rivers remains poor as:

- salinity levels in many western rivers are rising and new areas affected by salinity are developing. The drinking water uses for the lower Murray Darling are at risk because of this trend
- nutrient levels are high in many rivers with sediments storing high reserves of nutrients
- blue green algae outbreaks remain a problem for many river systems, made worse by reduced flows
- sediments in 'run-off' continue to be a significant problem arising from a number of rural land use practices
- pesticide residue levels at times have exceeded recommended levels in some rivers systems.

The *State of the Environment Report 2000* concluded that:

- rivers in highly urbanised catchments, and catchments where the predominant land use is cropping, showed the most signs of stress
- river flow is essential for maintaining aquatic ecosystem health
- early positive signs of improved river flows are apparent following the implementation of state-wide environmental flow provisions
- rivers were mostly good or fair, but salinity was increasing and over the next 50 years would exceed drinking water guidelines in some rivers
- turbidity levels in inland rivers ranged from fair to poor
- most inland rivers were rated as poor because of concentrations of algal and plant nutrients (phosphorous in particular) that exceeded water quality objectives.

There is clearly scope to improve water quality in certain catchments particularly where water pollution is caused by agricultural and stormwater runoff.

1.4 Principal Legislation

State agencies have considerable legislative authority with which to protect the quality of river water. In particular:

- the *Water Management Act 2000*, which is directed at water resource planning and management, provides the DLWC with authority for the efficient and equitable sharing of water and authority to protect, enhance and restore water sources, ecology, biological diversity and water quality
- the *Protection of the Environment Administration Act 1991* and the *Protection of the Environment Operations Act 1997*, which are directed at protecting the quality of the environment provide the EPA with a variety of regulatory tools to protect, restore and enhance water quality
- the *Environmental Planning and Assessment Act 1978* is the primary legislation to regulate land use planning and development consents and has a major role to play in water quality protection and management.

1.5 The Audit

River Water Quality The audit examined whether the quality of NSW river water is efficiently and effectively protected.

In particular, the audit reviewed whether there are appropriate and adequate management arrangements in place, including:

- a co-ordinated and strategic approach to the protection of river water quality
- accountability arrangements
- policies, plans and procedures to protect river water
- information systems to support the monitoring and management process
- performance assessment and reporting.

These topics are examined in the succeeding chapters.

River 'Health' The audit also contains references to river 'health', which refers to the ecological condition of a river including the different plants, animals and micro-organisms and the ecosystems they form.

The 'health' of a river may be considered from the following aspects:

- the provision of environmental flows
- protection of river water quality
- management of river frontages and river erosion
- aquatic biodiversity and habitat
- linkages with floodplains, wetlands, estuaries and terminal lake systems
- management of other resources, especially native vegetation and land.

The audit has not focused on the broader issue of river health as:

- the complexity and extent of the topic were considered to exceed the limits of a single performance audit
- a key component, the provision of environmental flows, is presently the subject of extensive reforms being introduced by the NSW Government
- another component, the clearing of native vegetation, was subject of an Audit Office report in August 2002
- river 'health' is a relatively new concept, not directly referred to NSW legislation
- there is as yet no definition as to what constitutes a 'healthy' river.

Nevertheless, the Audit Office accepts that effective management of riverine resources requires an integrated approach.

Further detail on the audit is included in Appendix 2.

2. Developing a Strategic Approach

2.1 Overview

A variety of natural and human induced factors affect the quality of river water.

As a consequence, the management of river water quality is a complex task requiring a co-ordinated effort.

In New South Wales there are a number of disparate and geographically dispersed agencies that have a role in the management of our river system.

It is therefore essential to have clearly defined objectives relating to the quality of the water and how to achieve them. One would expect to find a coherent strategic approach that would include:

- the setting of overall directions, objectives, outcomes and responsibilities for the protection of water quality
- river water quality objectives with which to set state-wide priorities and evaluate the outcomes of policy implementation
- river water quality management plans consistent with the state-wide water quality strategy, objectives and current conditions.

However, our audit revealed that, whilst a great deal of action and considerable effort have been taken, there is still:

- no water quality strategy to set State policy, priorities, institutional responsibilities or management arrangements for the protection of river water quality
- no integrated decision-making for river health
- no water quality management plans to set clear outcomes and responsibilities for river water quality.

2.2 Policies and Strategy for Water Quality

National Water Quality Management Strategy

In 1992 the Commonwealth introduced a *National Water Quality Management Strategy* containing 21 national guideline documents on water issues.

Each State was to use its own water quality planning and environmental policy tools to set water quality objectives and goals to give effect to the guidelines.

NSW State Rivers and Estuaries Policy

In 1992 work began on a *NSW State Rivers and Estuaries Policy* to provide a cohesive and integrated package of riverine and estuarine resource policies.

The Policy required a *NSW Water Quality Policy* be developed. However, this did not eventuate.

Healthy Rivers Commission

In 1996 the Government established the Healthy Rivers Commission to provide it with independent strategic advice about river health goals and the strategies necessary to achieve them.

The Commission makes recommendations to Government and the community after undertaking independent public enquiries into priority rivers chosen by the Government. The Commission has completed inquiries of the major coastal rivers in New South Wales. Reviews of the major inland river systems are yet to be undertaken.

Government decisions on Commission recommendations are embodied in public Statements of Intent, which outline the agreed actions and commitments of agencies. Government has assigned to the Commission the responsibility to undertake independent and public audits of implementation of the Statements of Intent two years after their release.

In 2002 the Commission reviewed progress on the *Statement of Intent* arising from its 1996 Inquiry into the Williams River and reported that:

- in only about half of the agreed actions has there been reasonable compliance with the terms of the Government's decision
- only about a quarter have achieved the desired river health outcome
- critical outcomes have not been achieved where implementation required integrated action by more than one agency.

Source: noted in *Final Report - Healthy Rivers Commission Inquiry into the Hunter River*, May 2002

The Commission is to commence auditing implementation of Statements of Intent for the Hawkesbury Nepean and Shoalhaven River systems in March 2003.

Other NSW Strategies and Policies

The Government has issued, or has in preparation, many diverse policies and strategies designed to improve water quality. These include:

- *NSW Salinity Strategy*
- *NSW Water Conservation Strategy*
- *NSW Groundwater Quality Protection Policy*
- *draft State Riverine Corridor Policy*
- *NSW Weirs Policy*
- *draft Sewage Management Policy*
- *water resources component within the NSW Biodiversity Strategy*
- *NSW Acid Sulphate Soils Strategy*
- *NSW Urban Stormwater Program*
- *NSW Waterways plan to manage sewage discharge from vessels*
- *State Water Management Outcomes Plan.*

State Water Management Outcomes Plan

The *Water Management Act 2000* provides for the establishment of a *State Water Management Outcomes Plan* to set:

- the over-arching policy context
- targets and strategic outcomes for the development, conservation, management and control of the State's water sources.

The Government approved the final Plan on 20 December 2002. The *Plan* provides general policy guidance to catchment committees. More specific policy advice on water sharing was provided in a series of 15 "policy advices" *Water Sharing - The Way Forward*.

The *State Water Management Outcomes Plan* focuses on operational aspects of water resource management such as:

- limits on extractions
- access entitlements
- water use efficiency
- river channel management.

The *Plan* calls for all water management plans to incorporate water quality objectives that have **considered** Government approved Interim Environmental Objectives, the current ANZECC Guidelines and the recommendations of relevant Healthy Rivers Commission Inquiries.

Audit Observations

The Healthy Rivers Commission has recommended strategies and improved management practices for the State's river systems.

Catchment planning has been developed separately from the process of implementing the Statements of Intent and it is important that the outcomes are integrated and consistent.

The *State Water Management Outcomes Plan* provides a basic policy framework for dealing with the protection of water quality, but includes little specific information in relation to:

- long term objectives for water quality (discussed in the next section)
- allocation of management responsibilities (discussed in chapter 3 of this report)
- prioritisation and the use of multiple mechanisms, both regulatory and non-regulatory, to achieve water quality protection (discussed in chapter 4)
- monitoring and performance assessment (discussed in chapter 5).

Notwithstanding the prolonged history of policy and strategy development, New South Wales does not have an integrated strategy to protect river water quality. This would seem to contrast with Victoria.

Victoria has developed a River Health Strategy (which includes water quality) to provide the management framework, within which community plans and decisions are made. The Strategy provides:

- a common vision for the management of rivers in Victoria
- statewide targets for river restoration
- a planning framework which is based on community decision-making within an integrated catchment management context, balances environmental, economic and social needs, integrates the management of all activities impacting on rivers, is based on the best available scientific understanding of river functioning and is responsive to new knowledge
- criteria for priority setting for investment in river protection and restoration
- an overview of government policy relating to the management of activities affecting river health, including environmental flows and water allocation; and
- the institutional arrangements for the management of river health in Victoria.

Source: State Government of Victoria, Victorian River Health Strategy, *Healthy Rivers, Healthy Communities and Regional Growth*, August 2002

2.3 Water Quality Objectives

NSW Interim Environmental (Water Quality and River Flow) Objectives

In 1999 the Government, following community consultation, adopted *NSW Interim Environmental (Water Quality and River Flow) Objectives* for each of 31 catchments in New South Wales. These objectives:

- are ambient objectives, not maximum limits
- were developed to guide plans and actions of water management committees, agencies and local planning authorities
- varied depending on the environment and the various human uses of water in a particular catchment.

The interim objectives apply to each catchment until the Government either:

- adopts longer-term objectives resulting from recommendations by the *Healthy Rivers Commission*, or
- approves more localised objectives in a water management plan for each catchment. In this case, the environmental objectives would apply for the duration of the plan, subject to review and an independent audit.

Audit Observations

The effectiveness of the *NSW Interim Environmental (Water Quality) Objectives* is not clear given that:

- the objectives are advisory not mandatory (the objectives are considered by agencies when setting development and licence conditions for activities that can affect water quality)
- many catchment committees developed general target levels for improvement rather than using the *Objectives*
- committees have explicit salinity targets established by the *NSW Salinity Strategy* and the *Murray Darling Basin Commission Salinity Management Strategy*
- the *Healthy Rivers Commission* has tended to rely on criteria specified in ANZECC's *Australian Water Quality Guidelines for Fresh and Marine Waters*, rather than recommending specific ambient water quality objectives.

An assessment of how effectively water quality objectives are being addressed in land use planning and natural resource management planning would provide a clearer picture.

2.4 Water Management Plans

Water Management Plan

There are 28 Water Management Committees throughout New South Wales most of which are aligned with a catchment area. It was originally envisaged that the committees would prepare a comprehensive *Water Management Plan* for their river valley by 2003, which would integrate flow rules, monitoring, water quality plans, and socio-economic studies.

The Act also provides for the development of water management plans to include (but not be limited to):

- water sharing
- water source protection (includes the preservation and enhancement of the quality of water)
- drainage management
- floodplain management.

Catchment Blueprints

Catchment Blueprints are a recent development, designed to provide:

- a strategic direction for the management of natural resources (including water management) on a catchment basis by identifying objectives, targets and management actions
- an overview of the pressure in each catchment
- the results of extensive community consultation
- suggestions for improvement, unrestricted by budget limitations
- background for specific projects to be funded.

Since 2000, and to be eligible for funding, the Commonwealth has required that such a plan be developed for each catchment (the Commonwealth and States/Territories agree on targets and outcomes in the Blueprints).

The NSW Government had endorsed 21 *Catchment Blueprints* by December 2002.

**Audit
Observations**

Water Management Plans, that address water quality, have yet to be developed either pursuant to the *Water Management Act 2000* or by Water Management Committees as originally intended.

Priority was given to the preparation of *Water Sharing Plans* as a result of COAG requirements in relation to the National Competition Council.

Many *Catchment Blueprints* call for preliminary work to identify a range of priority tasks including (to):

- identify priority water pollutants
- develop and implement water management plans
- establish an integrated water quality monitoring and reporting system, including establishment of site-specific water quality indicators and baseline standards for priority sub-catchments
- provide clear guidelines to assist decision makers in considering cumulative impacts.

In many respects the *Catchment Blueprints* contain aspirations, assumptions and broad statements of intent in terms of protection of water quality. For example:

- water quality actions focus on salinity, as a national priority, with less consideration of the risks posed by other water quality contaminants
- there is often little consideration of the need to protect existing areas of “good” water quality against future deterioration
- in a number of cases, further data and studies are needed to establish baseline information to enable achievable and measurable targets to be implemented
- different methods of prioritisation can result in a large issue, such as the protection of river water quality, ending well down on the list
- a large issue may be the highest priority, but it may be difficult to address within expected resources.

The NSW Government has indicated that the implementation of the *Catchment Blueprints* will need to be audited every five years. Any audit is likely to be more difficult due to the general nature of the *Catchment Blueprints*.

3. Allocating Management Responsibility

3.1 Overview

The *National Water Quality Management Strategy* suggests that the management of water quality requires clear and explicit assignment of responsibilities for the various phases of administration and operation.

In New South Wales there are several Ministers, over a dozen agencies, over a hundred committees and over a hundred local councils that have responsibilities to protect the quality of river water.

As a consequence the effectiveness of the Government's efforts to address water quality issues depends on the integration and co-ordination of the efforts of agencies, community based committees, local government and individuals.

Our audit identified that there is no overarching framework to co-ordinate the management of rivers between persons and agencies.

There is no lead agency or entity with an appropriate governance structure and resources for implementing the Government's objectives for water quality.

Accountability for the protection of river water quality is both fragmented and unclear.

Catchment Management Boards are in a position to co-ordinate at the local level, but not at the State level.

Responsibility has not been assigned to any agency to conduct an independent environmental audit of river water quality.

3.2 Commonwealth - State Arrangements

National Action Plan

In November 2000 the Commonwealth and the States agreed to a *National Action Plan for Salinity and Water Quality*.

The Commonwealth and New South Wales Governments would each contribute \$198 million over five years from 2002/03.

The *Plan* aims to identify high priority actions to address salinity, particularly dry-land salinity, and deteriorating water quality in key catchments and regions.

Steering Committee

A steering committee, co-chaired by DLWC and the Commonwealth, was established in 2002 to:

- develop agreements with the Commonwealth concerning Commonwealth funded projects
- oversee development of the National Action Plan for Salinity and Water Quality and the Natural Heritage Trust
- recommend to relevant Ministers on priorities for funding of natural resource projects.

Murray-Darling Basin Commission

The Murray-Darling Basin Commission reports to the Ministers responsible for land, water and environmental resources of the governments of New South Wales, Victoria, South Australia, Queensland, the Australian Capital Territory and the Commonwealth.

The Murray-Darling Basin Commission:

- is required to equitably and efficiently manage and distribute the water resources of the Murray River in accordance with the Murray-Darling Basin Agreement
- undertakes works and co-ordinates the efforts of the government partners in the Murray-Darling Basin
- has a mandate to initiate, support and evaluate integrated natural resources management across the Murray-Darling Basin.
- Most of New South Wales, west of the Great Dividing Range, drains into the Murray-Darling River Basin.

3.3 NSW Agencies

There are at least 15 agencies responsible, to varying degrees, for protecting river water in New South Wales. The agencies and their roles are summarised in Appendix 4.

Department of Land and Water Conservation

The *Water Management Act 2000*, identifies several principles to manage and generally protect water quality.

The Minister is to ensure DLWC has been:

... effective in giving effect to the water management principles of this Act ...

In accordance with these principles DLWC should give effect to the:

- protection, enhancement and restoration of water sources, their associated ecosystems, ecological processes and biological diversity and their water quality
- efficient and equitable sharing of water from water sources.

DLWC:

- shares the total available water for the environment and extractive users, in accordance with Water Sharing Plans for each river system
- works principally through a range of catchment committees to achieve the protection of water sources
- assists the Catchment Management Boards by providing, among other things, technical, communications, administrative and financial support
- has established Landscape Manager positions in regions to initiate, direct and manage landscape improvement programs (including works, marketing, education and advisory programs).

State Water:

- is a business arm of DLWC
- supplies water in accordance with the sharing rules to some 6,000 licensed water users along the rivers regulated by dams and weirs
- operates the dams and regulating structures to physically supply water to industry, towns, stock and domestic users and the environment. Regulation of flow is one of the main factors affecting water quality
- monitors water usage and recovers costs through water charges determined by IPART.

The National Competition Council and IPART have pointed to the need for the commercial side of water delivery to be separated from DLWC's broader functions of water management and regulation. To date the arrangement is unchanged.

DLWC has developed a draft operating licence for State Water requiring that it:

- attempt to achieve the outcomes of water management plans
- establish and maintain water quality monitoring and reporting programs for storages and rivers under its control
- remain accountable to the Director General of DLWC
- be subject to a 'resource management' charge levied by DLWC for service to State Water or its customers.

**Environment
Protection
Authority**

The EPA is required to:

- develop environmental quality objectives, guidelines and policies to ensure environment protection (including developing setting water quality objectives)
- monitor and report the state of the environment for the purpose of assessing trends and the achievement of environmental quality objectives, guidelines, policies and standards
- develop a comprehensive scheme of environmental audit with respect to industry, commerce and public authorities.

Source: *Protection of the Environment Administration Act 1991* sec 9

The EPA:

- reports on river quality through the State of Environment Report. In doing so the EPA relies on input and data from a wide range of government agencies and organisations
- audits agencies that it licences in relation to water quality, such as Sydney Water and State Forests, but does not audit the efforts of other state agencies that have no licence for control of water pollution (such as DLWC).

The *State of the Environment Report* is prepared every three years and is tabled in Parliament.

**The NSW Cabinet
Office**

The NSW Cabinet Office provides advice to the Premier and the Cabinet.

At times the Office takes a direct role in relation to natural resources; for example, it led the development of the *NSW Salinity Strategy*.

**Audit
Observations**

The *Water Management Act 2000*, *Protection of the Environment Administration Act 1991* and the *Protection of the Environment Operations Act 1997* provide both DLWC and EPA considerable powers to protect the environment, including the quality of river water.

DLWC is to 'give effect' to the water management principles of the *Water Management Act 2000*.

DLWC places considerable reliance on catchment and water management committees to give effect to the principles of the *Water Management Act 2000*. The committees, however, have neither the governance structure nor resources to implement the water management principles of the Act.

State Water has not been:

- assigned water quality targets
- held accountable for achieving water quality monitoring programs and targets
- subject to independent review
- licensed by EPA (as are Sydney Water and State Forests)
- subject to the resource management charge.

The Audit Office found little evidence to indicate that State Water has:

- reviewed the main environmental impacts of its operations
- proposed a program to reduce the negative impacts of its operations.

DLWC has, however, undertaken many reviews of operations, predominantly relating to the translucency and transparency flow rules for a number of dams.

No entity, including EPA, routinely audits river water quality or the efforts of state agencies in relation to water quality.

3.4 Committees

There is a range of committees concerned with water issues in New South Wales, including:

- government committees that co-ordinate major tasks and projects within the natural resource agencies
- standing committees formed for a particular purpose, such as State Weirs Review Committee, Stormwater Trust, Irrigation Reform Steering Committee
- community based committees reporting to Ministers.

The committees are independent of one another, reporting separately to Ministers.

However, many of the committees report to the same Minister and there is a degree of cross representation of membership. Agencies, particularly DLWC, endeavour to facilitate co-ordination between committees and others where there are common interests.

The roles of certain committees are discussed below.

Water CEOs Group

A committee of public sector chief executives, known as the *Water CEOs Group*, was established in 1995 to help develop, co-ordinate and drive the Government's Water Reform agenda.

EPA has advised that the *Group* receives specific references from the Cabinet on a range of water management issues. The committee, for example, considers:

- significant policy issues such as progress on the implementation of the Water Management Act 2000
- integrated water and sewage management
- progress on commitments against the Statements of Intent arising from the Healthy Rivers Commission Inquiries.

The chief executive of the EPA chairs the committee, which also includes senior officers from The Cabinet Office and Treasury.

Audit Observations

The Water CEOs Group is well placed to lead a more integrated approach to managing river water quality. The committee has, however:

- no general terms of reference or strategy
- the environment protection regulator (EPA) as its chair, potentially confusing its role and limiting the independence of the regulator
- of late relatively less focus on river water quality and the significance of diffuse pollution problems of rural New South Wales
- no direct relationship with the many other committees, boards and expert groups that report directly to Ministers on water related issues.

Community Based Committees

Key community based committees reporting directly to the Minister for Land and Water Conservation include:

- 28 Water Management Committees established to develop water management plans, including water sharing plans for stressed rivers to determine water sharing between users
- a Water Advisory Council which tends to act in an advisory role, not directly co-ordinating the many Water Management Committees
- 18 Catchment Management Boards to plan and advise on integrated management of land, water and vegetation
- a State Catchment Management Co-ordinating Committee which tends to act in an advisory role, not directly coordinating the many Catchment Management Boards.

**Community
Monitoring
Groups**

Additionally, community water quality monitoring programs began in Australia in the early 1990s. Waterwatch is a national program supported by Environment Australia, with the NSW Department of Land and Water Conservation as the lead agency in NSW.

**Audit
Observations**

The community based committees are authorised to prepare plans and *Catchment Blueprints*, but have no statutory authority:

- to implement (or enforce implementation of) the plans or *Blueprints*
- or to 'give effect' to the principles of the *Water Management Act 2000*. This falls to the State agencies.

The community monitoring groups represent an efficient and effective resource for the State government.

However, their role and contribution to the State's efforts to protect river water quality are not as yet recognised in any state-wide government monitoring program.

3.5 Local Government

There are around 170 local councils in New South Wales whose powers and responsibilities derive mainly from the *Local Government Act 1993*.

Local Government has a range of functions, powers and responsibilities at its disposal to influence natural resource management on both private and public land. These include:

- *strategic planning* through land use zoning and statutory controls on all freehold land and locally managed public open space
- *development control* of nearly all activities and works through development consent powers
- *enforcement powers* for development consent conditions, waste management and unauthorised land uses
- *stormwater management* and control; sewerage and drainage works and flood control and planning in many jurisdictions.

In New South Wales two Local Government representatives are required for each Catchment Management Board.

**Audit
Observations**

Local Government has an important role in catchment planning and water quality outcomes and has been actively involved with programs such as the Government's Stormwater Management Program.

Progress is best served if the plans and management processes of councils are consistent with those of the Catchment Management Committees.

There is potential to increase the integration, co-ordination and delivery of natural resource management programs with Local Government. The application to land use planning is discussed in the following chapter.

Case Study in Formalising Coordination and Accountability

In **California**, more than 20 state and federal agencies have been working with local communities to improve the quality and reliability of California's water supplies and revive the San Francisco Bay-Delta ecosystem.

The Program:

- is a collaborative effort to implement a long-term, comprehensive plan to restore the ecological health of the Bay-Delta system and improve water quality and water supply reliability
- has completed its second year of implementation of the plan, with more than \$840 million invested to date in local projects to improve water quality, restore habitats, expand storage, strengthen levees and increase water use efficiency.

A **California Bay-Delta Authority** was established in January 2003 to:

- formally assume responsibility for overseeing implementation of the Bay-Delta Program
- provide a permanent governance structure for the collaborative state-federal effort
- ensure balanced implementation of the Program, providing accountability to the Legislature, Congress and the public.

The new Authority is composed of representatives from six state agencies and six federal agencies, five public members from the Program's five regions, two at-large public members, a representative from the Bay-Delta Public Advisory Committee, and four ex officio members, namely the chairs and vice-chairs of the Senate and Assembly water committees.

Source: California Bay-Delta Authority website accessed 7 March 2003

4. Managing River Protection

4.1 Overview

The risks to water quality are varied and extensive, such as pollution from mines, roads, sewage treatment plants, piggeries, and semi-rural development.

The potential to contaminate the catchment depends on the:

- location of the polluting activity relative to the catchment
- type and amount of pollutant produced
- likelihood of its discharge into the river system.

Pollution is best managed at its source and on site rather than discharged, but this is not always achievable.

There are a variety of ways to protect and restore the quality of river water including:

- regulatory instruments
- economic incentives
- integrated measures such as land use planning and protection zones
- better practice.

The means often depend on the nature of the pollution, whether it be from a single 'point source' or of a more 'diffuse' nature.

To ensure efficiency and effectiveness of efforts, it is important to set priorities and employ a coordinated state-wide approach to the use of such mechanisms.

The *National Land and Water Resources Audit Advisory Council* has suggested priorities for action and appropriate types of action for the various groups of rivers:

These principles establish:

- protecting reaches that support endangered species or communities
- protecting reaches in the best general condition
- stopping streams from deteriorating
- improving the condition of damaged reaches and focusing on those that are easy to fix
- rehabilitating reaches that are already extremely degraded (lowest priority).

Source: National Land and Water Resources Audit Advisory Council, *Australian Catchment, River and Estuary Assessment 2002*.

Our audit found that there is no systematic and documented state-wide process for prioritising the protection of river water quality (apart from an assessment for water sharing).

This contrasts with the principles suggested by the *National Land and Water Resources Audit Advisory Council*, and the example offered by the Environmental Protection Authority of Western Australia.

An assessment of river water compared to the *NSW Interim Environmental (Water Quality) Objectives* should be formalised and used to:

- set a coordinated framework
- establish the priorities for protection and remediation.

There is no assurance that New South Wales employs the most cost effective mix of measures to protect river water quality whether it be for example, regulatory instruments, economic incentives, education or other integrated measures.

At the local level, *Catchment Blueprints* are intended to integrate landscape management with river water quality, but a state-wide co-ordinated approach is still required.

4.2 Regulation

Pollution Licences

At present some 3,000 environment protection licences are in place under the *Protection of the Environment (Operations) Act 1997* (covering air, water, waste and noise issues). About one third of these licences have provisions to protect water quality.

Sewage Treatment Plants

Generally sewage treatment plant discharges are the major point-source discharges to river water.

Under the *Protection of the Environment (Operations) Act 1997*, a new licence system known as the load-based licensing scheme was introduced.

The system progressively introduces 'emission load limits' and links licence fees to the pollutant loads emitted from each licensed premises.

The EPA has issued 27 sewerage system licences to Sydney Water for the Sydney, Blue Mountains and Illawarra regions, covering complete sewerage treatment systems.

Licences are also being developed for all Local Councils across New South Wales with sewerage systems. This will entail developing pollution reduction programs including capital works.

Emission Permit Schemes

EPA has developed new licensing schemes that extend to multiple emission sources, as for example the:

- South Creek Bubble Licence prescribes large overall reductions in pollutants but provides for environmental improvements to be achieved in the most cost effective way across a number of sources
- Hunter River Salinity Trading Scheme regulates the amount and timing of saline water discharges to the river from licensed mines and power stations according to the number of credits they hold
- Nutrient Reduction Trading Scheme for South Creek is a voluntary scheme with new and existing activities cleaning up as much additional nutrient pollution as they create.

Pesticides

Pesticides are used extensively in both urban and rural environments. There are currently about 3,800 pesticide products registered for use in New South Wales.

Under the *Pesticides Act 1999* the EPA enforces the proper use of pesticides, including those used in agriculture, on public lands and on domestic and commercial premises.

Agricultural Activities

The EPA licences corporatised irrigation areas (such as Murrumbidgee Irrigation Limited and Coleambally Irrigation Corporation) and potentially polluting industries, including:

- abattoirs and (large) livestock intensive industries
- (large) agricultural produce industries
- agricultural fertiliser industries
- chemical industries and extractive industries.

There are guidelines and regulations covering the control of effluent from most of these industries.

In some instances the EPA is not required to license, for example, piggeries of less than 1,000 head and cattle feedlots of less than 400 head. The EPA does not regulate dairies in New South Wales, unlike its equivalent in Victoria.

Nonetheless the premises are subject to regulatory action under the water pollution provisions of the *Protection of the Environment Operations Act 1997*.

Water Use Licences

DLWC licenses bulk users of water.

Licences typically contain general conditions such as:

- run-off shall not be discharged into any river or creek
- vegetated buffer zones shall be maintained along river banks.

Under the *Water Management Act 2000*, conditions may also be imposed by the relevant management plan or by the Minister.

**Audit
Observations**

Regulation is an effective means of limiting pollution:

- but has been focused on point source discharge
- could be extended to more dispersed forms of pollution (as has been the case for forestry operations).

In particular, pollution licences could be more extensively applied to rural properties to discourage poor practice in the context of river systems. This could take the form of emission permit schemes, allowing a total acceptable level of pollution to be defined and set.

This type of approach is used in the United States:

Federal law requires states to identify all water bodies that do not meet water quality standards. For those "impaired" water bodies failing to meet standards, the states must establish total maximum daily loads, defining how much of a specific pollutant a water body can tolerate and still meet relevant water quality standards. All of the combined pollution sources in a watershed may not discharge more than the total limit.

Not only do the total maximum daily loads have to be established, but they must also be implemented by allocating responsibility for corrective measures among a variety of dischargers.

Source: California State Water Resources Control Board, Strategic Plan 2001

4.3 Better Practice Management

Direct regulatory controls are not practical in many situations.

Better practice management should be encouraged, particularly in these cases.

Guidelines

Better practice management guidelines have been developed and encouraged in a number of areas. For example:

- EPA has prepared guidelines for the use of effluent in irrigation and played a role in developing guidelines for on-site sewage management, industry led guidelines for dairy effluent, piggery effluent and feedlot effluent
- NSW Agriculture, the Murray-Darling Basin Commission and the Grains Research and Development Corporation, with support from industry, are developing and promoting better practice in water use for a range of irrigated crops
- NSW Fisheries has encouraged landholders to modify and actively manage floodgates to allow the passage of fish

- State Forests has implemented better management practices for vehicular access roads and logging practices in the forests through compliance with the EPA's Environmental Protection Licence
- the cotton industry has developed a better management practices manual, which includes issues such as farm design, pesticide application, management of runoff, pesticide storage and handling, hazard assessment and integrated pest management
- DLWC is developing integrated water cycle management guidelines to manage water supply, sewerage and stormwater services within a whole of catchment strategic framework.

Access to Water

In December 1996 the *Healthy Rivers Commission's Inquiry into the Williams River* recommended that incentives for best practice farming be created by linking access by farmers to water to farm practices and water use efficiency.

The Commission identified:

- NSW Agriculture as the agency responsible for better practice definition and adoption
- DLWC as responsible for licensing.

The NSW Government endorsed this recommendation and the associated proposed actions. A scheme was developed that involved water users (excluding stock and domestic) who implement certain better farm management practices achieving an accreditation status that would entitle them to access low flows in the Williams River and its tributaries, which would be unavailable to non accredited users.

During 1997 and 1998 a working group chaired by NSW Agriculture developed the better practice criteria for the scheme addressing issues including:

- crop selection, field preparation and planting practice
- irrigation practice, use of chemicals and fertilisers
- on-farm drainage and dairy shed effluent control
- limitation of cattle access to river banks
- livestock management practices
- property planning.

Audit Observations

Such a scheme:

- could be directly linked to water access privileges particularly in areas where water quality is at risk
- has potentially wide application in New South Wales
- has been under consideration since development, but has yet to be implemented by DLWC.

4.4 Economic Incentives

The *National Water Quality Management Strategy* highlights the benefits of economic incentives in water quality management:

A basic tenet of the water quality management strategy is the importance of identifying opportunities where economic instruments may be applied to achieve efficient allocation and realistic valuation of water resources as an asset. The adoption of market incentives and sanctions can modify the use of water resources and work towards desired water quality outcomes. The correct price for water resources will reflect the full social cost, both financial and environmental, of using the resource as well as capital, operations and maintenance costs.

Source: *National Water Quality Management Strategy - Policies and Principles*, April 1994

Examples of economic incentives include:

- pricing of the water resource to reflect the environmental impact of the use and the decreased asset value where degradation occurs
- substantially higher licence fees reflecting recovery of the costs of regulatory and monitoring functions
- application of discharge levies or pollution charges such as the Load Based Licensing Scheme
- emissions trading schemes such as the EPA's Hunter River Salinity Trading Scheme which has fixed long standing salinity problems caused by saline discharges from mines and power stations (river salinity levels have been halved since 1995).

Green Offsets

The EPA has a number of economic instruments in place. It is trialling an economic mechanism that encourages developers not to add to overall water pollution loads and to deal with diffuse sources of pollution. The term given to the mechanism is 'water pollution offset'.

Developers, where unable to eliminate impacts of their operations, contribute to a fund that is used to commission offsetting restoration works.

Pilots are underway or proposed for South Creek in Western Sydney, Sydney's drinking water catchment, Albury, Moree and Ulan.

Environmental Services Investment Fund

The Government has established an *Environmental Services Investment Fund* to encourage and support targeted landscape changes.

The Government is contributing an amount of \$20 million to the fund as part of the *NSW Salinity Strategy*. Using \$2 million of this, the Government has established an *Environmental Services Scheme*.

Expressions of interest have been sought from land-holders with a view to awarding 20 contracts for land use change on individual properties.

Audit Observation

However, there is little information as yet on the environmental outcomes to be achieved by this scheme and relative costs and benefits.

Water Pricing

The price of water has long been considered by some to be lower than its economic cost. A contributing factor may have been that neither the costs of taking the water from the environment nor of protecting the catchments from which it is collected are required to be included in the current 'full cost recovery' pricing regimes.

Source: The Parliament of the Commonwealth of Australia, *The Value of Water*, Report of the Senate Environment, Communications, Information Technology and the Arts References Committee, December 2002

In recent years, the Independent Pricing and Regulatory Tribunal (IPART) has:

- made determinations on the maximum charges that can be levied by large water service providers in New South Wales (including DLWC, Sydney Water Corporation, Hunter Water Corporation, Gosford and Wyong Councils), and
- has recommended pricing principles for other urban water suppliers.

In setting prices IPART is required to consider a range of issues, including the cost of providing the services, the need to maintain ecologically sustainable development and government policy. Both EPA and DLWC have recommended IPART consider an 'environmental charge' in the pricing.

Similarly, the *NSW Water Conservation Strategy* identifies the need for government rates and charges to progressively move to reflect the full economic costs of water use and water quality degradation:

5.1 Ensure that government rates and charges progressively move to reflect the full economic costs of water use and water quality degradation. This includes the cost caused by environmental damage and by natural resource management, or 'externalities';

Source: *NSW Water Conservation Strategy*, 2000

IPART's approach, consistent with COAG guidelines, has been to incorporate in prices any externality or environmental costs where these are attributable to and incurred by water businesses. That is, where environmental impacts result in expenditure by the water agency for mitigation or management these costs will be incorporated into prices.

**Audit
Observations**

Economic incentives are used to control water pollution but could be more extensively employed.

For example, there is no Government pricing strategy that calls for the pricing of water to reflect the environmental impact of its use, beyond IPART's current approach which is limited to costs attributable to and incurred by water businesses

4.5 Protection of Water Levels

**Interim
Environmental
Objectives for
River Flow**

The volume of water, and the rate at which water it flows, affects the quality of water. Additionally, there is a need to ensure that adequate water remains within the river system to maintain river health.

In 1999, as part of its Water Reform package, the Government adopted *Interim Environmental Objectives for* (both) *River Flow and Water Quality* for each catchment in New South Wales.

The flow objectives seek to protect river health by, for example, protecting water levels in natural river pools and wetlands during periods of no flow, and to maintain or mimic natural flow variability.

The protection of water flows has also been the main focus of the *State Water Management Outcomes Plan*, which requires limits on the extraction of water from rivers.

Water Management Committees have been developing environmental flow rules to determine water users' access to water depending on the flow range - low, moderate or moderate to high flow periods.

4.6 Land Use Planning

Role

Land use planning can play a key role in protecting water quality by helping to ensure:

- landscapes and areas are zoned as 'landscape protection' to protect or maintain critical environmental functions
- state and local government planning processes support catchment plans
- the cumulative effects of erosion and degradation under proposed zonings are considered and mitigation measures required
- pollution risks are minimised by restricting their location, constructing buffers, requiring better management practices.

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is the main vehicle for land use planning in New South Wales.

State Riverine Corridor Policy

Planning NSW is preparing a draft *State Riverine Corridor Policy* that:

- establishes management guidelines for non-urban, urban and new urban areas
- identifies the key issues affecting riverine corridors
- establishes objectives and principles to guide the protection, sustainable use and rehabilitation of the land adjoining river channels.

Regional Environmental Plans

The *Sydney Water Catchment Management Act 1998* requires that a *Regional Environmental Plan* be prepared for Sydney's drinking water catchments, and that provision be made in the Plan:

requiring consent authorities to refuse to grant development consent to a development application relating to land to which the plan applies unless the consent authority is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect on the quality of water.

Source: *Sydney Water Catchment Management Act 1998*

Having neutral or beneficial effect is the same as having no adverse impact and can be achieved, for example, by containing a development's water quality impacts within the site of the development.

Planning NSW is presently developing the Regional Environmental Plan.

Legislation

The *Water Management Act 2000* gives DLWC distinct environmental protection powers that could be included in water management plans, including:

- identifying zones in which development should be controlled in order to minimise any harm to water sources
- identifying the manner in which any such development should be controlled
- requiring the establishment of action plans to encourage the abandonment of existing uses that cause harm to water sources, and to encourage the carrying out of remedial measures.

The Act also provides that environmental protection provisions be included in a *Regional Environmental Plan*.

Protection of the Environment Policies

EPA can declare *Protection of the Environment Policies* to assist in the control diffuse pollution. These policies give directions to agencies to exercise their authority to limit pollution from diffuse sources.

A policy must specify one or more environment protection requirements, including a:

- goal
- standard
- guideline
- protocol.

Legislation requires that policies be considered by:

- a Local Government council when preparing a local environmental plan or development control plan under the Environmental Planning and Assessment Act 1979
- the Minister when taking certain actions administering that Act.

Source: *Protection of the Environment Operations Act 1997*

Audit Observations

The *Water Management Act 2000* and the *Protection of the Environment Policies* of the *Protection of the Environment Operations Act 1997* provide explicit provisions to protect river water.

The provisions of these Acts have as yet not been utilised by DLWC and EPA which are authorised to do so.

Water quality outcomes from land use planning can be strengthened by:

- integrating the many natural resource related plans with those plans developed under the EP&A Act. Proposals to remedy this have been included in the Government's Planfirst framework
- incorporating water quality objectives in regional planning strategies under Planfirst
- developing land use planning guidelines for catchment planning. The State Catchment Management Co-ordinating Committee is examining this through its Planning and Policy Subcommittee
- requiring that developments in sensitive catchment areas have a neutral or beneficial effect on the quality of water.

4.7 Protection Zones

Wild or Heritage Rivers

Naturally undisturbed rivers, known as 'wild' or 'heritage' rivers, and their catchments provide:

- reference sites for environmental monitoring and scientific study
- a store of genetic stock of the animals and plants living in them
- remnant habitat for some threatened species of flora and fauna and corridors for wildlife.

Environment Australia maintains a national wild rivers database, which includes reference to many river stretches in New South Wales.

Where *aquatic ecosystem protection* is determined to be an environmental value, a decision is required as to what level of protection is needed. This will, in turn, directly influence the water quality targets and management actions to be set for that water body.

There are three levels of protection:

- *high conservation/ecological value systems* are often found within national parks, conservation reserves or inaccessible locations
- *slightly to moderately disturbed systems* have undergone some changes but are not considered so degraded as to be highly disturbed
- *highly disturbed systems* may still retain some ecological or conservation values that require protecting.

Source: Environment Australia, *Water Quality Targets: A Handbook*, June 2002

Legislation The *Water Management Act 2000* requires that water sources be classified in terms of their conservation value.

The National Parks and Wildlife Act 1974 provides for the identification, protection and conservation of wild rivers in National Parks.

Audit Observations Legislation provides protection for the remaining undamaged river segments in New South Wales but has not been used.

As yet there has been no comprehensive effort to identify important undisturbed river segments of high conservation value and to establish terrestrial or aquatic reserves to ensure their protection.

The identification and protection of high conservation value aquatic areas, including wetlands, rivers and wild or heritage rivers, should be a high priority. The repair of a damaged river is likely to be more expensive than the protection of an undamaged river.

4.8 Restoration and Remedial Works

Commonwealth - State Programs Restoration and remedial works are a significant component of Commonwealth and State Governments' funding programs.

The State *Rivercare* program awarded financial assistance to between 50 and 100 community projects a year from 1994-95 and 2000-01.

In 2002 funding of \$396 million was announced under the *National Action Plan for Salinity and Water Quality*. Under the five year agreement, the Commonwealth and NSW Governments would each contribute \$198 million.

Remedial works are sometimes necessary to deal with existing structures that cause problems for water quality.

For example, *Weir Review Reports* reviewed 1,364 of the recorded 3,227 weirs and made the following preliminary recommendations:

- 135 fish ways on weirs
- the removal of 88 weirs, and
- operational changes to 69 weirs.

Source: DLWC, October 2002

Storm Water Projects Remedial works are also necessary to deal with structures such as stormwater drains. The *NSW Stormwater Trust Grants Scheme* has allocated \$66 million since 1998 primarily to local councils to undertake 327 storm water projects throughout the State.

Sewage Treatment Upgrades In some cases a major replacement of plant and structures will be necessary. Sydney Water has replaced its older sewage treatment plants and improved many of its existing plants. Sydney Water advises that in the last five years the amount of phosphorous (a significant pollutant) discharged to inland waterways has decreased by over 50%.

Similarly, the Government aims to reduce pollution from rural sewage by contributing funds to a *Small Towns Sewerage Scheme* under its *Country Towns Water Supply and Sewerage Program*.

Audit Observations The costs of improving river water quality through restoration and remedial works are considerable.

The *Catchment Blueprints*, for example, identify restoration and remedial works of hundreds of millions of dollars over a ten-year period.

The expenditure of limited financial resources needs to be targeted in a systematic and documented way.

4.9 Education

Education can help individuals to understand:

- their responsibility to help maintain water quality
- the effect of their actions and/or inactions on water quality
- the roles, responsibilities and impact of agencies and catchment committees.

In addition, education can:

- motivate behaviour change
- help individuals to develop skills and capacity
- assist in protecting water quality.

State-wide Programs There have been a large number of general education and awareness raising programs related to water, such as those of:

- Waterwatch, *Rivercare 2000*
- National Water Week, *Murder Under the Microscope*, water reform information packages
- DLWC's *Exploring the Nardoo*, water quality and flow objectives video and publications
- Urban Stormwater Trust grants to local government have increasingly included major education components as part of the Urban Stormwater Education Program. EPA has delivered a range of training courses both for local government and industry on stormwater management
- NSW Agriculture's *Water Wise on the Farm* and *Farming for the Future* programs.

There are also training courses directed at the irrigated agriculture sector and delivered through Murrumbidgee and Tocal Agricultural Colleges (NSW Agriculture).

There have been programs to support particular initiatives. For example, an evaluation of the Urban Stormwater Education Program up to 2001 indicated that:

- one in five people in New South Wales had recently changed their behaviour to reduce the negative effect on stormwater
- nine out of ten people were now able to nominate something they do to reduce storm water pollution
- more than 100,000 people had been directly involved in education and training activities as part of statewide education relating to the program.

More generally, DLWC has consulted with the community in developing programs related to water reform initiatives, draft plans and draft *Catchment Blueprints*.

Catchment Programs

There has also been some effort to target the problems of particular catchment areas. For example, in the South Creek area, NSW Agriculture and the EPA are planning to work together to develop information packages, local seminars and extension support covering:

- the implications for agriculture of declining water quality
- the water pollutants relevant to the specific agricultural activity
- statutory requirements for water pollution control and pesticide use
- better management practices for water pollution control
- funding opportunities for improvements.

Education initiatives have also been incorporated in catchment based Stormwater Management Plans as part of the Urban Stormwater Program.

Similarly, DLWC and other agencies are developing a *NSW Capacity Building Strategy* to assist catchment management committees to develop their planning and development capabilities.

The National Parks and Wildlife Service has developed the WISE Rivers and Wetlands Database, which provides a CD and web based information system with all publications for a catchment 'tied' to different parts of the catchment. Seven catchments have been completed with photographic and multimedia information.

**Audit
Observations**

Much more could be done to target education programs on a catchment basis that takes account of:

- the environmental priorities of the region, and
- those in the community that can have the most impact on improving river health.

Good examples of programs include *Bringing Cooks River to Life*, the South Creek education program and Lachlan Community Monitoring Program.

Case Study in Comprehensive Planning

Western Australia requires the preparation of comprehensive plans of river management, including the need to:

- establish a framework for the co-ordinated management of the protected waterways and the protected catchments and specify the persons, bodies, agencies or organisations responsible for that management
- identify areas within the protected waterways and the protected watercourses which require protection
- identify critical areas within the policy area which require (i) priority protection; or (ii) priority remedial action to achieve the environmental quality objectives
- recommend indicators, parameters or criteria to measure the environmental quality of the policy area
- develop a program to achieve and maintain pollutant levels in accordance with the environmental quality objectives referred to in clause 8
- include strategies for the development of best management practices for the control of drainage, sewage, and the disposal of wastewater and the discharge of nutrients, whether directly or indirectly.

Source: Environmental Protection Authority, Western Australia, *Environmental Protection (Swan and Canning Rivers) Approval Order 1998*

5. Information to Plan and Assess Progress

5.1 Overview

The ability of an organisation to measure its performance requires that:

- objectives be clearly defined
- responsibility for achieving those objectives be established within the organisational structure
- performance indicators be set for defined objectives and responsibilities (the indicators can be used to measure performance internally and externally)
- systems be in place to produce information that can be compared with a norm (the information must be relevant appropriate, timely and in a usable form).

The *National Water Quality Management Strategy* suggests:

- the management of water quality be audited
- accountability be reported, and
- progress towards the desired water quality goal be monitored and reported.

Questions fundamental to the management of water quality would include:

- what is the quality of water in each waterway?
- are the levels of water quality acceptable?
- what are the key water quality issues?
- what pollution types are leading to the degradation of each waterway?
- what are the pressures and sources of pollution?
- what are the trends over time?
- what are the risks in each case?

There is little benefit in knowing the chemical content of river water and not knowing whether this represents a problem that should, and can, be solved.

It is little use in knowing of a problem, if the source of the problem cannot be traced. For example:

- much salinity results from the inherently saline soils derived from deposited marine sediments
- much turbidity (muddiness) arises from the naturally muddy banks of many inland rivers
- some pesticides and herbicides will break down quickly, whilst others will be chemically persistent.

The *Healthy Rivers Commission* has pointed to the need to incorporate monitoring strategies into river management:

Well designed strategies for managing rivers will inevitably involve an adaptive approach, given the inherent uncertainties and lack of information on many matters. For that reason, river health monitoring programs must be strategically designed to provide the necessary feedback and to improve the overall information base progressively.

Source: Healthy Rivers Commission, *Securing Healthy Coastal Rivers - a Strategic Perspective*, April 2000.

Our conclusion is that monitoring programs, sites and data collection activities need to be better designed so that information serves management needs in protecting river water.

Currently DLWC does not have a performance monitoring framework to demonstrate success in achieving the water management principles of the *Water Management Act 2000*.

The *State Water Management Outcomes Plan* states that a performance assessment strategy will need to be established within six months of its gazettal (that is, by mid 2003).

5.2 Monitoring Programs

Monitoring and assessment of water quality is generally undertaken to:

- protect public health and the aquatic environment
- assess waterway condition and trends
- ensure compliance with discharge licences
- improve scientific understanding of catchment processes
- identify water quality relationships and responses to land management practices
- inform the reporting process.

A monitoring program should have clearly stated objectives, an agreed funding mechanism, a focused approach, regular analysis and comprehensive reporting on water quality in our rivers, compared to the agreed water quality objectives.

- DLWC Programs**
- DLWC has undertaken state-wide monitoring programs including:
- *Integrated Monitoring of Environmental Flows*, established in 1998 and continuing to evaluate the effects of environmental flow rules established by community-based river management committees
 - *Key Sites Water Quality Monitoring Program*, established in 1992 to monitor trends in salinity, turbidity and nutrient levels at 89 sites; this program is being reduced
 - *Central and North West Regions' Water Quality Program*, established in the early 1990s to monitor pesticides and nutrients in the Macintyre, Gwydir, Namoi and Macquarie Rivers; this program has recently been closed down
 - *Sustainable Rivers Audit*, a more comprehensive monitoring scheme being developed on a trial basis for the Murray Darling Basin using reference sites to equal the condition that would exist before European settlement.

DLWC has increased river salinity monitoring in line with the *NSW Salinity Strategy*.

Pollution Line

EPA operates the *Pollution Line*, a 24 hour 7 day service for pollution incident reports and information requests.

The service receives more than two thousand incident calls a year related to water quality. Most of these are referred to EPA regional offices and local councils for investigation.

Waterwatch NSW and Streamwatch

Waterwatch is a community program, supported by funding from the *Natural Heritage Trust*, that monitors the state of waterways and encourages action to protect and improve water quality.

In New South Wales, *Waterwatch* is supported by DLWC. However, the data collected by the community is not quality assured and does not have any direct use in DLWC.

In the Sydney basin, *Waterwatch NSW* is closely linked with *Streamwatch*, which Sydney Water runs with the Sydney Catchment Authority and the Upper Parramatta River Catchment Trust. Sydney Water ensures the data is of acceptable quality. *Streamwatch* has a network of around 300 groups, who monitor water quality at over 400 sites.

Harbourwatch

Since 1994 the *Harbourwatch* program, administered by EPA, has monitored and reported bacterial levels in recreational water throughout the metropolitan area of Sydney.

EPA advises that *Harbourwatch* data is scientifically rigorous and quality assured.

State Water Monitoring Strategy

As part of the program, EPA has developed an information package and field manual to assist Local Government councils to design and implement a water monitoring programs that will be cost effective and meet scientific guidelines.

In 1996 the *Water CEOs Group* established the *State Water Monitoring Co-ordination Committee*. The committee, chaired by the EPA, seeks a consistent and efficient approach to water monitoring.

The Committee is developing a *State Water Monitoring Strategy* to identify:

- a common approach to water monitoring by agencies, local councils and non-government organisations
- scientifically rigorous protocols and standards for data collection
- the minimum long term monitoring gaps that need to be filled for an effective water monitoring program
- current monitoring programs as a basis for considering future programs
- avenues for accessing and sharing information

The Committee has identified 30 existing water-monitoring programs, the majority of which are on-going or long-term monitoring programs but of limited scope.

From a statewide perspective, the Committee identified a number of gaps in these monitoring programs. For example:

- the spatial coverage across the state of the longer term monitoring data sets was relatively sparse
- limited monitoring was being conducted to assess the ecological condition of waterways
- there was no on-going monitoring of riparian vegetation across the state
- regular monitoring of contaminants in water, sediments and flora and fauna in terms of ecological condition does not occur as part of any ongoing program.

Source: State Water Monitoring Co-ordinating Committee, *An Interim Approach for Water Monitoring in NSW*, June 2002

**Audit
Observations**

Many monitoring programs have been used at various times for the assessment of rivers in New South Wales.

Despite the extent of monitoring there is:

- no comprehensive data that clearly indicates the state of water quality in NSW rivers at this point in time
- no program to routinely and consistently monitor the extent and condition of river water quality at catchment levels in accordance with ANZECC 2000 guidelines
- a lack of strategic, targeted information at key locations, collected over time and addressing specific issues such as particular water quality needs and the effectiveness of measures to limit water pollution
- little long term information on the location, extent, type and trends in point and diffuse sources of pollution
- limited knowledge of how water quality trends are affected by changes in catchment characteristics, land uses, climate and other relevant factors.

The interim *State Water Monitoring Strategy* does not focus on management needs or resource issues (such as how much monitoring the agencies need to do and how much can be relied upon from local government, licensees and the community generally).

The *Strategy* proposes a framework for data collection and has produced protocols for consistent methods of sampling and analysis that can provide more consistent and scientifically rigorous data.

However there is a need to define how monitoring is to be used to directly inform management decision-making.

The interim *State Water Monitoring Strategy* currently lacks a focused, informative and resourced approach. It needs aims similar to those in the following example:

- co-ordinate surface water monitoring efforts so that they are comprehensive, non-duplicative, and appropriately funded
- identify specific water quality problems preventing the State and Regional Boards, and the public, from realizing the beneficial uses of water in targeted watersheds
- develop a comprehensive water quality tracking, analysis and reporting system
- build a comprehensive, integrated, appropriately accessible system with consistent, reliable data.

Source: California State Water Resources Control Board, Strategic Plan 2001

5.3 Assessment Reports

Environmental assessment reports of various kinds are prepared from time to time, based on the results of monitoring programs.

NSW State of Environment Reporting

The EPA prepares a *State of Environment Report* every three years. The report:

- comments on the state of the environment including an assessment of the status and conditions of the major environmental resources in of New South Wales
- highlights problems areas such as the presence of algal blooms, high levels of salinity and turbidity.

The *Local Government Act 1993* requires municipal Local Government councils to prepare a local *State of Environment Report* each year (a comprehensive report every four years and supplementary reports each year in between).

State of the Rivers and Estuaries Reports

In 1992 the *NSW Rivers and Estuaries Policy* stated that *State Rivers and Estuaries Reports* would be routinely prepared on two levels: two yearly regional reports and four yearly State summaries.

DLWC completed:

- *Mid-North Coast Catchments 1994-1995, State of the Rivers and Estuaries Report*, August 1995
- *Hunter, Karuah and Manning Catchments, State of the Rivers and Estuaries Report 2000*, May 2000
- *Namoi State of the River Report 2000*, December 2000
- *Upper North Coast Catchments State of the Rivers and Estuaries Report 2001*, November 2001.

Reports have also been produced on the Murrumbidgee and Lachlan. Reports on the Murray and on the Far South Coast were in preparation at the time of the audit.

DLWC considered that the data requirements and reporting were resource-intensive and ultimately few reports were completed.

For a number of years, DLWC produced a report titled *Window on Water*. The report summarised the results obtained from the *Key Sites Water Quality Monitoring Program* managed by the Department. The last report was produced in 1998.

State of the Catchments Reporting

In 1998 DLWC developed a *State of the Catchments Reporting Proposal* on the basis that:

- expansion from river based reports to integrated catchment reporting gives greater emphasis to causes rather than symptoms
- baseline and trend information could be included for management and monitoring the effectiveness of river flow / water quality objectives
- it should help in moving Catchment Management Committees towards greater strategic focus and better promote integration of natural resource management.

Source: DLWC, *Developing the Framework for Natural Resource Management*, internal circular dated 23 December 1998

DLWC has advised a proposal is under development and will take into account the reporting requirements of the *National Action Plan for Salinity and Water Quality* and the *Natural Heritage Trust*.

Australian River Assessment Scheme

The *Australian River Assessment Scheme* compares a sample of aquatic life with reference sites considered to be relatively undisturbed by human activity.

However, in many areas of New South Wales it is difficult to find undisturbed reference sites.

For example, many large rivers in the west of the State have artificially modified flow regimes and are affected by agricultural activities.

Audit Observations

The *State of Environment Report* does not prioritise the main risks to river water quality nor identify how those risks are to be managed.

Despite the limitations of current information, EPA and some DLWC regions have made efforts to report on water quality in *State of the Environment* reports.

The reports, however, do not generally provide information in sufficient detail, in relation to objectives, for management decisions at the catchment or local level:

We need to ensure monitoring and assessment are cost-effective and provide information to support management decisions and track progress from regional to Australia-wide scales.

Source: National Land and Water Resources Audit Advisory Council, *Australian Catchment, River and Estuary Assessment 2002*

Data limitations include:

- water quality (no chemical, heavy metals or thermal pollution data)
- vegetation (no specific riparian vegetation community or condition data)
- biota (limited national data beyond freshwater macro-invertebrates in the case of river condition assessments)
- habitat (no freshwater wetland data to support the catchment condition assessment).

Source: National Land and Water Resources Audit Advisory Council, *Australian Catchment, River and Estuary Assessment 2002*

In its 1998 report, the Industry Commission observed that:

... the development of environmental indicators, which will provide measures of environmental health and/or the sustainability of natural resources management practices, is hampered by the lack of relevant information on the state of the environment

... most existing reporting [on the state of the environment] does not provide information in sufficient detail for management decisions at the regional or local level.

Source: Industry Commission, *A Full Repairing Lease*, 1998

Appendices

Appendix 1 Terms Used in this Report

Adaptive Management	A management approach that involves monitoring the outcomes of a project or issues and, on the basis of the monitoring, improving the way they are managed.
ANZECC	Australia and New Zealand Environment and Conservation Council
Bank	The relatively steep part of a river channel.
Biodiversity	The variety of life forms, the different plants, animals and micro-organisms and the ecosystems they form.`
Biota	Animal and plant life of a region.
Capacity Building	The development of understanding, skills and motivation to empower the community to effectively carry out natural resource activities.
Catchment	The land area drained by a river and its tributaries. The slope, geology, soil, vegetation and land use will all have some effect on river condition either through influencing stream flows, water quality, channel features, energy supply, or riparian and floodplain vegetation.
Catchment Management Boards	Catchment Management Boards are made up of members from local councils, Aboriginal communities, land management, environmental and conservation groups, the Government and the community.
COAG	Council of Australian Governments
Dam	A structure designed to block the flow of water for storage purposes.
DLWC	Department of Land and Water Conservation
Ecosystem	Community of organisms (that may include humans), interacting with one another.
Environmental water provisions	Water allocated to support the ecological functioning of the river.
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
Eutrophication	The over-enrichment of water with nutrients, especially nitrogen and phosphorous.
Fish Ladder	Inclined waterway to allow passage of migratory fish.

Flow	The flow variability is a key determinant of river shape and functioning and of the biota that live in rivers. The flow pattern will affect the physical form and ecology of the waterway and is very much driven by climate.
Integrated catchment management	A management process that takes account of all aspects of a catchment with the aim of protecting natural resources.
IPART	Independent Pricing and Regulatory Tribunal
Landscape	The sum of the living environment on the surface of the earth, that is the soil, vegetation, landform and artefacts found there.
NPWS	National Parks and Wildlife Service.
Pesticide	Chemical substance for destroying pests.
Protection	Ensuring there is no further decline on the condition of the river. Protection may include regulation, promotion of best practice guidelines, economic incentives or education. It may also involve works to restore the condition of the river.
Water Quality	Water quality refers to the condition of the river as defined in ANZECC water quality guidelines, including biological assessment as well as physical and chemical indicators.
Remediation	Action to return land or a river to as near original condition as practical.
Riparian	Of or on a river bank.
River Health	Ecological condition of a river, dependent on water quality and flow regimes.
Regulated Rivers	Rivers that have their flow controlled by the major Government rural dams and released as necessary to meet the needs of licensed users.
Salinity	The concentration of sodium chloride or dissolved salts in water.
Target	Quantifiable level of performance to be achieved within a specified timeframe.
Turbidity	The cloudy appearance of water due to the presence of suspended material.
Water Sharing Plan	A plan that allocates the right to draw water from naturally occurring, sources such as rivers and groundwater sources.

Appendix 2 About the Audit

Audit Objective	The objective of the audit was to examine whether the quality of New South Wales' river water is efficiently and effectively protected.
Scope of the Audit	<p>The audit has examined how efficiently and effectively government agencies carry out their functions in this regard. The audit focused on the efforts of EPA and DLWC, but also had regard to the involvement of other government agencies listed in Appendix 4.</p> <p>The audit did not:</p> <ul style="list-style-type: none">▪ review the legislative or regulatory provisions of the <i>Water Management Act 2000</i> or the <i>Protection of the Environment Operations Act 1997</i>, although the audit examined implementation of the requirements of the Acts▪ review the 'day to day' operations or decisions of river or water management committees or catchment management committees▪ duplicate previous work in which Audit Office reported on the EPA's control of all forms of pollution through the issue of environment protection licences▪ review water quality in estuarine or marine areas▪ review water conservation measures, such as community education and the use of financial incentives▪ include any review of the decisions of the Minister.
Criteria	<p>The audit had regard to better practice and government guidelines. The audit reviewed whether there are appropriate and adequate arrangements in place to protect river water including the existence, adequacy and implementation of:</p> <ul style="list-style-type: none">▪ a co-ordinated and strategic approach to protecting river water quality▪ oversight and accountability arrangements▪ policies, plans and procedures for protecting river water quality▪ information systems to support the monitoring and management process▪ performance assessment and reporting.
Cost of the Audit	The cost of the audit was \$197,000. This figure includes the cost of printing the report (\$8,000) and travel and incidentals (\$2,000).
Acknowledgments	<p>The Audit Office gratefully acknowledges the co-operation and assistance provided by representatives of the Environment Protection Authority, the Department of Land and Water Conservation, other environmental regulatory agencies and central government agencies, Sydney Water and the Sydney Catchment Authority.</p> <p>The audit was also assisted by discussions with a number of external bodies including the NSW Farmers Association, Nature Conservation Council of NSW, Local Government and Shires Association of NSW, NSW Irrigators' Council, Murray-Darling Basin Commission and Environment Australia.</p>

Appendix 3 Common Water Quality Issues

Environmental value	Common water quality issues	Common pollutants
Aquatic Ecosystems	Stress/death of fish	Low dissolved oxygen, toxicity (algal blooms or chemical contamination), pH, salinity, habitat modification, flow alteration and temperature.
	Loss of diversity of aquatic animals	Chemical contamination, altered habitat conditions (sediment, algal blooms), acidic waters, increased salinity, heavy metal contamination, dissolved oxygen levels, flow alteration and temperature
	Loss of seagrasses	Nutrients and turbidity
	Smothering of aquatic fauna	Suspended sediment
	Loss of spawning trigger for fish	Flow alteration and temperature
	Loss of aquatic plants	Acidic waters
Drinking Water	Taste and odour problems from algal blooms and suspended sediment	Nutrients, sediment and salinity
	Human health problems and scares	Toxins from algal blooms, chemical contamination, viruses, faecal and other micro-organisms
	Reduced treatment and disinfection capability	Nutrients and suspended sediment
Primary Industries (irrigation, stock, aquaculture, human consumption of aquatic foods)	Water unsuitable for consumption by stock	Toxins, suspended sediment and salinity
	Contaminated foods (such as mussels, oysters)	Heavy metals, chemical contamination, viruses, faecal coliforms and other micro-organisms
	Fouled pumps and corroded pipes	Suspended sediment, pH, and salinity
	Water unsuitable for irrigation	Salinity
Recreation and Aesthetics	Smell and odour problems	Nutrients and sediment
	Beach closures (health risks)	Viruses, faecal coliforms and other micro-organisms
	Nuisance growth of aquatic plants, scums, toxic blue greens	Nutrients, turbidity, light and temperature
Industrial	Blockage of intake screens from algal or plant growth	Nutrients and light
	Equipment fouling, corroding pipes	Suspended sediment, pH and salinity
Cultural and Spiritual	Dependent on the particular cultural and spiritual use/value	Dependent on the particular cultural and spiritual use/value

Source: Environment Australia, Water Quality Targets: A Handbook, June 2002

Appendix 4 State Agencies in the Protection of River Water Quality

Agency	Responsibility
Department of Land and Water Conservation (DLWC)	manages state water supplies, supports councils for water, sewerage and stormwater services, and supports catchment management committees
Environment Protection Authority (EPA)	regulates pollution of water, develops non-regulatory measures to reduce water pollution, develops water quality objectives and prepares <i>State of Environment</i> reports
NSW Fisheries	operates an Office of Conservation which requires rehabilitation of fish habitat as a condition of permitted activities
NSW Agriculture	advises farmers on how to conserve water and protect water quality
National Parks and Wildlife Service (NPWS)	responsible for the protection of wildlife and cultural resources and the management of reserves; responsible for threatened species, populations, critical habitats, threatened ecological communities and the management of key threatening processes; provides expertise on the ecological state of many NSW rivers to support action on the protection, restoration and rehabilitation of river systems
Department of Mineral Resources	regulates mines to prevent pollution of waterways
Department of Local Government	assists local councils with water and sewage management programs
Planning NSW	plans and regulates land use to support sustainable development
Waterways Authority	regulates discharges from vessels in NSW waterways
Sydney Catchment Authority	manages and protect Sydney's catchments and supplies bulk water to Sydney Water and a number of local councils
Sydney Water Corporation	provides drinking water and sewage systems for the Sydney area
Hunter Water Corporation	provides drinking water and sewage systems for the Newcastle area
NSW Health	regulates the quality of drinking water
Independent Pricing and Regulatory Tribunal	sets prices for declared government monopoly services including bulk water
The Cabinet Office	co-ordinates Commonwealth-State relations for NSW, including the <i>National Action Plan for Salinity and Water Quality</i>

Performance Audits by the Audit Office of New South Wales

Performance Auditing

What are performance audits?

Performance audits are reviews designed to determine how efficiently and effectively an agency is carrying out its functions.

Performance audits may review a government program, all or part of a government agency or consider particular issues which affect the whole public sector.

Where appropriate, performance audits make recommendations for improvements relating to those functions.

Why do we conduct performance audits?

Performance audits provide independent assurance to Parliament and the public that government funds are being spent efficiently and effectively, and in accordance with the law.

They seek to improve the efficiency and effectiveness of government agencies and ensure that the community receives value for money from government services.

Performance audits also assist the accountability process by holding agencies accountable for their performance.

What is the legislative basis for Performance Audits?

The legislative basis for performance audits is contained within the *Public Finance and Audit Act 1983, Part 3 Division 2A*, (the Act) which differentiates such work from the Office's financial statements audit function.

Performance audits are not entitled to question the merits of policy objectives of the Government.

Who conducts performance audits?

Performance audits are conducted by specialist performance auditors who are drawn from a wide range of professional disciplines.

How do we choose our topics?

Topics for a performance audits are chosen from a variety of sources including:

- our own research on emerging issues
- suggestions from Parliamentarians, agency Chief Executive Officers (CEO) and members of the public
- complaints about waste of public money
- referrals from Parliament.

Each potential audit topic is considered and evaluated in terms of possible benefits including cost savings, impact and improvements in public administration.

The Audit Office has no jurisdiction over local government and cannot review issues relating to council activities.

If you wish to find out what performance audits are currently in progress just visit our website at www.audit@nsw.gov.au.

How do we conduct performance audits?

Performance audits are conducted in compliance with relevant Australian standards for performance auditing and our procedures are certified under international quality standard ISO 9001.

Our policy is to conduct these audits on a "no surprise" basis.

Operational managers, and where necessary executive officers, are informed of the progress with the audit on a continuous basis.

What are the phases in performance auditing?

Performance audits have three key phases: planning, fieldwork and report writing.

During the planning phase, the audit team will develop audit criteria and define the audit field work.

At the completion of field work an exit interview is held with agency management to discuss all significant matters arising out of the audit. The basis for the exit interview is generally a draft performance audit report.

The exit interview serves to ensure that facts presented in the report are accurate and that recommendations are appropriate. Following the exit interview, a formal draft report is provided to the CEO for comment. The relevant Minister is also provided with a copy of the draft report. The final report, which is tabled in Parliament, includes any comment made by the CEO on the conclusion and the recommendations of the audit.

Depending on the scope of an audit, performance audits can take from several months to a year to complete.

Copies of our performance audit reports can be obtained from our website or by contacting our publications unit.

How do we measure an agency's performance?

During the planning stage of an audit the team develops the audit criteria. These are standards of performance against which an agency is assessed. Criteria may be based on government targets or benchmarks, comparative data, published guidelines, agencies corporate objectives or examples of best practice.

Performance audits look at:

- processes
- results
- costs
- due process and accountability.

Do we check to see if recommendations have been implemented?

Every few years we conduct a follow-up audit of past performance audit reports. These follow-up audits look at the extent to which recommendations have been implemented and whether problems have been addressed.

The Public Accounts Committee (PAC) may also conduct reviews or hold inquiries into matters raised in performance audit reports.

Agencies are also required to report actions taken against each recommendation in their annual report.

To assist agencies to monitor and report on the implementation of recommendations, the Audit Office has prepared a Guide for that purpose. The Guide, *Monitoring and Reporting on Performance Audits Recommendations*, is on the Internet at www.audit.nsw.gov.au/guides-bp/bpglist.htm

Who audits the auditors?

Our performance audits are subject to internal and external quality reviews against relevant Australian and international standards.

The PAC is also responsible for overseeing the activities of the Audit Office and conducts reviews of our operations every three years.

Who pays for performance audits?

No fee is charged for performance audits. Our performance audit services are funded by the NSW Parliament and from internal sources.

For further information relating to performance auditing contact:

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Performance Audit Reports

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
64*	Key Performance Indicators	<ul style="list-style-type: none"> ▪ <i>Government-wide Framework</i> ▪ <i>Defining and Measuring Performance (Better practice Principles)</i> ▪ <i>Legal Aid Commission Case Study</i> 	31 August 1999
65	Attorney General's Department	<i>Management of Court Waiting Times</i>	3 September 1999
66	Office of the Protective Commissioner Office of the Public Guardian	<i>Complaints and Review Processes</i>	28 September 1999
67	University of Western Sydney	<i>Administrative Arrangements</i>	17 November 1999
68	NSW Police Service	<i>Enforcement of Street Parking</i>	24 November 1999
69	Roads and Traffic Authority of NSW	<i>Planning for Road Maintenance</i>	1 December 1999
70	NSW Police Service	<i>Staff Rostering, Tasking and Allocation</i>	31 January 2000
71*	Academics' Paid Outside Work	<ul style="list-style-type: none"> ▪ <i>Administrative Procedures</i> ▪ <i>Protection of Intellectual Property</i> ▪ <i>Minimum Standard Checklists</i> ▪ <i>Better Practice Examples</i> 	7 February 2000
72	Hospital Emergency Departments	<i>Delivering Services to Patients</i>	15 March 2000
73	Department of Education and Training	<i>Using computers in schools for teaching and learning</i>	7 June 2000
74	Ageing and Disability Department	<i>Group Homes for people with disabilities in NSW</i>	27 June 2000
75	NSW Department of Transport	<i>Management of Road Passenger Transport Regulation</i>	6 September 2000
76	Judging Performance from Annual Reports	<i>Review of eight Agencies' Annual Reports</i>	29 November 2000
77*	Reporting Performance	<i>Better Practice Guide A guide to preparing performance information for annual reports</i>	29 November 2000
78	State Rail Authority (CityRail) State Transit Authority	<i>Fare Evasion on Public Transport</i>	6 December 2000
79	TAFE NSW	<i>Review of Administration</i>	6 February 2001
80	Ambulance Service of New South Wales	<i>Readiness to Respond</i>	7 March 2001
81	Department of Housing	<i>Maintenance of Public Housing</i>	11 April 2001

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
82	Environment Protection Authority	<i>Controlling and Reducing Pollution from Industry</i>	18 April 2001
83	Department of Corrective Services	<i>NSW Correctional Industries</i>	13 June 2001
84	Follow-up of Performance Audits	<i>Police Response to Calls for Assistance The Levying and Collection of Land Tax Coordination of Bushfire Fighting Activities</i>	20 June 2001
85*	Internal Financial Reporting	<i>Internal Financial Reporting including a Better Practice Guide</i>	27 June 2001
86	Follow-up of Performance Audits	<i>The School Accountability and Improvement Model (May 1999) The Management of Court Waiting Times (September 1999)</i>	14 September 2001
87	E-government	<i>Use of the Internet and related technologies to improve public sector performance</i>	19 September 2001
88*	E-government	<i>e-ready, e-steady, e-government: e-government readiness assessment guide</i>	19 September 2001
89	Intellectual Property	<i>Management of Intellectual Property</i>	17 October 2001
90*	Better Practice Guide	<i>Management of Intellectual Property</i>	17 October 2001
91	University of New South Wales	<i>Educational Testing Centre</i>	21 November 2001
92	Department of Urban Affairs and Planning	<i>Environmental Impact Assessment of Major Projects</i>	28 November 2001
93	Department of Information Technology and Management	<i>Government Property Register</i>	31 January 2002
94	State Debt Recovery Office	<i>Collecting Outstanding Fines and Penalties</i>	17 April 2002
95	Roads and Traffic Authority	<i>Managing Environmental Issues</i>	29 April 2002
96	NSW Agriculture	<i>Managing Animal Disease Emergencies</i>	8 May 2002
97	State Transit Authority Department of Transport	<i>Bus Maintenance and Bus Contracts</i>	29 May 2002
98	Risk Management	<i>Managing Risk in the NSW Public Sector</i>	19 June 2002
99	E-government	<i>User-friendliness of Websites</i>	26 June 2002
100	NSW Police Department of Corrective Services	<i>Managing Sick Leave</i>	23 July 2002

No.	Agency or Issue Examined	Title of Performance Audit Report or Publication	Date Tabled in Parliament or Published
101	Department of Land and Water Conservation	<i>Regulating the Clearing of Native Vegetation</i>	20 August 2002
102	E-government	<i>Electronic Procurement of Hospital Supplies</i>	25 September 2002
103	NSW Public Sector	<i>Outsourcing Information Technology</i>	23 October 2002
104	Ministry for the Arts Department of Community Services Department of Sport and Recreation	<i>Managing Grants</i>	4 December 2002
105	Department of Health Including Area Health Services and Hospitals	<i>Managing Hospital Waste</i>	10 December 2002
106	State Rail Authority	<i>CityRail Passenger Security</i>	12 February 2003
107	NSW Agriculture	<i>Implementing the Ovine Johne's Disease Program</i>	26 February 2003
108	Department of Sustainable Natural Resources Environment Protection Authority	<i>Protecting Our Rivers</i>	May 2003

* Better Practice Guides

Performance Audits on our website

A list of performance audits tabled or published since March 1997, as well as those currently in progress, can be found on our website www.audit.nsw.gov.au



**THE AUDIT OFFICE
OF NEW SOUTH WALES**

THE AUDIT OFFICE MISSION

Assisting Parliament improve
the accountability and
performance of the State

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