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# **Australian River Management and Restoration**

## **Criteria for the legislative framework for the twenty-first century**

**Based on an analysis of Australian and international experience**

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**Occasional paper 02/00**

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# ABBREVIATIONS

ACF	Australian Conservation Foundation	ESWM	ecologically sustainable water management
AACM	AACM International	ICM	integrated catchment management
ACT	Australian Capital Territory	IGAE	Intergovernmental Agreement on the Environment (Commonwealth/State/Local government agreement)
AFFA	Agriculture, Fisheries and Forestry – Australia	INBO	International Network of Basin Organisations
ANZECC	Australian and New Zealand Environment and Conservation Council	ISO	International Standards Organisation
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand	LG	local government
AWWA	Australian Wastewater Association	LWRRDC	Land and Water Resources Research and Development Corporation
CALPB	Catchment and Land Protection Board	MDBMC	Murray–Darling Basin Ministerial Committee
CMA	catchment management authority	MOU	memorandum of understanding
CMC	catchment management committee	NCC	Nature Conservation Council
CRC	cooperative research centre	NHT	National Heritage Trust
COAG	Council of Australian Governments	NSESD	National Strategy for Ecologically Sustainable Development
CSIRO	Commonwealth Scientific and Industrial Research Organisation	NSW	New South Wales
CWMP	catchment water management plan	NWQMS	National Water Quality Management Strategy
DEHAA	South Australia Department of Environment, Heritage and Aboriginal Affairs	QCC	Queensland Conservation Council
DLPE	Northern Territory Department of Land Planning and Environment	QLD	Queensland
DLWC	New South Wales Department of Land and Water Conservation	R&D	research and development
DNR	Queensland Department of Natural Resources	RCS	regional catchment strategies
DNRE	Victorian Department of Natural Resources and Environment	RVMP	regional vegetation management plan
DPIWE	Tasmania Department of Primary Industries, Water and Environment	SA	South Australia
EBMP	environmental best management practices	SEPP	State Environmental Protection Policy
EDO	Environmental Defenders’ Office	SMP	streamflow management plan
EFR	environmental flow requirements	SoE	State of Environment
EPA	Queensland Environmental Protection Agency	SWRCB	State Water Resources Control Board
EPP	Environmental Protection Policy	TAS	Tasmania
ESD	environmentally sustainable development	USA	United States of America
ESForestM	Ecologically Sustainable Forest Management	USEPA	United States Environmental Protection Authority
		VIC	Victoria
		WA	Western Australia
		WAMP	water allocation and management plan
		WARC	Water and Rivers Commission
		WRC	Western Australian Water and Rivers Commission



# EXECUTIVE SUMMARY

In the LWRRDC 1999 project, *River Management and Restoration Legislative Frameworks: an Analysis of Australia and International Experience*, the task was to define criteria for a world best practice legislative framework for all Australian jurisdictions for the twenty-first century. The aim was to provide the opportunity for healthier rivers in Australia by using an agreed, nationally-consistent legislative framework model.

The approach involved a focus on four themes considered central to river management; reviewing a range of Australian legislation at all three levels of government, as well as legal provisions in selected relevant countries; analysing and documenting critical success factors for a best practice legislative framework.

The four themes—*water flows, water quality, riparian areas and administrative arrangements for integrated catchment management (ICM)*—were chosen on the basis that:

1. they represent a cross section of the major missing river management issues (protection of ecosystem values, governance and community empowerment);
2. they deal with discrete yet overlapping aspects of river management including resource allocation, pollution, land development and institutional arrangements; and
3. all four are presently experiencing legislative reviews.

The definition of a best practice legislative framework is one which:

1. defends rivers as a vital part of our natural capital and defines ecological 'bottom-lines' or thresholds for their use—this requires pre-stated measurable performance indicators, arrived at through community involvement;
2. manages conflicts between users, and between users and non-users;
3. facilitates change and requires continuous improvement in performance;
4. enables adaptive management, through policy, institutions; and management, in response to changes in perceptions, knowledge, technologies and management regimes; and
5. protects the public interest.

The 1994 Council of Australian Governments (COAG) Agreement for water industry reforms is arguably the most significant catalyst for legislative change to river management in Australia this century and its impacts

are not yet complete, much less critically evaluated. Most apparent examples of legislative initiatives are still just good ideas: they are not yet critically evaluated; locally, nationally or internationally. In Australia, no jurisdiction has specific legislation or a legislative framework which manages rivers or their ecological processes in a systematic, integrated manner.

From in-depth review of legislation for four themes the following conclusions were drawn.

1. Rivers are receiving greater attention than before. No national, binding standards have been set for their protection or management. Surrogate standards are proposed through Ministerial or council agreements, or Commonwealth financial incentives. Overseas river achievements in federal systems indicate the need for a stronger Commonwealth lead, in partnership with States and Territories. There is limited application of Commonwealth powers to protect rivers.
2. There is confusing terminology across jurisdictions for most aspects of river/resource management.
3. Water resource issues are the main focus of attention, with some degree of recognition of environmental flow needs and a narrow focus on river water rather than the total water cycle. There is opposition in some quarters to security of environmental flows in water allocation.
4. The Commonwealth commitment to NSESD has not been borne out in reality (Productivity Commission 1999 study).
5. Commitment has been given by all States to integrated natural resource management/ integrated catchment management. In most States, problems arise because major resource agencies are distant from the integrated planning process; outside the cooperative arrangements for planning and service delivery.
6. Although evolution is towards catchment-based planning, these plans remain non-statutory or advisory in most jurisdictions. Catchment legislation is added to the plethora of other legislation relating to resource management or ecosystem protection.
7. There is a trend towards devolution of functions and responsibilities to catchment or local level, but there is limited integration of statutory powers at this level.
8. Although there is strengthened representation of stakeholders, an absence of national/State policy

framework fails to ensure a level playing field (i.e. ecosystem protection with resource management).

9. There is increased knowledge about ecosystem processes and resource use impacts. Resource security has to be matched with emerging requirements to provide for ecosystem needs, adjusted over time.

The big directions of the future appear to be:

1. ecologically sustainable water management (ESWM, similar to ESForestM), where equity and ecological interests are represented alongside economic and sectoral interests in water management decisions;
2. development of new administrative arrangements at the regional/catchment level;
3. nationally-agreed binding framework for rivers (i.e. where to after COAG?); and
4. development of companion mechanisms in the package (tax reform, industry adjustment, environmental accounting) in a compatible and comprehensive way; potentially decreasing the role for legislation if these mechanisms perform for river management.

The nature of the legislative framework appears to be at a crossroads. The regulatory model that includes moving forward with structures, statutory plans and administrative processes, seems to be favoured by those stakeholders generally outside decision-making circles and disillusioned with river managers' performance. The other model moves forward with inclusive, co-management, multiple-mechanisms approaches and a lower but critical profile for legislation.

A set of criteria reflecting best practice river management and restoration frameworks was developed, primarily from the topics; and from literature and professional experience including practitioners, mainly in the public sector.

The criteria are:

1. Setting binding, measurable river management standards as a national function, requiring a strong leading role by the Commonwealth.
2. Legislating for a general duty-of-care for all landholders and all others to manage all aspects of surface water and groundwater resources sustainably, and to achieve ESD as the primary object (not just as one of several) of their activities.
3. Developing a statutory definition of 'river', founded in the total water cycle and including floodplains, all related wetlands, surface and groundwater.
4. A single, multi-functional agency for river

management and rehabilitation.

5. Catchment-wide spatial characteristic for river management agencies.
6. Statutorily-based powers commensurate with their responsibilities (i.e. for planning, funding, educating, regulating and achieving all components of river management) for river management agencies.
7. Inclusion of all stakeholders in an open, equitable and adequately-resourced manner into river management agencies.
8. Close links between river management agencies and local governments (given the previous three principles, and the extent to which local government is already involved in some environmental and other aspects of river management).
9. Statutory, comprehensive river management plans by river management decision making.
10. Statutorily-required regular, publicly-available audit of river management and rehabilitation, independent from the restoring/rehabilitating agency.
11. Requirement for specified periodic reviews in the legislative framework for administrative components of river management.
12. Primacy over all other legislation—including that applying to utilities and emergencies—of all legislation with a direct or indirect effect on river management needs.

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## Water ... an excerpt from Ulysses

(as Bloom's day draws to a close, he fills the kettle to make tea for Stephen Dedalus...)

*What in water did Bloom, waterlover, drawer of water, watercarrier returning to the range, admire?*

*Its universality: its democratic equality and constancy to its nature in seeking its own level; its vastness in the ocean of Mercator's projection: its unplumbed profundity in the Sundam trench of the Pacific exceeding 8,000 fathoms: the restlessness of its waves and surface particles visiting in turn all points of its seaboard: the independence of its units: the variability of states of sea: its hydrostatic quiescence in calm: its hydrokinetic turgidity in neap and spring tides: its subsidence after devastation: its sterility in the circumpolar icecaps, arctic and antarctic : its climatic and commercial significance: its preponderance of 3 to 1 over the dry land of the globe: its indisputable hegemony extending in square leagues over all the region below the subequatorial tropic of Capricorn: the multiseular stability of its primeval basin, its luteofulvous bed: its capacity to dissolve and hold in solution all soluble substances including millions of tons of the most precious metals: its slow erosions of peninsulas and downwardtending promontories: its alluvial deposits: its weight and volume and density: its imperturbability in lagoons and highland tarns: its gradation of colours in the torrid and temperate and frigid zones: its vehicular ramifications in continental lake contained streams and confluent oceanflowing rivers with their tributaries and transoceanic currents: gulfstream, north and south equatorial courses: its violence in seaquakes, waterspouts, artesian wells, eruptions, torrents, eddies, freshets, spates, groundswells, watersheds, waterpartings, geysers, cataracts, whirlpools, maelstroms, inundations, deluges, cloudbursts: its vast circumterrestrial ahorizontal curve: its secrecy in springs, and latent humidity, revealed by rhabdomantic or hygrometric instruments and exemplified by the hole in the wall at Ashtown gate, saturation of air, distillation of dew: the simplicity of its composition, two constituents parts of hydrogen with one constituent part of oxygen: its healing virtues: its buoyancy in the waters of the Dead Sea: its persevering penetrativeness in runnels, gullies, inadequate dams, leaks on shipboard: its properties for cleansing, quenching thirst and fire, nourishing vegetation: its infallibility as paradigm and paragon; its metamorphoses as vapour, mist, cloud, rain, sleet, snow, hail: its strength in rigid hydrants: its variety of forms in loughs and bays and gulfs and bights and guts and lagoons and atolls and archipelagos and sounds and fjords and minches and tidal estuaries and arms of sea: its solidity in glaciers, icebergs, icefloes: its docility in working hydraulic millwheels, turbines, dynamos, electric power stations, bleachworks, tanneries, scutchmills: its utility in canals, rivers, if navigable, floating and graving docks: its potentiality derivable from harnessed tides or water courses falling from level to level: its submarine fauna and flora (anacoustic, photophobe) numerically, it not literally, the inhabitants of the globe: its ubiquity as constituting 90% of the human body: the noxiousness of its effluvia in lacustrine marshes, pestilential fens, faded flowerwater, stagnant pools in the waning moon.*

(James Joyce 1992, pp. 782–784)

# 1. PROJECT TASK

In September 1998, the Land and Water Resources Research and Development Corporation (LWRRDC) called for four related consultancy projects into river management and restoration, as part of the need for R&D to support community-based efforts to rehabilitate Australia's rivers. These four projects were:

1. production of a CD ROM on River management and restoration (\$200,000);
2. review of methods to identify and protect high value rivers and river reaches (\$30,000);
3. development of a framework for river rehabilitation (\$80,000); and
4. analysis of legislative frameworks for river management (\$50,000).

The analysis of legislative frameworks for river management (Project 4) is tasked to suggest criteria for a world best practice legislative framework for all Australian jurisdictions for the twenty-first century, thus providing the opportunity for healthier rivers in Australia by using an agreed nationally consistent legislative framework model.

Deliverables consist of a broad assessment of existing legislation and critical success factors or criteria for a 'best practice' legislative framework for river management.

The challenge of this project was to undertake assessment, analysis and framework development in relation to river management and restoration legislation across ten Australian jurisdictions, utilising international examples and focusing on community empowerment.

With the aim of making this task manageable within the timeframe and budget, the following approach was approved and the study has proceeded through three key steps:

- a strategic overview of existing legislation based on researching legislation in Australian jurisdictions and overseas
- review and analysis to identify trends and challenges through examination of legislative frameworks for four topics (environmental flows, water quality, riparian areas and institutional arrangements for catchment management);
- scoping of critical success factors for a best practice legislative framework for river management and restoration drawn from this research.

This report is targeted to legal practitioners, policy advisers and people across a broad range of agencies (resource planning and management, integrated resource management, environmental protection and local government planning); and catchment managers, community stakeholders, water industry user groups and catchment residents.

The study proposes further work on model legislative frameworks including review of legislation in operation in all States, comparative studies of specific Acts, as well as a review of legislation in practice through examination of selected legislation and its effectiveness in leading jurisdictions.

## 2. CONTEXT OF THE LEGISLATIVE FRAMEWORK FOR RIVER MANAGEMENT AND RESTORATION

### River conditions in Australia

It is widely recognised that Australia's rivers are in crisis. Australia is the driest of the world's populated continents, and has the world's most variable rainfall and stream flow. Of the twelve major drainage systems in Australia, only half produce significant levels of useable runoff and many face major intractable water quality problems, due to overdevelopment of the water resource.

Australian river flows have high and unpredictable variability, over a variety of time scales: decade to decade, year to year and season to season. Further, the water volume in many river systems is over-allocated. Increasing demands on water resources are leading to serious conflict and growing competition in allocation to economic uses, and have largely ignored sustainable maintenance of ecosystems.

Australia's first *State of Environment Report* (Alexander 1996) has some startling statistics. A recent survey of the Murray and its side-channels found that at least 30% of the study area was cleared and that introduced weeds constituted 18–63% of plant species (Banens et al. 1996). An estimated 1.8 million tonnes of material fell into the lower Murray over a 153 km section in 1988–89 (Banens et al. 1996). Along the Goulburn and upper Murray rivers, some 870 and 400 stream-management works respectively have been recorded. In the Murray–Darling, more than 30 species of plants and animals have become extinct and another 70% are critically endangered. Over wide areas, less than 9% of native vegetation remains. (Industry Commission 1997, p 15).

Australia has the highest per capita rate of water storage of all countries. The growth in farm dams has meant a 50% reduction in annual stream flow in some Victorian catchments in drought years, and a flow decrease of up to 62% in some NSW rivers.

Victoria is estimated to have some 300,000 small farm dams. Their effect on stream flows is most pronounced in dry periods. In the Murray, drought periods previously occurring in 5% of years, now occur in 60%. The water audit of the Murray–Darling Basin estimated that, given current growth in water requirements, 90% of the flow from this system will be diverted for irrigation and other uses by 2010 (State of Environment [SoE] 1995, Murray–Darling Basin Ministerial Council 1995).

A two-year survey of the Murray River catchment did not reveal any Murray Cod; the system being

dominated by exotic fish species. The decline of such a widely-accepted Australian river icon strongly impacted on the community, which holds great store in fishing and river traditions. Similar degradation of fish stocks and species diversity was found in other regulated rivers in NSW (CRC for Freshwater Ecology 1997) and Queensland.

In NSW, assessment of stressed rivers (Department of Land and Water Conservation [DLWC] 1998) showed that, of 527 rivers so classified, 190 (28%) have a high level of stress. About 27% of all Victorian streams are in 'poor to very poor' condition, with 65% (17,000 km) of streams in cleared areas being in this category (Mitchell 1990).

It has taken some 200 years to bring Australian rivers to their present unsatisfactory state; it may take a not dissimilar period for river management and restoration.

### Recent Australian initiatives

In the last decade, key national initiatives have recognised the need for an endorsement of improved water management—primarily its resource aspects—but also in terms of water's many environmental service functions.

- 1990 National Water Quality Management Strategy, a joint initiative between Australian Water Resources Council and the Australian and New Zealand Environment and Conservation Council (ANZECC). This technical work defining environmental values for water quality objectives for individual river systems has stimulated State and local government legislation and water quality management initiatives.
- 1991 World's largest blue–green algae outbreak, over 1000 km in length, in the Darling River.
- 1992 Agreements working for a more coordinated and consistent approach to resource and environmental management nationally—the Intergovernmental Agreement on the Environment, and the National Strategy for Ecologically Sustainable Development.
- 1993 Australian Water Resources Council amalgamated with Australian Soil Conservation Council to form the Agriculture and Resource Management Council of Australian and New Zealand (ARMCANZ).

- 1994 Council of Australian Governments (COAG) recommended key reforms to aspects of water services in line with National Competition Policy and based on user pays, removal of cross-subsidies and pricing for full cost recovery (transparent arrangements by 2001, review of property rights to water and facilitation of water trading by 1998, infrastructure and extensive institutional reforms by 1998 [COAG 1994]).
- 1995 Interim Cap on increased water allocations from Murray River. Ministerial Council agreed that protection of the river system required a balance be struck between consumptive and instream uses of water in the Basin and introduced an interim Cap on further increases in diversions.
- 1996 Australia's State of Environment Report provided a snapshot of the critical problems facing inland rivers, estuaries and coasts. This project was a multi-sectoral, multi-agency exercise of three years duration. The next phase will focus on intensive measurement based on CSIRO's indicators for national State of Environment Reporting.
- 1997 Natural Heritage Trust (NHT) funded from the sale of the first 33% of Telstra, aimed at providing \$1.25 billion over six years to provide: strategic capital investment to stimulate additional investment in the natural environment; achieve complementary environment protection, natural resource management and sustainable agricultural outcomes consistent with national strategies; and provide for cooperative partnerships between communities and all levels of government.
- Community resourcing has occurred in five main areas across Australia: vegetation; rivers; biodiversity; land; and coastal and marine areas, administered through a number of national programs. Delivery through States and Territories occurs through partnership agreements, some of which have involved review of State/Territory arrangements (e.g. for vegetation clearing controls).
- Approximately 2,200 groups have been formed in voluntary rehabilitation projects in catchments and local areas; numbers of landowners committing to formal conservation arrangements on their properties are steadily growing.
- 1998 The introduction of the Commonwealth Government *Environment and Biodiversity Conservation Bill* presented the option to States and Territories of meeting specific milestones or standards in their environmental policies

and administration in return for accreditation and reduced use of Commonwealth powers over State operations where applicable. The scope of the Bill does not explicitly deal with water or river management issues.

This summary understates the exponential growth in water- and river-related scientific work, data base development, government projects and partnerships, community involvement, institutional reforms and innovative mechanisms which have taken place in the last decade.

A central driver for reform of water planning and management has undoubtedly been the Council of Australian Government Water Resources Policy announced in 1994 (COAG 1994). Australia has no single national water agency; the Commonwealth Government has therefore funded water resources and water management programs to drive reform of the water industry in all States and Territories.

By late 1996, all jurisdictions reported good progress with these reforms, though the pace and extent of change has not been consistent across Australia. There were doubts expressed that States and Territories would meet the 1998 reform milestones (Industry Commission 1997).

Several leading stakeholder groups including the Australian Conservation Foundation (ACF), the Cooperative Research Centre (CRC) for Freshwater Ecology and the Inland Rivers Network have queried whether the reforms go far enough, fast enough and if the water pricing structures include full environmental costs. If the perspective is one of championing the liberation of rivers, legal and policy mechanisms will seem to offer too little change, too slowly. With a perspective of reform of present systems to move towards greater sustainability, the emphasis will be more on using the proper channels and the appropriate pace for 'realistic and practical' reforms of policy and legislation.

### Rivers as natural capital

Harvesting or using rivers on a sustainable basis is a major challenge for Australia. In terms of ecologically sustainable development (ESD), material wellbeing must be balanced against irreversible losses of environmental assets. There are strong reasons to think of sustainable development as involving a further constraint, namely that the stock of environmental assets as a whole should not decrease (Industry Commission 1997, p. 11).

Ecological integrity is the core of the National Strategy for Ecologically Sustainable Development (NSESD) applied to river management and restoration. River managers are just starting to come to grips with this issue and its incorporation into future river

management. Maintenance of ecological integrity is commonly understood to occur when the productivity, stability and resilience of a system are sustained; that is, the system is ecologically healthy and can perform all essential ecological processes. It also means maintenance of evolutionary potential.

The relevant objectives are still difficult to define. The ANZECC (1992) guidelines for fresh and marine waters note that it is not yet possible to state with any degree of certainty just what constitutes a healthy or acceptable aquatic ecosystem. This point could equally apply to river systems and their catchments overall. However in 1998 the Brisbane Region Environment Council assessed water quality management work in the Brisbane River and Moreton Bay, and provided some examples of criteria for protection and restoration of catchment quality (Figure 1). These criteria provide some scope for the mechanics of river management and restoration.

**Figure 1.** Possible performance measures for river management and restoration.

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**Possible performance measures for river management and restoration**

- Soil water: content not to fall below 30% of maximum
- Groundwater: consumption:production not to exceed 70% (preferable level 50%)
- Percentage of whole catchment under natural land use (native vegetation): minimum 30%
- Percentage of riparian corridors under natural land use: minimum 30%
- Percentage of major floodplains under urban land use: maximum 10%
- Water quality objectives for nutrients, sediments, other contaminants to be specified for protection and restoration of aquatic and terrestrial ecosystems
- Value of ecological services provided by catchments, waterways and bays: not to decline by 5% or more in any year

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(Brisbane Region Environment Centre, 1998)

An alternative approach may be to specify achievement of a set percentage (e.g. 10%, 20%, 5%) improvement or stabilisation in overall river condition every five years, assuming baseline data is accessible.

Critical components for the restoration of rivers towards ecological sustainability means working in an integrated water management framework based upon:

- Protecting the hydrological system as a whole. This means ensuring there is awareness about the interdependence of natural systems and a commitment to an integrated approach to development and protection. Environment protection must be accepted as a major public policy goal. The watershed or catchment is the most appropriate unit for water management, for ecological processes and economic activities.
- Managing for water quality protection, conservation of water and the links between them. Management of sustainable water use in economic activities means an integrated approach to how these activities use and dispose of water.
- Maintaining the capacity for the ecological systems to deal with desirable change. Modifications to water flows, water quality, stream channels, riparian, floodplain, catchment or groundwater conditions have to be viewed in terms of the nature and scale of the impacts, as well as cumulative effects.
- Protecting and managing for sustainability under conditions of natural and human-induced change is not straightforward.

Mandated standards delivered through a strengthened whole-of-government approach are the most practical way of achieving the above.

One example of the difficulty of assessing a river system's capacity to handle change is the Oldman River Dam, Canada (Table 1).

This example serves to illustrate that, in terms of natural capital, short-term gains have to be assessed in the context of longer term effects on natural systems. Value judgements have to be made and justified in a transparent context. The precautionary principle puts the onus on the proponent of the changes and impacts but the tools for evaluating impacts are still rudimentary. Ecological 'bottom lines' are critical but mostly they are not readily identifiable. Additionally, there is a lack of accountability and sanctions: there is minimal likelihood of removing a dam once built, if its adverse environmental impacts are more than predicted. The best outcome is that the lessons, perhaps taking two decades or more to be perceived, are included in evaluation of future dams—a generational time loss.

The ecological condition and the contribution to Australians' livelihoods and lifestyles by rivers, are an essential part of the nation's natural capital. In terms of the need for legislation, natural capital has to be understood through its key characteristics:

- Natural capital has multiple functions and it is valued for this characteristic. Protection of this full range of functions is critical.
- Natural capital is difficult to value under present excessively narrow econometric measures.



**Table 1.** Assessing ecological outcomes in the Oldman River Dam, Canada.

<b>Ecological losses: dam impacts</b>	<b>Ecological gains: environmental mitigation plan</b>
<ul style="list-style-type: none"> <li>• Destroyed 43 km of wild river</li> <li>• Flooded 130 ha of critical fish habitat</li> <li>• Modified downstream habitat with resulting increase in brown trout</li> <li>• Inundated 2,400 ha of land, mostly native prairie grassland; overall loss of biodiversity in Southern Alberta</li> <li>• Changes to natural flow conditions with July, August flows to be higher, and other months lower than natural conditions</li> <li>• Downstream impacts on cottonwood forests which depend on flooding</li> </ul>	<ul style="list-style-type: none"> <li>• Habitat replacement for deer, marmot, falcon with purchase of 1012 ha of land</li> <li>• Shelter belts planted</li> <li>• Nesting sites for waterfowl</li> <li>• Replacement of lost raptor sites</li> <li>• 'No net loss of recreational fishing opportunity' meant replacement of high quality habitat by improving existing low quality fish habitat (aim is 130 ha of stream habitat)</li> <li>• Provision for periodic flooding (unsure of results for downstream forests)</li> <li>• Community Monitoring Committee established to evaluate mitigation plan and dam impacts.</li> </ul>

(de Loe 1997, p. 138)

Financial measures fall short and physical accounting measures quantify some aspects: but matters such as cultural heritage or 'substitutability' make matters of measurement and valuation difficult. Difficulties in valuing natural capital means that market mechanisms cannot yet work with a true costing; and development of more inclusive accounting techniques ('green accounting') is needed. Market constraints are then distorted. For so-called renewable natural resources, at this point in human history, rates of consumption and degradation exceed rates of renewal (e. g. clean air in urban areas, atmospheric ozone depletion, fertile soil, old growth forests).

- Scientific uncertainty of natural capital means that irreversible losses can occur as a result of systemic change. Causes and effects are not easily defined. Seemingly small or harmless actions can have irreversible consequences and substitution or replacement of these losses is not likely to be an option in the near future.
- As long as natural capital is not exploited beyond a critical point, it can be harvested or used on a sustainable basis for all time and does not compromise the welfare of future generations. However there are no practical substitutes for extinct species or depletion of the ozone layer.

In natural capital terms, rivers offer ecological benefits and services (Table 2).

While the scope and scale of these ecological services by rivers will vary, these characteristics provide a good argument for their protection as critical natural capital, notwithstanding their extensive social, cultural and economic capital.

Market mechanisms to date are limited in their inclusions. They have failed to supply public goods

adequately, to ensure social value such as the redistribution of wealth, to manage employment, to deal with externalities arising out of resource use and to account for cumulative effects of degradation or resource use. Legislation then has the pivotal role to play in the tripartite arrangement between the economy, society and the environment; to give legislative weight and direction to mechanisms needed to deal with market failures.

### Context of the legislative framework

Legislation is only one part of the total package used for restoring, rehabilitating and managing rivers and their catchments. For greatest effect, the package must incorporate:

- appropriate legislation;
- ongoing consistent political will;
- ongoing consistent agency commitment;
- compatible and comprehensive market-based incentives and disincentives;
- community access and involvement;
- information access and communication/ technological developments; and
- human factors such as leadership, attitudes, commitment and effective responses to crises.

Within this package, the purpose of legislation is to provide for the definition and delivery of policy through moderation and constraint of self-interest by groups or individuals, particularly when other parts of the package are unable, unwilling or unsuitable to deliver. Its primary characteristics are to:

- set out the policy intention and principles;

**Table 2.** Ecological services.

Rivers	Natural functions
<b>Water flows</b>	<ul style="list-style-type: none"> <li>• water distribution (infiltration and drainage)</li> <li>• materials and energy flows through the ecosystem</li> <li>• supplies of materials and energy to riverine and floodplain settings as well as marine, estuarine or lake systems</li> <li>• temperature adjustments and modification</li> <li>• volume fluctuations by seasons and events</li> <li>• water collection</li> <li>• habitat provision</li> </ul>
<b>Water quality</b>	<ul style="list-style-type: none"> <li>• the uptake, storage, transformation and transfer of a range of chemical and physical properties from atmospheric and terrestrial exposure, and sunlight; distribution of these properties through water flows</li> </ul>
<b>Stream dynamics</b>	<ul style="list-style-type: none"> <li>• channel functions both lateral and linear; geomorphological processes in the bed and banks; instream habitats and biota; instream processes and ecological processes within the receiving waters</li> </ul>
<b>Riparian areas</b>	<ul style="list-style-type: none"> <li>• stabilised water courses and banks</li> <li>• filtering and processing of water</li> <li>• chemical and physical properties of water flows and soils</li> <li>• wetlands habitats and biota</li> <li>• pest and erosion control</li> <li>• climate protection</li> <li>• flood mitigation</li> <li>• water table stability</li> <li>• wildlife corridors</li> </ul>
<b>Floodplain dynamics</b>	<ul style="list-style-type: none"> <li>• surface runoff</li> <li>• wetlands</li> <li>• infiltration and aquifer recharge</li> </ul>
<b>Receiving waters</b>	<ul style="list-style-type: none"> <li>• marine ecosystem processes and biota</li> <li>• limnological processes and biota</li> </ul>

- outline primary operating mechanisms and processes for achieving that intention;
- state boundaries and bottom lines;
- state where one legal matter has precedence over another;
- define enforcement provisions and penalties;
- be multi-layered (hierarchical or nested)—with umbrella legislation setting up broad intentions and heads of power, and subordinate legislation providing more specific details (e.g. for its application spatially or to specific issues); and
- define lines of authority.

While legislation is only one mechanism, it has an enabling function for other tools for improving resource management. Alternatively, it can present obstacles to their functioning.

### Legislation for river management and restoration

The legislative framework encompasses all instruments having a statutory basis, falling into two broad areas (see Table 3 for examples):

- those affecting land and water users impacting on rivers and their restoration, and
- those affecting governmental structures and intergovernmental and inter-agency relations and operations.

The Commonwealth *Constitution Act 1900* (Cwlth) does not define fundamental rights (e.g. environmental rights or rights to environmental quality). Nor does it define property rights to water. For natural resources law, the emphasis is on constituting organisations, setting broad parameters for their operations, specifying objects and decision-making considerations and empowering them to make discretionary decisions. Some may even include formal procedures for planning which meets the legislation's broad parameters (Farrier 1999).

Natural resource legislation in relation to water is not only about access and use of land and water, and management regimes for production and consumption activities. It is also about management of other values of water (e.g. values having economic importance such as navigation, public recreation, commercial fishing, property, drainage and flood mitigation, and pollution control). Other important values include socio-cultural significance, landscape and amenity values of water and streams, and a range of ecological benefits and services as well as more eco-centric values. The Crown, by virtue of these matters and of

its public interest value, has then a sizeable controlling interest in water and as such in rivers.

This array of values in relation to water means the legal system has to service multiple objectives. This in turn means a framework, explicit or not, based on multiple policies for water management. The NSW EDO (EDO 1994) scoped good environmental laws as displaying:

- clarity of purpose;
- political accountability;
- open decision making;
- access to information;
- environmental data;
- independent review; and
- civic enforcement.

Native title has additional, sometimes fundamental, impacts on the restoration and management of those rivers where it applies. This varies with history, tenure and jurisdiction, and in many instances can only be ascertained by specific research.

### Limits to legislation

Devolution trends in government are seen by some as the opposite of what is needed. Market forces and local community action cannot deliver the solution to the scale of degradation which rivers present. Regionalisation should not mean withdrawal of State or national governments from their respective responsibilities (Martin & Woodhill 1995). Martin and Woodhill argue that the achievements of market mechanisms and community participation must be assessed according to environmental outcomes, and not production efficiency, community development or cost-sharing.

Governance needs to ensure coordinated, somewhat centralised assessment of priorities, planning and monitoring. Central government also needs to ensure coordinated provision of the institutional capacity for regional and catchment-based action.

The legislative model preferred is still only as good as the political will driving it and the resources made available. In Bates' words *...the law does not tell the land user or resource managers or any other bureaucrat how to go about their jobs; nor does the existence of power to do something actually demand that the power be exercised.* (Bates 1995, p. 13).

The existence of legislative powers does not guarantee exercise of these powers. Even the world's best practice legislative framework will not guarantee maximal outcomes. Bradsen (1991) considered the record of Australia's departments of agriculture over the last 50 years to be 'poor'. An analysis of the Brisbane River situation showed that, while the legislative framework was not best practice, it had the capacity to achieve considerably better river management results than were occurring. Lack of political will and cumbersome institutional arrangements were the major contributors to the shortfall (Mary Maher & Associates 1998a). Also, resource limitations commonly cause river management and restoration shortfalls below that which is empowered by the legislative framework.

Persuasion and education are accompanying methods for implementing river management, restoration and rehabilitation. However, where management practices on private land impact on rivers and their waters. Bates (1995, p. 131) comments:

*Legislation has been slow to address these issues where they arise on private land, probably because the remedies require direct 'interference' with traditional property rights and land*

**Table 3.** Specific mechanisms for river management and restoration .

Legislative focus	Legislative framework
<b>Land and water users, activities, impacts</b>	Acts, regulations, state plans and planning policies, state environmental plans and policies, regional plans and planning policies, regional environmental plans and policies, codes of practice/guidelines constituting subordinate legislation, local or by-laws, town plans, local planning schemes and policies, and subordinate instruments such as local environmental (management) plans and policies, guidelines, environment best management practices (EBMPs) called up in statutory instruments, voluntary land and river arrangements and covenants provided for by legislation.
<b>Government structures, relations, operations</b>	Government and intergovernment/inter-agency administration: legislative framework covers constitution statutes, administrative arrangements instruments, financial powers, contracts and/or memoranda of understanding having legal effect, intergovernment and/or inter-agency agreements, service an/or commercial provider contracts on a bipartite or multi-agency basis.

*management practices, which is difficult politically, thus leading governments of all persuasions to attempt action by education rather than by regulation. Given the nature of the evidence that land clearance is the natural precursor to all other forms of degradation, Bradsen has described 200 years of degradation (and a context of) national government neglect prior to National Land Management Program, 1990 Decade of Landcare. Lack of transparency exists in Australia about the extent of environmental problems.*

Legislation has unique capabilities. There is no room however for complacency about the need to constantly question:

- whether legislation is the best mechanism for dealing with a matter;
- whether the functions ascribed to a regulation are the ones it is best equipped to perform; and/or
- whether any piece of legislation has the capacity to be responsive over time to new approaches or methods, legislative or not.

## Complex issues

As Dovers (1999) puts it, land and water management displays a number of attributes more commonly in combination than many other policy fields. They set the scene for all aspects of the management framework and they include:

- broadened, deepened and highly variable spatial and temporal scales;
- the possibility of absolute ecological limits to human activity;
- irreversible impacts and related policy urgency;
- complexity within and connectivity between problems;
- pervasive risk, uncertainty and ignorance;
- typically cumulative rather than discrete impacts;
- new moral dimensions (e.g. other species, future generations);
- systemic problem causes, embedded thoroughly in patterns of production, consumption, settlement and governance;
- lack of available uncontested research methods, policy instruments and management approaches;
- lack of defined policy, management and property rights, roles and responsibilities;
- intense demands for increased community participation in both policy formulation and actual management; and
- sheer novelty as a suite of policy problems.

(Dovers 1999, p. 81)

In essence, river management and restoration fits well into the definition of a 'super problem'. These complex public policy issues were previously referred to as 'wicked problems' (Rittel & Webber 1973). As Mason and Mitroff (1981) explain:

*Wicked problems are not necessarily wicked in the perverse sense of being evil. Rather, they are wicked like the head of a hydra. They are an ensnarled web of tentacles. The more you attempt to tame them, the more complicated they become.*

Wicked problems exhibit six characteristics: interconnectedness, complicatedness, uncertainty, ambiguity, conflict and societal constraints.

Similarly, super problems are those not amenable to ideal solutions: the goals of the particular aspects of the broader problem are often contradictory, and the definition of the component factors and values are usually arbitrary in terms of use, user, location and time. With a super problem, cause and effect are inextricably linked and largely unexplored social values and attitudes are usually involved (de Laet 1997, p. 308).

### 3. PROJECT ASSUMPTIONS AND APPROACH

#### Assumptions

This project accepts that the policy basis for river management and restoration is a decision for Australia as a whole, and for each jurisdiction. The policy emphasis may be on a combination of several options, including:

- protecting the present ecological integrity of all rivers;
- protecting the ecological integrity of all highly natural rivers;
- restoring only those rivers which will respond most readily to a small amount of investment (80/20 rule); or
- restoring the most stressed rivers, or those highly stressed river with high conservation significance.

River 'restoration' and 'management' are defined here in their broadest sense. The two terms include protection of rivers in their most wild or natural state, as well as the full range of actions associated with rehabilitation of Australian rivers. Protection of any remaining values is an essential and initial component of river management and restoration. In this project, 'river management' refers to the ongoing process which achieves a stated objective or condition for a river. 'River management and restoration' refers to an improved condition of the river.

While the task is to focus on the legal framework, this project understands that legislation is only one part of the mix of tools needed for implementation of river management and restoration. In this era there is a definite move to use a mix of mechanisms—ranging across public financing to performance measures, market-based mechanisms and precautionary strategies. These implementation mechanisms, including legislation, can be viewed as the basic 'tool kit' for management. This project supports and assumes mixed-mechanism implementation of river management and restoration, and supports and assumes a use of legislation only where necessary within this mix.

While the project's focus is on all ten jurisdictions—the Commonwealth, eight States and Territories, and local governments—the responsibilities related to rivers are largely the domain of the States and Territories. The focus for this project is primarily on State/Territory legislation.

Outputs of this project are to be 'practical'. River management and restoration is an emerging concept for protection of natural capital. In recent forums where river ecosystem needs are weighed up against social and economic needs, the response has been a pragmatic one:

*Fundamentally, in my deliberations I sought to answer the question: how can the ecological and social functions of a group of modified rivers be improved to the fullest extent, taking into account the interests of other users and beneficiaries?*

(Snowy Water Inquiry 1998, p. 6)

It might be argued that any proposal creating electoral risk and/or requiring additional funding is not 'practical'. Alternatively, having regard to the primacy of the May 1992 Inter-Governmental Agreement on the Environment (IGAE) including its agreement to implement the NSESD; and taking into consideration the provisions of the Commonwealth's Environmental Protection and Biodiversity Conservation Bill (1998), 'practical' is taken in this project to mean 'those measures which will most speedily and comprehensively achieve restoration, and ESD, of Australia's rivers'.

In Australia at the moment, most jurisdictions are exploring and implementing major reform packages in resource management and environmental protection, especially regarding rivers. The pace of change is considerable, and the consequences often distant; researchers indicate it is too early to report on achievements. Many river systems lack the data to be specific about river condition. River management and restoration often fails to state its outcomes in quantifiable and accountable terms. As the rapid recent change in river management frameworks is often through a multiplicity of measures with little or no legislation backing, it may not be straightforward in the future to ascertain which consequences flow from the legislative part of the changes, and which from the other parts.

The project is not intended as an explanation of the laws or policies in any depth. Rather, it provides a broad overview of the legal frameworks available for river protection and restoration. It is a social science account of legislation's strengths and weaknesses, providing the basis for scoping a strategic level framework and criteria for a best practice legal framework. This project then is 'desk top' only, and in its analysis limits itself to statements about the potential powers and achievements of the emerging legislative frameworks. It is based on the position as at 31 March 1999. As Farrier (1999) asserts, such a desk top exercise can say little about how the existing arrangements operate in practice. This no doubt is to be the subject of further studies.

It should also be noted that the suggested inclusion of a legislative component in the best practice framework does not imply that the provision in

question should be mandatory on all jurisdictions. Such a component will be included where analysis of best practice indicates that it is likely to be useful in the next century; it will still be discretionary to each jurisdiction as to whether such a component is enacted, let alone then used.

Several of the suggested legislative provisions may carry compensation impacts under the Australian Constitution or other existing legislation. The recommendations do not intend to alter the status quo in this matter. Similarly, many recommendations for the best practice legislative framework contain resource implications, including the option of financial incentives and/or disincentives under taxation or other fiscal provisions. These are a matter for subsequent management and budgeting decisions within each jurisdiction.

### Approach

This project has taken the approach that its output of criteria for world best practice river management and restoration legislative framework should be about legislation's role in enabling all actions to achieve restoration for rivers and their catchments, while sustaining and enhancing community effort and support.

Building on these matters, the project defines best practice legislative framework as one which:

- defends rivers as a vital part of our natural capital and defines ecological 'bottom lines' or thresholds for their use;
- manages conflicts between users, and between users and non-users;
- facilitates change and requires continuous improvement in performance;
- enables adaptive management, through policy, institutions, and management, in response to changes in perceptions, knowledge, technologies and management regimes; and
- protects the public interest.

Challenges for river management and restoration, and the critical success factors for a best practice legislative framework are addressed here through examination of four topics (water flows, water quality, riparian areas and administrative arrangements for catchment management), as this selection provides insights into aspects of a cross section of river-related legislation (Figure 2).

**Figure 2.** Insights into aspects of a cross section of river-related legislation.

Topics	Related legislation
1. <b>Water flows</b>	Resource use and access
2. <b>Water quality</b>	Environmental protection
3. <b>Riparian areas</b>	Ecosystem protection
4. <b>Administrative arrangements for catchment management</b>	Land planning, development and management Catchment management Public administration.

The project breaks new ground. It covers all Australian jurisdictions and focuses on all legislation relevant to river protection, restoration and management. As such, there were considerable constraints in terms of research materials. Few comparative studies have been published which address legislative frameworks for aspects of environmental management, let alone their outcomes and effectiveness.

Greatest reliance was placed on a selection of projects with similar charters to this one. Several which produced useful research materials are asterisked (\*) in the reference list.

Given the paucity of research materials, the project scope and methods were tailored to provide a strategic overview and to identify the priorities for further investigation in this dynamic area of research.

## 4. ENVIRONMENTAL FLOWS

### Scope

#### Introduction

The assessment, identification and delivery of environmental flows to our river systems have received extensive recent attention across Australia. The catalyst stems from the federally-initiated objective to administer our water resources better, and to incorporate environmental flows as an integral part of these reforms. Increasing demands for a limited and often scarce resource, and conflict between extractive and other water uses, have resulted in the development of accepted principles and parameters for environment flow objectives. In addition, there has been rapid development of State legislation and policies to provide the statutory framework for their implementation.

The regard for the provision of environmental flows has been described as resource management rather than science, with their assessment based upon decisions which are 'arbitrary, hasty and politically driven' (Pusey 1998). Although methodologies and approaches have progressed since 1994 (when the COAG agreement on water reforms were put in place), a number of the dilemmas and challenges present at that time still remain, and are discussed further below.

Environmental flows consist of ecological, temporal and hydrologic elements. They clearly extend beyond a mere volumetric allocation.

The concept of an environmental flow has been outlined by Cullen (1994) as including but not limited to:

- volume of water over some time base;
- velocity of water in channel;
- duration of flow event;
- water temperature;
- water level;
- natural and human induced variation flows on an annual and longer time scale;
- need for pulses of high flows (e.g. to stimulate fish breeding); and
- the rate of change of flow.

It is important that these elements of environmental flows are strongly linked to the objective of ecological and ecosystem management. The nature of environmental flows and their focus on ecological processes and ecosystems should be recognised and specifically stated in relevant legislation and policy documents, to curtail using water flows for other

purposes which may have only a tenuous linkage to ecosystem health.

The integration of these elements provides an essential basis for the sustainability of river systems. The ecological emphasis needs to be focused on an ecosystem approach, rather than a single species; a principle which is reinforced in the *National Principles for the Provision of Water for Ecosystems* (ARMCANZ/ ANZECC 1996).

#### Desired ecological outcomes

Past practices which allocated water from rivers essentially overlooked environmental requirements, thus leading to widespread degradation of waterways and loss of aquatic ecosystem values. Indicators of this trend include:

- changes in the timing, duration and frequency of flows which make many current river flow regimes almost the opposite of natural flows;
- obstructions to the migration of fish and other aquatic organisms, and a decrease in their breeding and spawning grounds due to extraction of water and changes to flow patterns;
- changes in water temperature arising mainly from cold water releases from dams;
- impacts on bank stability and channel structure from more slower flowing water flowing in different seasons; and
- reduction in diversity of instream habitat, with pools and riffles replaced by a more homogeneous and flatter channel habitat.

The allocation of an environmental water entitlement or environmental flow is not an end in itself. Environmental flows provide a defined and specific water allocation for the protection, maintenance and restoration of ecological values—a key part of river management and restoration. They consist of two parameters: a volumetric and quality allocation; and a seasonal pattern which mimics, as far as possible, the natural flow regime.

The methodologies for assessing the volume necessary for environmental flows vary between States and Territories. They have evolved from a single species focus, with emphasis on commercial species such as fish, to a more holistic, integrated approach which includes diverse elements of the riverine ecosystem. Although approaches such as the 'building block', the 'expert scientific panel' and the 'expert panel assessment' methods differ in methodology, a recurring factor is the absence of objective data and scientifically collected information

upon which to base predictions and modelling refinements (Arthington 1998).

Many other factors also influence river condition, with environmental flows an essential but single element. Virtually all environmental flow methodologies focus upon flows, with other disturbances in the banks or wider catchment excluded from current assessments. The implication is that, although flows may be required to largely mimic natural conditions, this in itself may not be sufficient to restore river health in many highly disturbed riverine systems.

#### Ecological issues and challenges

The flow requirements of many elements of the riverine ecosystem (e.g. invertebrates) are largely unknown. The limited information to hand suggests that for many taxonomic groups, there exists a wide diversity of breeding and ecological requirements, with consequent diversity in environmental flow requirements (Growthns 1998).

Incorporating such diverse needs of riverine ecosystem components into environmental flow assessments has been an important challenge (Figure 3).

The lack of rigorous data underpinning most environmental flow assessments suggests comprehensive monitoring is essential to progressively refine our understanding and confidence in scientific assessments. It would be a useful step to adopt a uniform methodology to enable comparability with techniques and outcomes across Australia. The current variety of approaches promotes complexity in agency responses to the water reform agenda (Arthington 1998, p. 22).

A key benchmark to assist the identification of river flow needs is to identify the objective of these flows. The maintenance of current ecosystems and conditions will have different flow requirements to an objective to restore ecosystems to some desired future state. Loosely defined objectives, such as

'maximise environmental values', provides little guidance in the translation to quantitative measures and specific flow requirements.

The question 'how healthy/natural/sustainable do we want our rivers to be?' is not specifically answered by legislation, but requires further scientific work and community acceptance before an unconstrained response can be provided.

The role of legislation within such uncertainty is to provide:

- a transparent and rigorous process for addressing the ecological and societal/political conflicts which will inevitably emerge;
- clear principles where the scope, intent and objectives of the legislation are clear;
- requirements for appropriate scientific monitoring of environmental flow regimes; and
- flexibility and adaptation, given the uncertainties outlined above.

#### Dimensions for river management and restoration

This section is focused around water flows within Australian rivers. Water allocations and flows are generally bound up with water law across Australia, which is a far broader body of statutes than river law. It is pertinent that there are few laws in Australia which relate specifically to the management of rivers—most legislation has traditionally stemmed from a utilities function, so that numerous statutes cover water for irrigation, drainage, sewerage and water rights.

This broader treatment is outside this project's scope; its emphasis is deliberately upon river management, underpinned by the ecology and environmental health of rivers.

The current impetus for water reform generated by COAG (1994) involves the mechanisms of water pricing, trading of water entitlements and

**Figure 3.** Incorporation of ecological needs of riverine ecosystem components into environmental flow assessments.

Environmental flow requirements	State of knowledge
<b>Provision of water for wetlands</b>	Very limited: flow calculations have concentrated on quantity of water allocated, rather than timing, duration, frequency and seasonally (McCosker 1998, p.57).
<b>Riparian vegetation</b>	Very limited: flood tolerant species are making opportunistic colonisation of reaches of the Brisbane River, whilst flood dependent species are in decline due to reduced flows following regulation of the river (McCosker 1998).
<b>River red gums</b>	Study recommended that flows be increased in winter, to allow for winter flooding and recession of waters in spring, which would give maximum opportunity for seedling growth. This regime is not compatible with the needs of extractive users (McCosker 1998, p. 57).



administrative systems for implementing these reforms. These economic and administrative mechanisms are again outside the scope of sustainable river management, unless they impact upon the sustainability of river systems and the construct of environmental flows. They are therefore not examined in the following discussion.

Although the focus is on rivers themselves, previous discussion has identified trends toward a more holistic management of the water cycle, with all water storages, sinks and sources managed under an integrated framework (Cullen 1997). There has also been a link between placing limits on water extraction from one component of the water cycle and the exploitation and consequent deterioration in the quality of another. It is for these reasons that some discussion, albeit cursory, of groundwater and floodplains is included.

### **Management challenges for legislation**

The broadest challenge is to set water flows for rivers within an ESD framework. Although uncertainty and flexibility is inherent in the definition of ESD, four important principles can be identified which should form the basis for a legislative framework for sustainable river systems:

1. protection of resources for the needs of future generations;
2. application of the precautionary principle;
3. the protection of biological diversity and ecological integrity; and
4. improved valuation and incentive mechanisms.

Specific objectives stem from this challenge and they can be grouped into three categories:

#### **Ecological**

- To establish desired ecological objectives for both existing benchmarks and future targets through a robust, scientifically based process

#### **Social**

- Broad community acceptance of the need and urgency to establish appropriate water flows through rivers to maintain and improve river health

#### **Economic**

- Accepting the need for review, refinement and possible increases in water allocations for environmental flows as additional information increases our knowledge and understanding of ecological requirements
- Achieving a balance between security for resource planning and economic viability of productive enterprises and adaptation to emerging information on environmental requirements.

The challenge goes beyond gaining community support for these principles: it is to translate these into statutory requirements and workable policies so they become operationalised in practical, on-the-ground working arrangements.

### **Key drivers for legislative change**

The legislative and policy context for water flow legislation is clearly different from that which existed as recently as the early 1990s.

The fundamental catalyst for change on this front is clearly COAG (1994), arguably the most powerful driver for changes to Australian river management this century. Although environmental outcomes were a subsidiary objective, the staged economic incentives linked to reforms required under the National Competition Policy have been the catalyst for the rapid generation of state legislation and policy on environmental flows across all States and Territories (although Victoria had initiated this process prior to COAG). The agreement also recognised, for the first time, water entitlements to protect environmental values as a legitimate use for water allocations.

It is of interest that the initiator for widespread environmental reform across all States and Territories was a non-legislative, primarily financial mechanism.

The audit of water use in the Murray–Darling Basin (Murray–Darling Basin Ministerial Council 1995) was a rigorous scientific and objective study which demonstrated to the general public the over-committed nature of this system, and the unsustainable consequence of current practices. The ramifications of poor management of our rivers clearly had a much wider application than to this system alone. The implications for Australia rivers overall were unacceptable to many decision makers.

In response to these two developments, the establishment of agreed and accepted principles for protection of aquatic ecosystems and water reforms have since formed the basis of State water reform legislation.

In particular, the *National Principles for the Provision of Water for Ecosystems* (ARNCANZ/ANZECC 1996) and *A National Framework for the Implementation of Property Rights in Water* (ARMCANZ 1995) have been the key principles around which State legislation has been developed.

The principles, accepted by all States and Territories, herald substantial change to previous practice. They provide further guidelines for the development of legislation which reflects the principle that the

environment is a legitimate user of water, as well as the requirement that environmental water provisions would be both legally recognised and met as far as possible.

The general debate therefore has accepted these principles as the basis for good policy. Discussions have moved beyond this stage into the operational detail and the more specific legislative or policy requirements. However, some of the principles are more difficult to accommodate than others. The principles (ARMCANZ/ANZECC 1996) of 'revising and increasing environmental water allocations in over-committed rivers where environmental values are not being sustained' and 'no new water allocations in rivers where environmental flow requirements cannot be met' have yet to be demonstrated in policy development and resulting planning decisions in most States and Territories.

States and Territories that have over-allocated rivers (particularly Victoria and New South Wales) find it more difficult to adopt a proactive approach to establish requirements for reviewing existing allocations and environmental flows, as this questions the security of current user entitlements.

In Victoria, although the *Water Act 1989* (Vic) and the bulk entitlement program are meant to provide long term protection for existing aquatic values, the rules to implement this process are designed to convert all existing allocations, regardless of whether desirable environmental flows can be met (Department of Conservation and Natural Resources 1995, p. 7). There seems to be little readiness in the present climate for improving environmental flows in heavily allocated rivers.

In NSW, setting an upper limit for regulated rivers on the impact of changes in environmental flow rules and subsequent allocations to 10% of average long term diversions allowable under the Murray–Darling Cap over the initial five year period until 2002, also constrains the degree of change to improving environmental flows.

These two examples illustrate how existing social and political constraints make complete compliance with these principles, and thus river management and restoration, difficult over the short term. They are more realistically seen as principles to which steady and committed progression will be made by the States and Territories over following decades, until full implementation is achieved. This timetable may well be perceived by many as too slow.

In contrast, Western Australia generally has an under-allocated river system, which suggests it can take a more proactive stance in its legislative and policy development, with less of a focus on 'clawing back' than on 'setting ecologically preferred benchmarks'.

In summary:

- the policy climate for water flow reform has changed considerably since the early–mid 1990s;
- environmental values have legal recognition as a legitimate water use;
- the caps on further allocation represent caps on development, not the meeting of ecological 'bottom lines';
- there is broad acceptance at the Commonwealth and State/Territory level of the principles for water allocations and water reforms which sustain ecological values; and
- the work and debate is now focused on translating the accepted principles into practical policy requirements and operational tools.

## Existing legislation arrangements and gap analysis

### Current legislative context

Most Australian States and Territories have recently introduced, or are in the process of introducing, legislation and policy that deal with wide-ranging water reforms; and as a consequence, with environmental flows and water allocations. Water resource management is the greatest single area of legislative change taking place in relation to river management in Australia at present.

There are two consequences relevant to this project:

- the recent nature of many changes means little to no evaluation has been, or can yet be, undertaken on their effectiveness; and
- a number of States and Territories are implementing policy simultaneously, with few opportunities to assess developments in other jurisdictions prior to reviewing their own progress.

It is a period of legislative innovation and change for river management, with no substantial precedents to inform likely consequences and outcomes.

However, a number of conclusions can be drawn from international examples, particularly from the USA. Examples from Oregon and Alberta (Figure 4) illustrate the tradeability of water allocation rights (Bartlett et al. 1997).

The implications from these two examples are that the economic and market-driven tool of transferability of water entitlements can work to promote greater efficiency of water use and the opportunity to incorporate benefits for environmental flows.

### Incorporating principles and objectives

Legislation affecting river flows should consist of three important elements:

- key environmental principles and objectives, a head of power and an objects clause which describe the essential intent of the legislation as well as its scope and breadth of application;
- the products (plans, river strategies, river plans and operational frameworks) which provide the rationale and tools for water allocation decisions; and
- the processes from which the products are derived, including community input, reporting and compliance arrangements, role and responsibilities of agencies.

### **Head of power**

The head of power provides the legal basis for addressing environmental objectives and requirements in the legislation, and also defines the scope for their application. Two examples illustrate how differences in the head of power can affect the scope and effectiveness of legislation.

The *Water Resources Act 1989* (Qld) states that water does not fall under the jurisdiction of the Crown until it enters a watercourse. This restricts powers of the State to regulate and control water flow issues outside a watercourse, including surface flow across floodplains. The Review of Cap Implementation (Murray–Darling Basin Ministerial Council [MDBMC] 1998, p. 2) recommended that new legislation in Queensland includes management of floodplain harvesting. This would involve an alteration to the definitions and scope of the Act.

In contrast, water legislation in NSW has a broader scope, with all surface water coming under the jurisdiction of the Crown not just water flowing within

**Figure 4.** Tradeability of water allocation rights in Oregon and Alberta, Canada.

#### **Oregon**

The 1987 legislation encourages the conservation of water and its conversion to instream uses. Any water conserved by extractive users through improved technology or more efficient distribution is allocated to instream flows (25%) and the user who can sell, lease or gift it.

#### **Alberta**

In overallocated rivers, the use of a 'water conservation holdback' provision applies. Up to 10% of any water allocation which is being transferred under licence can be withheld in the public interest to protect aquatic ecosystems. The water 'held back' cannot be used for any consumptive purpose. Under this arrangement, the river system, the transferee and the transferor all benefit.

a watercourse. This has enabled the emergence of policies aimed at managing surface water flows captured by farm dams and floodplain harvesting.

The Queensland Water Resources Act 1989 also had no reference to environmental objectives in the water allocation process, giving no head of power for ecological issues to be incorporated into water flow assessments and planning. New legislation will amend this limitation, but it illustrates the constraints of most Acts which were developed prior to the 1990s.

### **Empowering principles**

Legislation usually incorporates principles which provide the framework for more operational detail. Principles can be expressed in very generic, 'motherhood' statements, or be a more specific outline of important objectives.

A desirable, if not essential element in all legislation dealing with water flows, is a clear statement in the objects of the Act of the environmental principles and objectives, links to ecologically sustainable development and the precautionary principle, the primacy of these objects and a 'general environmental duty of care' to be required of all citizens.

These principles are a means to an end. They enable the legislation to move beyond a utility-based, traditional water-use framework, and reflect environmental, non consumptive values (Cummings et al. 1996).

These principles are empowering, and enable the legislation to extend further than mere administrative arrangements. They also clearly establish the philosophical and ecological parameters of the legislation, and the underlying paradigms against which more detailed interpretation and implementation should be gauged. It therefore enables a broader and more holistic view of the environment, assists in a more ecologically-based interpretation of the legislation, and provides the basis for avoiding a mere codification of administrative arrangements.

Most recent legislation impacting on the environment has these principles enshrined. The following are selected excerpts from legislation which illustrates these points.

**Table 4.** Excerpts from relevant legislation.

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**South Australia Water Resources Act 1997**

(Useful example of both ESD principles and specific and detailed environmental objectives)

6(1) the object of this Act are to establish a system for the management of water resources of the State –

- (a) that ensures that the use and development of those resources sustain the physical, economic and social well being of the people of State and facilitate the economic development of the State while –
  - (i) ensuring that those resources are able to meet the reasonably foreseeable needs of future generations; and
  - (ii) protecting the ecosystems (including their biological diversity) that depend on those resources; and
- (b) that, by requiring the use of caution and other safeguards, reduces to a minimum the detrimental effects of that use and management.

6(2) The Minister, the Water Resources Council, catchment water management boards, municipal and district councils, the Court and other bodies and persons involved in the administration of this Act –

- (b) must have regard for the need:
  - (i) to maintain and improve the quality of naturally occurring water with resulting benefits to other natural resources of the State including the land and its soil, native vegetation and native animals, and
  - (ii) to protect watercourse, lakes, surface and ground water from degradation and, where practicable, to reverse the degradation that has already occurred;
  - (iii) to protect and enhance the ecosystems that depend on naturally occurring water;
  - (iv) to keep the state and condition of the water resources of the State under review;
  - (v) to integrate, as far as practicable, the administration of this Act and other legislation dealing with natural resources.

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**Water Act 1989 Victoria**

(useful contrast to SA (above), with a more limited coverage of ESD and environmental objectives)

This Act has the following purposes:

- (a) restate, with amendments the law relating to water in Victoria;
- (b) provide for the integrated management of all elements of the terrestrial phase of the water cycle;
- (c) promote the orderly, equitable and efficient use of water resources;
- (d) make sure that water resources are conserved and properly managed for sustainable use for the benefit of present and future Victorians;
- (e) maximise community involvement ...
- (g) minimise inconsistencies in the treatment of surface and groundwater resources and waterways.

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**Queensland Environmental Protection Act 1994**

(Useful example of a duty of care for all citizens to prevent or minimise environmental harm.)

36. (1) A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practical measures to prevent or minimise the harm.

- (2) In deciding the measures required to be taken under subsection (1), regard must be had to, for example,
  - (a) the nature of the harm or potential harm; and
  - (b) the sensitivity of the receiving environment; and
  - (c) the current state of technical knowledge for the activity; and
  - (d) the likelihood of successful application of the different measures that might be taken; and
  - (e) the financial implications of the different measures as they would related to that type of activity.

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**Western Australia legislation (being drafted)**

(useful example of objectives and the extent of Crown rights)

A possible long title for WA's new water legislation is *An Act relating to rights, management, use and protection of water resources and for irrigation schemes and other purposes*. The specific purpose of this is to recognise water resources consist of bed and banks of streams and wetlands, floodplains and associated ecological systems as well as underground aquifers. (Water and Rivers Commission 1998, p. 8).

More specifically, proposed law in this State will vest control of surface and underground water with the Crown. Suggested wording could be : *'the right to the use and flow at any time in any watercourse, wetland or underground source of supply shall...vest in the Crown*. (Water and Rivers Commission 1998, p. 18).

There is also the specific intent to include a statutory objective of sustainable use and management of the water resources as well as a general 'duty of care' for all persons involved in carrying out the Act (Rivers and Water Commission 1998, p. 9).

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The very clear and full elaboration of environmental objectives in the South Australian Water Resources Act provides a model for emerging legislation.

Incorporating an objects clause in legislation is a recent development, with legal consequences that are the subject of ongoing debate. The essence is the extent to which an objects clause either fetters the exercise of power (which has been held as invalid by the NSW Supreme Court) or rather provides strategic statements to guide decision makers and assist in interpretation of the legislation. This second usage has been supported in Court decisions. The use of wording such as 'ensure, promote, encourage, achieve' is important, with 'promote' and 'encourage' suggesting less of a statutory duty and constraint than 'ensure' (Mascher et al. 1997, p. 16).

The implications are fourfold:

- all water and river legislation should include clauses which make clear and explicit reference to, and a requirement to achieve, ESD and its guiding principles;
- an objects clause should be included in legislation which explicitly states and gives legislative primacy to environmentally based principles, objectives and purpose;
- a general 'environmental duty of care' to be created for all citizens exercising powers or rights received under the Act; and

- explicit reference to exercise all powers in a manner consistent with the objects of the Act, in particular ESD and environmental principles (Mascher et al. 1997, p 20).

#### Operational products and elements

Table 5 provides a snapshot of elements of state statutes and policy. As indicated, many are currently being developed, and have not yet been finalised.

A number of relevant points emerge from this table:

- elements of water flow such as floodplains and groundwater are largely perceived as peripheral to the water allocation process, and are dealt with inconsistently, with the former generally not included in policy development;
- capture and diversion of surface water in farm dams is not addressed in any State except NSW;
- fine tuning and tailoring of the mechanics and operational tools (for examples, the review period and auditing framework) do not emerge from this overview, although most States and Territories have at least some procedures in place;
- the community has been involved in nearly all water allocation processes (although the extent and mechanisms again vary considerably);
- terminology for plans, operational tools and processes differ markedly between States and Territories. This lack of commonality and consistency creates pointless barriers to easy

**Table 5.** Elements of state statutes and policy.

ISSUE	NSW	Qld	Vic	WA
Legislation/policy in place for water allocation/environmental flows?	yes	*	yes	*
Review period for water allocation/environmental flows?	5 yrs	10 yrs	nil	not yet finalised
Strong monitoring/auditing framework?	no	unclear at present	yes	yes: for regulated no: for unregulated
Includes controls on floodplain harvesting?	initial work done on draft policy	still under consideration	no	local rules developed in certain areas
Includes controls on farm dams?	yes	no	no	local rules developed in some areas
Legislation includes groundwater?	no	still under consideration	no	yes
Strong community involvement in setting flows, objectives?	yes	yes	no	yes (especially for local rules)
State wide river condition assessment to inform priorities?	yes	no	yes	yes

\*legislation imminent, with Bills in Queensland and Western Australia currently being drafted. Acts for both States are timetabled for late 1999.

understanding and effective comparisons between States and Territories. A more standardised system would be more efficient and in the interests of a more unified approach. Examples of the mixture of terminology is illustrated in Table 6.

#### Floodplains and farm dams

The issue of diverting surface water into farm dams and off floodplains affects river flows. The following examples provide an illustration of the effects of surface water diversion.

- in some Victorian catchments the growth of farm dams has meant a reduction of 50% of annual stream flow in drought years, and a decrease of between 4–62% in some NSW streams.
- Victoria is estimated to have some 300,000 farm dams. Their effect on stream flow is most pronounced in dry periods. (SoE 1985, p. 7.11)
- the construction of onfarm storages in Queensland grew from 360 GL in 1993–4 to 684 GL in 1996–7. The latter figure was recorded after the cap was implemented in the Murray–Darling Basin. This is nearly a 100% increase over only three years (MDBMC 1998, p. 20).

Clearly the increasing capture and diversion of surface water has negative impacts on river flows, particularly in dry periods. The need to manage all storages and flows within the water cycle is becoming increasingly obvious, particularly as constraints on water allocations from river flows are providing the trigger for users seeking water from other, as yet, unconstrained sources.

The growth in farm dams has caused NSW to introduce policies to deal with these issues. The Farm Dams Policy allows the collection of 10% of the runoff from a landholding each year which makes up the

harvestable right, and which will not be licensed. Maps are being prepared for each of the various climatic and bio-geographic regions which provide estimates of the 10% runoff volume which will be used as the basis of assessment. Volumes captured above the 10% limit require a licence.

Floodplain harvesting has been identified as a major issue in NSW. At present, it is not subject to comprehensive licensing, even though large quantities of water could be managed under a more regulated system. There are various options being examined to establish a regulated framework for harvesting of floodplain flows.

It would not be possible to implement such measures in Queensland under current legislation, as no head of power exists to give the Crown jurisdiction over water outside defined water courses.

#### Groundwater

Many of the groundwater aquifers are stressed. A recent assessment in NSW indicated that, of 93 aquifers across the State, 36 were classified as high risk—mainly from overallocation (DLWC 1998). For States and Territories such as Queensland, Western Australia, Northern Territory and South Australia, groundwater is a critical resource. Most of Perth's potable water supply originates from underground aquifers.

A national policy framework has been developed through the *Allocation and Use of Groundwater – A National Framework for Improved Groundwater Management in Australia* (1996). NSW and Western Australia have developed policy and requirements for setting sustainable yield, employing embargoes on over allocated systems and for developing management plans for groundwater systems.

**Table 6.** Example of terminology between the States.

Item	NSW	Qld	WA	Vic
<b>Floodplain water diversions</b>	floodplain harvesting	offstream harvesting	floodwater management	-
<b>Key plans</b>	river management plan	water allocation management plan	regional allocation plan	bulk entitlement program
<b>Subsidiary plans</b>	land & water management plan	best practice water management plan	local area management plan	streamflow management plan
<b>Water rights</b>	water allocation	water entitlement	water rights	bulk entitlement
<b>Community committees</b>	river management committee		local water management committee	project group (for a specific river basin)

## Overview of arrangements

As the following diagram for current arrangements illustrates, principles and agreements are set at the Federal level, whilst specific legislation has been developed at the State/Territory level.

It is around these elements of water allocation and water flow legislation that legislative arrangements are still being developed.

A summary of these elements, the various approaches adopted by different States and Territories and the implications are set out below.

### Commonwealth level

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#### NATIONAL PRINCIPLES; AGREEMENTS

- . COAG agreement
- . ARMCANC/ANZECC National Principles for Water for Ecosystems
- . ARMCANZ Water Allocations and Entitlements – a National Framework
- . Murray–Darling Basin Agreement and Cap

### State/Territory level

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#### STATE/TERRITORY LEGISLATION AND POLICIES

- . incorporates principles
- . administration and planning frameworks
- . hierarchy of frameworks: regional/local

### Operational elements

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Adaptive management, review periods and processes

Role of community in setting environmental flow and water quality objectives

Enforcement, compliance, auditing process

Farm dams, groundwater, floodplains

Setting priorities and broad goals using State-wide river assessment

Process of setting environmental flows: volume, seasonality

Monitoring programs to further refine environmental flow requirements

## Assessment of operational elements

### Environmental flows

All States and Territories have developed different approaches and frameworks for establishing water allocation and environmental flows on regulated as compared with unregulated rivers. Within this variation, there are a number of critical issues and questions which need to be addressed. They are:

- will environmental flows consist of seasonality, temperature and other quality components, as well as a volumetric allocation?
- by what ecological criteria is the desired flow set?
- how can some variability of flow be introduced, when other users seek certainty?
- how, in the absence of rigorous data, can we best review and refine environmental flows, when other users seek security and stability of use?

From these questions and issues, a ‘best practice’ set of environmental flow elements can be elucidated.

Environmental flows should:

- have a volumetric, seasonality and other water quality components;
- include the capacity for introducing some annual variability;
- have clearly stated objectives to meet environmental flows before other uses are allocated;
- be based upon ecosystem values, not requirements of other uses (e.g. short flushes to wash out blue–green algal blooms);
- be based upon ecosystem values which establish an acceptable ecological benchmark;
- be calculated on a rigorous, transparent and scientifically based methodology; and
- be flexible, to cater for refinement through increased information and understanding.

A key question still largely unresolved is where to set the requirements for environmental flows? How ‘healthy’ do we want our rivers to be? Is sustaining current conditions sufficient, or should there be a restoration of ecosystems and species which were present in previous decades?

The following summary sets out how some States are dealing with issues raised above.

### Victoria

The potential for any improvement to environmental flows for over-committed rivers is limited, with the emphasis in the bulk entitlement process being on establishing a quantified, firm basis for water entitlements.

However, any *new* developments will be constrained unless environmental flow requirements (EFR) are met. Existing developments have current entitlements secured.

The EFR can be granted through a bulk entitlement (for regulated streams) or a streamflow management plan (SMP). No additional environmental flows have been allocated through the former process as yet, whilst two streamflow management plans (for unregulated streams) have been completed. Approximately twenty SMPs are intended to be developed over the next three years.

Management rules allow flexibility for variability in volumes between different years

### **New South Wales**

Water for environmental values to have priority of over water for extractive uses is stated as an objective.

Concerns that continuous accounting (credits 'saved' during wetter years can be used in other times) may lead to over-allocation in dry periods, without some rule to govern maximum limits and impacts on environmental flows.

The maximum impact of environmental flows set at 10% of Murray–Darling Cap diversions reduces their scope in many over allocated rivers.

Management rules allow flexibility for variation in volumes between different years.

### State-wide river assessment

#### **Victoria**

- Assessment completed (Stressed Rivers Program). Criteria of river condition developed by a scientific panel used to set priorities and actions.
- Restoration plans underway for the top eight priority rivers by 2000. These will need to address inadequate environmental flows if ecological improvements are to result. It is presently unclear how this will occur on over-allocated rivers.

#### **New South Wales**

- Stressed Rivers assessment completed, indicating of 527 rivers classified, 190 (or 28%) of rivers have a high level of stress.
- This used to set priorities, with river management plans completed for all stressed rivers by 2001.

#### **Queensland**

- No State-wide assessment. Priority catchments identified on the basis of highly allocated rivers, and those where major development and infrastructure (dams, irrigation) are likely to occur in the near future.

### Compliance, auditing and enforcement

#### **Victoria**

- For bulk entitlements: annual report to the Minister on catchment basis.
- For streamflow management plans: most diverters are not metered at present, though all pumps will be eventually fitted with meters. Annual report to the Minister.
- There is a concern that any review on regulated streams will provide opportunities for renegotiated allocations, and by implication, a decrease in environmental flows.

#### **New South Wales**

- Not known at present. Traditionally, the industry has been self-regulating. A compliance plan is being developed for the new water reforms.

#### **Queensland**

- Not known at present.

### Planning hierarchy

Emerging legislation has, in most cases, a characteristic hierarchy of planning frameworks. Clearly, the river basin or catchment is the basic planning unit, although it is employed at a range of scales for plan development. It is most developed in WA, where a nested hierarchy of regional, sub regional and local river plans are to be developed. In other States and Territories, the river catchment is the basis for planning, without a regional and sub-regional structure sitting above this.

Two different approaches have emerged, both with apparent merit for river management and restoration. Western Australia has delegated many decisions (regarding, for example, floodplain allocations, levee construction on floodplains and farm dams) to 'local rules' which are regulations decided by locally constituted water management committees according to the landscape and water demands operating at the this scale. In this way, blanket policies which apply to the whole State are substituted for an approach which tailors 'rules' to reflect the river resource and demands upon it at a more fine tuned level.

In contrast, NSW has preferred a blanket policy approach at the State level for planning pertaining to farm dams and proposed floodplain harvesting policies. This approach, whilst not accommodating local variations, has the virtues of being simpler, consistent and less vulnerable to intense bargaining by specific interest groups at the local level.



**Figure 5.** NSW and Western Australian approaches to river management and restoration.

**NSW approach**

- . Policy, guidelines, criteria developed at the State level
- . Applied consistently across the State

**WA approach**

- . State legislation
- . Locally developed rules & guidelines by local water management committee
- . Local committees

These approaches can be summarised in Figure 5.

Western Australia’s approach is not yet implemented. The outcomes will be watched with interest, as these two approaches have relevance to a wider scope of river management than to just the flow elements discussed here.

The operation and effectiveness of the local committees which usually develop local rules or guidelines, are all under scrutiny, particularly with regard to their independence, representativeness, ability to make and implement ‘difficult’ decisions and level of expertise. NSW, Victoria and Western Australia have all employed extensive use of river-based committees. Although the frameworks they operate within may vary, the issues for evaluating their effectiveness remain remarkably similar.

**Summary**

The key issues which have emerged from the review of these components are:

- the seasonality component of environmental flows is not robust, particularly for heavily or over-committed rivers. Seasonality requirements may directly conflict with demands of extractive uses.
- temperature and other quality components of environmental flows
- the potential for addressing environmental flows in fully- or over-allocated rivers appears very constrained at present.
- meeting environmental flows should be explicitly stated as the priority objective in legislation and policy.
- the balance between security for users (certainty) and adaptive management (flexibility) requires careful balance, with the needs of river management and restoration given dominance. A shorter review period could be most appropriate in the initial phases of introducing the water reforms.

**Practical case studies**

Although many initiatives regarding environmental flows are recent, an evaluation of case studies across various Australian States and Territories illustrates the operational issues and challenges which occur behind the legislative framework (Figure 6).

A summary of the more generic issues, and conclusions which can be drawn from the diverse examples, provide a useful assessment of the operational and on-the-ground implementation of State and Territory legislation and policies. The following discussion is based upon findings in Allan and Lovett (1997).

**Figure 6.** Summary of elements of case studies in managing environmental flows.

Issue	Case Study						
	Lachlan Valley NSW	Macquarie Marshes NSW	Gwydir Wetlands NSW	Barmah–Millewa Forests NSW	Kerang Lakes Vic	Goulburn/Delaitie R. Vic	Lake Merreti SA
Monitoring adequate	no	yes	partially	no	no	no	yes
integrated ecosystem or species/ issues specific approach	eco	eco	moving from species to eco	species until recently	issue	largely species	eco
appropriate environmental flows							
seasonality	yes	yes	yes	yes	partial	no	yes
volume	yes	yes	yes	partial	partial	partial	yes
variability	yes	yes	yes	partial	partial	no	yes
Community controversy	yes	no	yes	yes	yes	yes	no
							(land leases bought by conservation groups)

Some conclusions which emerged from the Allan and Lovett (1997) study include:

- Most flows were what was feasible given existing allocations and infrastructure, and can be seen as a compromise between optimal and acceptable environmental flows.
- The scientific basis was often uncertain, given lack of data and little monitoring to build upon the poor information base.
- The approach was often species-specific, with full integration of ecosystems difficult to achieve. Even planning for one wetland in isolation from other linked wetlands was seen as inappropriate.
- Species with an economic and recreational use such as fish and ducks received disproportionate attention when assessing flow requirements.
- Some environmental allocations had economic and other benefits, including salinity and river cod management.
- The process is complex, with detailed scientific information, a number of agencies and competing community and environmental interests. Adequate resourcing of community committees is essential to promote better understanding and more informed decisions.

### Emerging trends

It is clear there has been a recent transition in legislation regarding water allocation. Four distinct phases can be identified, with the third phase still partially unfulfilled. It is important for sustainable river management that legislation progress beyond Phase two, be steeped at least in Phase 3 and move toward Phase 4. These phases and their features are presented in Figure 7.

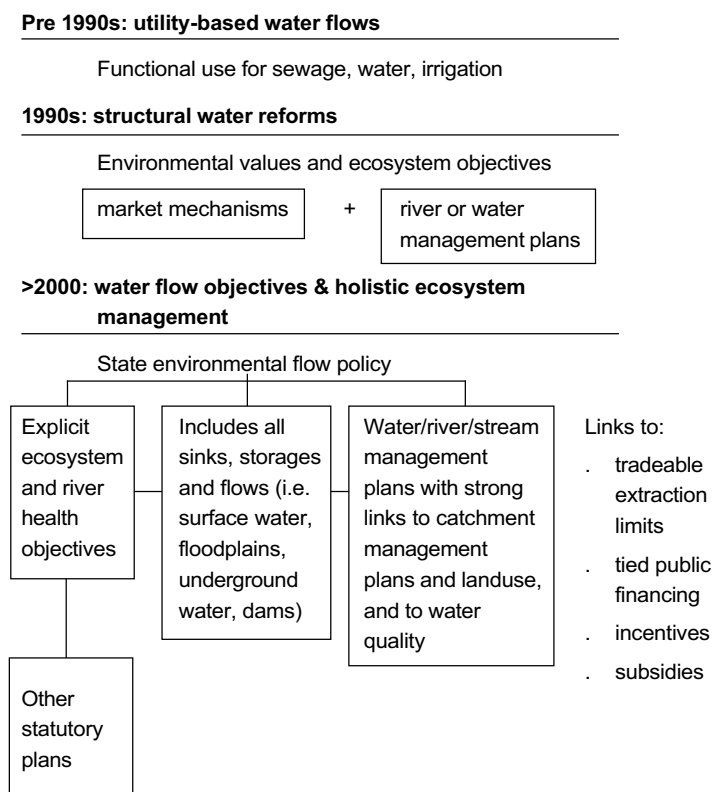
Figure 8 illustrates trends in specific elements of environmental flows, illustrating that progress has been made on a number of fronts over the past decade. The 'S' indicates the current state along the spectrum of a number of identified elements. As the diagram illustrates, progress has been more substantial in some areas (e.g. ecosystem approach instead of single species focus) than in others.

#### Critical success factors for water flow legislation

- Develop structures to accommodate ecologically-based environmental flow allocations to river systems which cross State boundaries, and therefore deal with interstate agencies and legislation.
- Legislation and policies need flexibility in structures coordinating community and agency interests, to be able to reflect the wide variability in river systems, as well as the physical and social context of their catchments.

- Achieving environmental flow requirements needs to be specified as the priority objective when allocating water flows.
- Progression toward an ecological, ecosystem framework for water resource legislation which embraces a holistic appreciation of all elements of the water cycle.
- Progress toward providing environmental flows which restore riverine ecosystems to some desired and defined future state, rather than just maintain or slightly improve existing conditions in highly modified or degraded river systems
- Critical elements of the water cycle (e.g. farm dams, groundwater) which impact on river flows should be incorporated in water flow legislation.
- Environmental flows should include a volumetric and seasonality/variability component, as well as a process for establishing appropriate environmental allocations in over-committed rivers. This can be achieved by the inclusion of 'operational rules' which reflect the essential variability in hydrological parameters in addition to a volumetric allocation.
- Legislation includes an object which clearly requires achievement of, and therefore gives primacy to, ESD and ecological objectives and principles concerning water flows and

**Figure 7.** Development in legislation: water flows.



environmental allocations. There need to be accompanying mandated criteria for decision making, to guide decision makers and those (including the Courts) implementing the Act.

- Clear, explicit statements of objectives, standards, principles and duty of care as part of all water resources legislation, which provide a clear head of power for legislating over elements of the water cycle. The less explicitly that central principles and elements of legislation are described, the greater the opportunity for political interpretation and influence by special interest groups.
- Adequate resourcing for scientific and community working groups, given the complexity of the scientific, ecological and hydrological issues and inter-agency powers which are inherent in many environmental flow decisions.
- Monitoring requirements incorporated into legislation, so that scientific information can be collated and used to further refine environmental flow assessments and provide greater certainty with ecological and scientific information.

**Figure 8.** Trends in specific elements of environmental flows.

Original or unacceptable objectives	Preferred
Single species	Ecosystem
Volumetric	Seasonal, variable and management rules
River based	Includes other storages and flows
River based	Other disturbances, activities in the catchment
Emphasis on recreation and economic uses	Ecosystem values
Narrow objectives and cursorily defined	Key principles, objectives clearly and fully stated
Environment as one of many competing outcomes	Environment as priority environmental flow objective

## 5. WATER QUALITY

### Introduction

Water quality has been traditionally of secondary importance to water quantity issues. This status is reflected in the legislation, which has been largely concerned with water allocation issues. The focus on water quality has generally been narrow, limited to potable water issues and control of pollutants and contaminants from point sources. Yet despite nearly 30 years of clean water legislation, water has continued to become less fit for use.

In Australia, the States and Territories have the prime responsibility for water quality management and protection, delivered through various agencies empowered under State / Territory legislation. Prime responsibility for water pollution by point sources such as industries and utilities has rested with environmental agencies. Powers over diffuse sources have been shared between a number of agencies and various legislative instruments and administrative arrangements.

This situation reflects the complexity of water quality management, and the range of activities which can have a potential impact upon water quality management.

Discussion here proceeds from an analysis of existing legislative approaches, an outline of trends in legislation, identification of challenges and gaps in current legislation, and a scoping of criteria for legislative best practice in the future. Examples of water quality protection and management in Australia and overseas highlight key elements of the discussion.

### Desired ecological outcomes for water quality management

The quality of Australian waters continues to deteriorate. The main threats to water quality include:

- contamination due to activities associated with intensive agriculture, industry, urbanisation, aquaculture, mining, water storage, and waste disposal;
- environmental problems (e.g. salinity, sedimentation, nutrient enrichment, and flooding) caused by clearing and/or modification of native vegetation, particularly in sensitive catchment areas and within the riparian zone;
- inappropriate use/management of land and water resources, for example, overgrazing of pastoral leases, excessive recreational use, inappropriate urban design and urban form (Welker 1996, State of the Environment Advisory Council 1996, Johnson 1999); and

- temperature changes in water storages and from thermal pollution.

Healthy waterways are a vital component of both the natural and human environment. Effective management of activities associated with the continual decline of water quality will not only protect the significant values associated with our water resources, but will also contribute to a range of desired ecological outcomes, including:

- healthy human populations—a healthy and sustainable supply of clean drinking water and water for other domestic purposes (e.g. washing and bathing);
- economic viability—long term viability of water supplies for agricultural and industrial activities;
- biological and physical environmental integrity—healthy land-based and aquatic ecosystems where biodiversity and ecosystem integrity are maintained;
- fishability and swimability—a level of water quality that allows people to engage in both primary and secondary contact recreational activities;
- aesthetically pleasing water resources, both inland and coastal.

**Figure 9.** Performance indicators for protection and management of water quality.

#### Compliance

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- . AWQ Guidelines (drinking water)
- . AWQ Guidelines (fresh water)

#### Incidents

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- . eutrophic events
- . fish kills
- . marine blooms

#### Inputs

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- . nutrient generation rate
- . % of catchment with erosion problems
- . % of vegetation cover
- . % of riparian areas cover
- . % of catchment elevated salinity
- . acid sulfate soils

#### Water quality

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- . Dissolved oxygen, nutrients, temperature, acidity and alkalinity, pathogens, salinity, turbidity and clarity, temperature, bacteria, toxicants
- . indicator species

Governing water quality through a legislative framework means achieving control over discharges from both point sources and non-point sources. 'Control' in this case means:

- pollution prevention, management, repair and restoration;
- protection, conservation and regeneration of habitats; and
- management of land and water use processes and protection of ecosystem processes.

Water quality issues relate as much to the needs of the receiving waters as they do to instream uses and values. Coastal rivers flow to oceans, to reefs, to bays or estuaries, with or without dams or water diversions. Similarly, inland rivers flow to lakes, dams, major rivers, bays or the ocean. The body of knowledge for determining the effects of pollutant loadings on receiving waters has expanded rapidly. Water quality managers are relying increasingly on the load limits resulting from models of receiving waters. 'Standards' and limits are now more 'tailored' to meet the water quality objectives for specific water bodies, a tailoring made possible by this new body of knowledge.

Accompanying this evolution in knowledge—of pollutants, their effects and risks throughout the water cycle—has been the need for greater capacity in water quality policy to handle the complexity and increase effectiveness of management. Table 7 summarises just some of the parameters of water quality where increased complexity has impacted on policy options.

## National guidelines

An important national initiative aimed at consistency in water quality management is the National Water Quality Management Strategy (NWQMS). The development of this strategy encourages consistency across water quality management authorities. The strategy provides a framework for choosing and setting interim water quality objectives, and a policy context within which to implement a system of water quality management.

It offers a holistic approach to natural resource management within catchments, marine waters and aquifers with water quality considered in relation to land use and other natural resources; coordination of all agencies and levels of government; and community consultation and participation.

In addition to the NWQMS, national guidelines have been developed for freshwater and marine waters and for potable water used for drinking water. The contents of these guidelines are summarised in Table 7 below.

**Table 7.** Choices for water quality policy.

<b>Water quality parameters</b>	<b>Policy options/elements</b>
<b>Pollutants:</b>	
• persistent toxins	Prevent use and eliminate
• toxins	Eliminate over time
• sediments	Targeted reduction
• nutrients	Targeted reduction of diffuse sources; targeted elimination of point source
• microbes	Targeted reduction
<b>Pollutant limits</b>	Concentration levels Load limits
<b>Spatial variations</b>	Deciding the focus for management actions: <ul style="list-style-type: none"> <li>• receiving waters</li> <li>• problem catchments</li> <li>• sub-catchments</li> <li>• specific sites e.g. acid sulphate areas, highly erodible soils</li> </ul>
<b>Temporal variations</b>	Tailoring requirements to pulsed flows <ul style="list-style-type: none"> <li>• droughts</li> <li>• floods</li> <li>• normal and long lead times for some impacts e.g. practices producing salinity</li> </ul>
<b>Load variations</b>	Allocating load limits between sources: <ul style="list-style-type: none"> <li>• between point sources and non-point sources</li> <li>• amongst non-point sources</li> </ul>
<b>Audience variations</b>	Policy instruments for the full spectrum of people: <ul style="list-style-type: none"> <li>• innovators</li> <li>• early adopters</li> <li>• mainstream adopters</li> <li>• laggards</li> <li>• apathetic or active resisters</li> </ul>
<b>Definition of water quality problem</b>	Emphasis on: <ul style="list-style-type: none"> <li>• need to protect water for downstream uses</li> <li>• need to protect ecosystem health</li> <li>• need to deal with inappropriate human behaviours and beliefs</li> </ul>
<b>Water quality improvement goals</b>	Balancing the needs for: <ul style="list-style-type: none"> <li>• restoring balance between water flow and water quality objectives</li> <li>• stabilisation of water quality in all water bodies</li> <li>• % improvement in water quality of some water bodies</li> <li>• restoration of water quality to a pre-defined level in some water bodies</li> </ul>

Research and development of these guidelines reflects the expanding knowledge base for water management. They are an achievement—they provide the opportunity at least for national coherence about the scientific basis for water quality. These guidelines however cannot ensure consistency of their application. Their effectiveness is solely reliant upon the States and Territories adopting and giving expression to these in their legislation.

This degree of weakness in the national delivery of water quality management in Australia is in strong contrast to the arrangements in the United States. Water quality policy in the USA is delivered through a strong centralised framework based on Federal legislation and on conformity by individual States reliant on Federal funds and assistance programs.

Federal powers in the United States enable direction and priority-setting by the national government in relation to individual States and their water quality management (Figure 10.). Relations with individual States are highly charged and based on hard bargaining arrangements where States seek variations in aspects such as standards, load limits or timeframes required and prescribed by the United States Environmental Protection Agency (USEPA).

This Federally interventionist and funded approach is, in theory at least, a strong basis for a national framework for river management particularly in relation to water quality. The same administrative model applies for wetlands, estuaries and coastal management. An approach more reflective of partnership would be in closer harmony to recent advances in river management and restoration in Australia.

**Table 8.** National guidelines for water quality.

National guidelines	Characteristics
ANZECC ( <i>Water Quality Guidelines for Fresh and Marine Waters</i> )	<ul style="list-style-type: none"> <li>Identifies five types of environmental values—ecosystem protection, recreation and aesthetics, raw water for drinking water supply, agricultural water, and industrial water (commonly referred to as 'beneficial uses').</li> <li>Each value has ambient physical, chemical and biological guidelines which are not to be exceeded if the environmental value is to be maintained (Mascher 1997).</li> </ul>
ARMCANZ ( <i>Drinking Water Guidelines</i> )	<ul style="list-style-type: none"> <li>Uses concentrations of indicators 'below which no harm or offence should occur to individuals' (Alexander 1996, p. 7.36).</li> <li>Indicators are grouped into benchmarks—Health Criteria, Aesthetic Criteria and Amenity Criteria.</li> <li>Health Criteria—prescriptive: consumed water should be free of harmful levels of toxic substances and pathogens.</li> <li>Aesthetic Criteria—more subjective; consumed water should be free of objectionable odour, taste and colour.</li> <li>Amenity Criteria—water used for other domestic purposes should be free of gross microbial contaminants and excessive, staining, corrosive or scaling agents.</li> </ul>

#### Drivers for change

Water quality problems are receiving recognition at local, regional and national scales. Key drivers moving the water quality agenda forward in recent times have been:

- The two major national developments: the ANZECC, NWQMS and COAG 1994
- Acknowledgment of a water quality crisis at a number of scales through:
  - State of Environment assessment of Australia's inland rivers and marine waters;
  - fish surveys in the Murray–Darling, our major national river system; and
  - outbreaks of blue–green algae and microbial scares in vital water supply catchments.
- Recognition of the sizeable contribution of diffuse sources to the problem and the need for multiple solutions—legislative requirements linked to market mechanisms (tradeable discharge rights, cross subsidies from point sources to management of diffuse sources) and to public financing of incentives.
- Increasing community awareness and extensive community involvement in land and water care projects.

Legislation which dealt with water pollution through an approach based on a single solution, universally applied, may have had some success when the focus for water quality was mainly on point sources. As the focus shifts now to diffuse sources, legislation's focus and its *modus operandi* is changing accordingly.

**Figure 10.** Water quality management in the USA.

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**Water quality management in the USA**

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As a result of its constitution, there is in the USA a greater degree of formal intervention by the Federal Government in State matters. In the case of river management activities particularly water quality, this intervention is engineered through a mix of Federal laws encompassing environmental protection and administrative matters (and related funding) through:

- Several major water (environmental) Acts with highly specific requirements of Federal agencies and States for plans and processes complying with Federal requirements:
    - *National Wild and Scenic Rivers Act 1968,*
    - *Federal Water Pollution Control Act 1972 (Clean Water Act),*
    - *Compensation & Liability Acts 1980, 1986;*
    - *Coastal Zone Management Act 1972,*
    - *Water Pollution Control Act 1956; amended 1965;*
    - *Estuary Protection Act 1968.*
  - The prime piece of legislation is the Clean Water Act (CWA), a powerful legislative tool for water quality. It aims to control point and diffuse sources through:
    - Requirements on States to establish State Water Resources Control Board (SWRCB) for implementation of the CWA under supervision of EPA. Regional Water Quality Control Boards are established to prepare Basin Plans based on beneficial uses and total maximum daily loads for the waterway (load based planning rather than environmental standards) for SWRCB approval.
    - Ranking of waters that do not meet applicable water standards with technology-based controls alone (the three highest priority waters per region then are required to have action plans, and implementation and monitoring strategies) a river basin management plan
    - This river basin management plan is based on total daily maximum loads (TDML) allowable for a river to retain its desired environmental values.
    - Funding provisions to States and to individual farmers are based on approval of these plans.
    - Requirement for each State to prepare Non-Point Source Management Program – with Federal funding for assistance. These have relied on non-regulatory approaches – grants, loans technical assistance, public education. Results have been limited so states are now looking at more regulatory approaches.
    - USEPA publishes 'guidelines' for diffuse pollution and management of the ten land uses with the highest risk of pollution; States are required to manage these land uses through requirements for best management practices
    - Delegations from Federal Government to States to issue Discharge Elimination Permits, the equivalent of pollution licences; five yearly review of this delegation power
    - Funds for specific initiatives across the country are raised from specific relevant sources e.g. coastal wetlands planning protection and restoration funds come from taxes on small engine fuel (outboard motors) and from requirements on States to match Federal funds by 50%, or 25% if the State has its own trust fund for acquisition of coastal wetlands
    - Series of Acts targeted at inserting environmental requirements into other major legislation e.g. *Food Security Act (1985)*. The latter Act sets out conservation provisions for soils (sodbusters) and wetlands (swampbusters). Federal funds are attached to plans and demonstrated achievements under these programs.
    - Strong links potentially between Coastal Zone legislation and Clean Water Act—tightening of requirements (approved plans before funding, observance of USEPA guidelines) about nonpoint pollution control and about State/local agency plans, policies and permits. Advances in California towards stronger regulations for non-point source runoff and for administrative coordination for planning and decision making. (California Coastal Commission (n.d.), The Habitat Restoration Information Center (n.d.))
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## Trends in legislation

### Clean water legislation

Legislation for water quality has achieved a degree of uniformity across the States as evidenced by a nation-wide releases of Clean Water Acts by the States in the 1970s. The next era saw the incorporation of water quality into broader 'environmental protection' legislation, with more comprehensive schedules of polluting activities, more stringent licence conditions and stiffer penalties.

### Environmental protection legislation

Presently, all States have environmental protection acts supported by environmental protection policies (State Environmental Protection Policies [Vic], Environmental Protection Policies [WA, Qld, SA], Protection of Environment Policies [NSW], and Sustainable Development Policies under the *State Policies and Projects Act 1993* [Tas]). Environmental protection relates to all contaminants and the protection policies are subsidiary legislation specifying requirements and processes in relation to noise, air, water quality or selected geographic areas or in key activities (e.g. mining).

### Change of focus

Two primary trends have impacted on the legislative framework for water quality:

- the move away from reliance on standards to set limits on discharges to a focus on ambient water quality; and
- the move away from the focus on point sources to a combination of point and non-point sources of water pollution.

The degree of uniformity evident in the environmental protection legislation can be attributed largely to the ANZECC NWQMS, a strategy based on the evolving science of water quality with a view to reforming water quality management. The guidelines developed under the NWQMS enabled the focus to shift from end-of-pipe estimates for protection of water quality to a focus on ambient water quality and its tolerance levels for various pollutants. The use of 'standards' for discharges and for ambient water quality was the initial approach. Now, in the late 1990s, the emphasis is on risk assessment of activities and the 'tailoring' of water quality requirements to environmental values and specific conditions of a selected water body.

This evolution of water quality requirements generated fundamental changes to environmental protection legislation as well as to legislation indirectly affecting water quality.

### Point source licensing

For three decades, licensing has been the primary mechanism for pollution control. This was the vehicle

for the traditional 'end of pipe' management method. Licences control discharges and emissions through the setting and enforcing of licence conditions. The effect of licensing was mainly enabling environmental agencies to know the pollutants produced by an industry and to enforce conditions generally if breaches were detected. Pollution prevention and elimination objectives were addressed through licensing until environmental protection legislation became serious about penalties, strategic about pollution as ineffective waste management, and incorporated incentives for industry compliance.

In recent years, licensing has undergone changes. Licensing systems are moving to encourage voluntary proactive improvement of environmental performance consistent with the concept of best practice environmental management. This shift in approach is part of a change in environmental management generally.

The main elements of this new approach incorporate best practice licences, codes of practice, self-monitored licences, incentive licences, and load-based licence fees. Industry self-regulation through codes of practices and certified Environmental Management System (ISO 14,001) and regulation negotiation (termed *Reg-Neg* in the USA) are also part of these trends. While it is early days as yet to judge the results of this form of de-regulation, environmental groups have expressed the need for legislation to hold the bottom line in terms of performance requirements and not to rely excessively on industry self-regulation.

Environmental protection legislation will continue to utilise licences and works approvals for control and management of point source discharges from prescribed premises. The shift however is towards more holistic, target-based approaches where overall water quality management is planned for, and licences are issued in the context of desired water quality objectives. Licence conditions are specifying measures for minimising and even eliminating pollution through requirement to recycle waste and through fees scaled to account for discharge levels. Tradeable emission schemes, such as operate in the Hunter Valley (NSW), could be useful here.

### Evolution of legislative framework for water quality

The move away from licensing of ongoing pollution and reliance on licensing of point sources for water quality protection is a fundamental shift. The emphasis on multiple mechanisms for managing point and non-point source means a number of other legislative mechanisms become critical to water quality. For comprehensive protection, water quality then has to be addressed through:

- Legislation relating to activities and land uses which impact on surface and groundwater for example agriculture, forestry, mining, industrial



activities, urban development, utilities and river engineering.

- Legislation managing specific environments e.g. catchment management, coastal protection
- Legislation protecting use of and access to resources e.g. land, soils, forestry, fisheries, water; including occupational licensing for those engaged in resource-based activities (Figure 11).

Administration of the legal framework for protecting water quality is critical to its achievement. The Western Australia case study (Table 9) demonstrates the problems of fragmentation of pollution control responsibilities across agencies.

A multiplicity of decision makers exercising powers under different pieces of legislation does not necessarily lead to the conclusion that water quality

**Table 9.** Case study of water quality-related administration, Western Australia.

**Water quality responsibilities: Western Australia**

**Water and Rivers Commission (WARC)** formed through split of former Water Authority into Water and Rivers Commission and Water Corporation. WARC administers all legislation for water resources and planning for use of water plus water allocation and assessment, conservation, protection and management of State water resources and their environments.

WARC is vested with powers to **make by-laws** to control polluting activities, regulate land use and allow for steps to be taken to prevent or clean up pollution; **to proclaim areas and make by-laws** for protecting underground water and to prevent pollution of water and associated lands in declared management areas; **to proclaim controlled lands** within which tree clearing without a license is an offence; **to license consumptive uses** (though usually without reference to effects on water quality); **to develop policy** such as catchment policies to maintain:

- Priority 1 areas which are most important for public water—no degradation, strict limitations on land uses, no development.
- Priority 2 areas where there is some development already—restrictions on further change, guidelines.
- Priority 3 areas where existing or planned development requires high water treatment. **Department of Environmental Protection** is charged with pollution control powers for land water and air under the *Environmental Protection Act 1986*. Powers include authority to issue licences and works approvals for point

source discharges from prescribed premises and power to enforce prescribed offences; power to prepare EPPs which when approved have the force of law.

EPP (Gnangara Mound Crown Land) control effects on groundwater/wetlands, private land controls;

EPP (Swan Coastal Plain Lakes 1992) control activities on or around lakes;

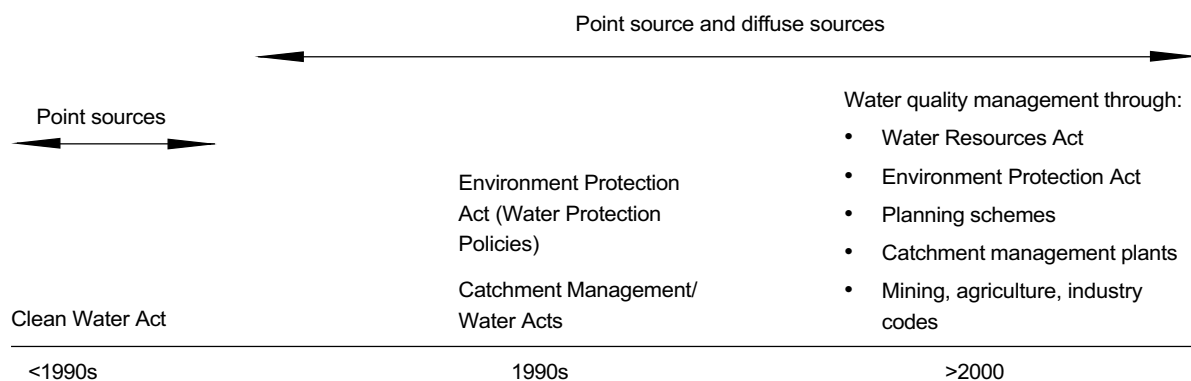
EPP (Peel–Harvey Estuary 1992) control of pollutants especially phosphorus;

EPP (Swan & Canning Estuary 1997).

Environment Protection Act 1986 requires environmental impact assessment. The Minister for Environment, in consultation with the relevant decision making authority, **is the final decision maker** on the environmental acceptability of the proposal. Planning Legislation Amendments give Minister further powers to intervene; also there is the application of environmental impact assessment **to planning schemes**.

**Western Australian Planning Commission** is responsible for regional plans with which local planning schemes must be consistent and statements of Planning Policy. Most policies and regional plans have looked at protection of underground water supplies and public water supplies. The Metropolitan region plan has far-reaching objectives e. g. avoiding development which unacceptably diminishes water quality and quantity; ensuring subdivision designs which minimise destruction of wetland and avoid pollution, making provision for water conservation. Requirement to consult with EPA, Water and Rivers Commission, other agencies (Mascher 1997).

**Figure 11.** Development of water quality legislation over time.



is adequately protected. This type of system lends itself to fragmentation and the resulting danger that powers and functions overlap and that decision making is not integrated or directed towards achieving the same, or even compatible, goals (Figure 12).

**Figure 12.** Trends in water-related decision making.

Present	Future
Water quality focus	Total water cycle focus
Discharge limits	Load limits tied to water quality objectives
Licence for pollution	Licence for pollution elimination
Generic single solution approaches	Target-based, tailored approach
Complex science	Credible science and simple tools for its application
Fees and penalties	Integration of fees, penalties, market and public finance mechanisms
Management by central agency	Multiple agencies, operational agreements, regional / local planning and service delivery at catchment / regional and local scales

### Legislative framework requirements

Management of point sources has been addressed primarily through a reliance on environment protection legislation. Legislation for management of diffuse sources however will require a more diverse, innovative and comprehensive legislative framework involving land use control, pollution prevention, environmental impact assessment, resource management and catchment protection.

#### Objects clauses

Water quality objectives, and ecological sustainability in general, need to be incorporated into legislation. One method for this is the use of objects clauses, duty of care statements and principles. These should be incorporated in the full range of legislation governing water quality directly or indirectly, including:

- State planning policies—this would apply to all decision makers when water quality could be affected.
- new water quality legislation or an umbrella Act governing all decision making related to water resources.

- all State legislation that affects water quality management and the management of other natural resources (Mascher 1997).

In Queensland, the *Environmental Protection Act 1994* imposes a general statutory environmental duty. This duty may be enforced through mechanisms in the Act. An environmental duty requires all persons to take all reasonable and practicable measures to prevent or minimise the occurrence of environmental harm.

In South Australia, the Water Resources Act 1997 strengthened links between water quality and water quantity through its clear statements of the Objects of the Act. It also strengthened the link between catchment management planning and land development. Any inconsistencies between catchment management plans and local planning schemes are to be rectified, though this has not yet been tested in any substantial way.

#### Integration of plans

Water quality objectives form the basis of water quality management plans, and for subsidiary plans such as those for nutrients, sediments, stormwater and sewage treatment. These in turn need to be incorporated into other plans making up the information base for an area's protection and resource development. Examples of these other plans include coastal, vegetation management, agriculture, water allocation, agricultural or residential development, salinity management.

Water quality objectives must also inform statutory plans, for example local planning schemes, and any statutory catchment and coastal plans. Modelling tools are increasingly available to inform strategic plans about different land use scenarios and resulting water quality regimes.

**Figure 13.** Water quality and water quantity planning stressed rivers assessments, NSW.

#### Water quality and water quantity planning stressed rivers assessments, NSW

In 1998, NSW in line with its State Rivers Policy released its report assessing stress levels in NSW rivers. The report is intended to form the basis of government management priorities in terms of embargoes on issue of new water licences and licence transfer arrangements.

The overall stress classification was based on estimates of stream flow, water usage and hydrological stress together with stream health indicators, conservation status and risks to environmental values.

The result was that 228 subcatchments (33.5%) rate as high priority for the preparation of river management plans, 112 subcatchments (16.4%) are medium priority and 108 (15.9%) are low priority. 232 remain unclassified (DLWC 1998).

NSW is planning for its rivers through integrated riverine strategies (Figure 13). Priority rivers under the State Rivers Policy, have been identified and planning effort is targeted at these. The plans themselves are based on water flow objectives and water quality objectives. The resulting riverine plans are not statutory. They need integrating with estuary plans, coastal plans, floodplain management plans, Local Environmental Plans as well as informing decisions for licences for water and for discharges.

#### Smart growth

When priority is given to water quality protection, the right to unfettered development in every catchment comes under scrutiny. The alternative is to set a threshold or cap in pollutants which can be exported to a water body, necessitating a limit on development in certain catchments.

Based on pollution load limits of receiving waters, thresholds can be set for the scale and types of development permitted in a catchment. The Chesapeake Bay example (Figure 14), based on the *Smart Growth Areas Act* (date) planning legislation, is a case study of catchment planning for nutrient capping.

#### Integrated management

The effectiveness of water quality protection and management will depend on the success of integration of water resource management, land use allocation, catchment land management and environmental protection functions at the strategic, regional and local levels (Welker 1996).

In Queensland, for example, the Brisbane River is principally managed through the Water Resources Act 1989 but at least 41 other Acts have significant impact and are administered by at least 22 different State agencies. Additionally, another 32 Acts, plus a range of site-specific Acts, impact on the Brisbane River's restoration. There are also the town planning schemes, policies and local laws of 16 local governments. The situation is generally similar for other Queensland rivers; at least 70 Acts actioned by at least 38 State and local agencies plus local governments apply to all Queensland rivers (Mary Maher & Associates et al. 1998).

Victoria's method of ensuring protection and management through extensive institutional reform and founded on catchment administration is outlined in Figure 15 (see p. 42).

**Figure 14.** Protecting Chesapeake Bay, USA.

#### Protecting Chesapeake Bay

Maryland, a state on the eastern seaboard of the United States has a strategy to reduce 1985 nutrient pollutant loads from each of Maryland's major tributaries flowing into Chesapeake Bay by 40%, i.e. a nutrient capping at 60% 1985 levels.

Through its Smart Growth Areas Act, Maryland's government provides regulations and guidelines for planning and growth management designed to concentrate growth, protect rural land resources and encourage stewardship of the Bay. Smart Growth is to be achieved by providing incentives to better focus growth in planned areas and by financial assistance to preserve rural land.

In its *Tributary Strategies* documents, the method for achieving nutrient capping is not merely a matter of focusing on point sources and non-point source control through applying urban and agricultural best management practices. As well, Maryland's watersheds are to see the implementation of Smart Growth guidelines which will direct growth in appropriate ways.

*Directed Growth* is intended to achieve a range of outcomes to:

- accommodate projected growth on substantially fewer acres of land
- conserve more resource and environmentally-sensitive land such as forest, farmland and riparian buffers along streams
- put more new households on sewer service and fewer on septic systems
- reduce nutrient pollution from new development and septic systems
- limit impacts of growth to relatively few local watersheds in areas designated for growth.

In a model for the Patuxent River watershed, it has been estimated that by 2010 30% less nitrogen will result if the following Directed Growth options are implemented (assuming the same amount of growth in households, population and employment):

- increase in development potential of nominated growth areas
- transfer of development rights to growth areas
- extension of sewer service to all designated growth areas
- protective zoning of agriculture areas
- purchase of development rights
- rural clustering
- forest conservation programs
- stream buffer protection programs

The findings in Maryland are that such directed growth measures, implemented through the local planning, zoning and subdivision processes, have major roles to play in limiting future pollution loads. Directed growth mean greatly improved stream quality for one quarter of the watersheds (130,000 acres), stable quality in 118,000 acres and additional degradation in only two sub-watersheds totalling 7,900 acres.

(Patuxent River Commission 1999)

## Devolution

Any desired increase in public policy intervention to deal with current pressures on water quality can only be delivered with creative use of stakeholder motivations and partnerships. This era of communication, public participation and partnerships, and devolution of powers is a strong trend. Regional and local planning, service delivery and enforcement will depend on appropriate delegation of powers as well as appropriate resourcing, central leadership and advocacy about what is necessary to protect ecosystem and human

**Figure 15.** Victoria's integrated catchment management reform.

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In Victoria the *Catchment and Land Protection Act 1994* allows creation of regional catchment strategies. These are the central regulatory tools and guide actions of public authorities. Under the Act, the Victorian Catchment and Land Protection Council advises on catchment management and land protection, and operation and administration of the Act.

From 1 July 1997, Catchment Management Authorities (CMAs) were created to implement RCSs in all rural regions (except Yarra), bringing together community service delivery and advisory groups in a whole-of-catchment approach with responsibility for coordination of floodplain management, rural drainage, water quality, Crown frontages and heritage rivers outside national parks. They combine the roles of the former CALPBs, river management authorities, salinity implementation groups, water quality groups and sustainable regional development committees.

Plans prepared for special areas can include specified land use conditions and are binding on the landowner. It is an offence to disobey.

The Act also prescribes a number of general duties on landowners. Landowners are required to take all reasonable steps to protect water resources. The body corporate under the *Conservation Forests and Lands Act 1987* can issue a land management notice to non-complying owners. The notice can prohibit or regulate land use or land management practices, require specific action and anything else considered necessary. It is an offence not to comply. However the Crown, a Minister or Secretary is not liable for an offence.

A minister or public authority must have regard to the regional catchment strategies and any special area plan. The Act defines land to include water. It sits over the top of the *Water Act 1989*, the *Environmental Protection Act 1970* and the *Planning and Environment Act 1970*.

Ministers can incorporate regional catchment strategies into State Environmental Protection Policies, and make them binding. Catchment and Land Protection Boards functions are linked to river management authorities' functions.

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health. Downsizing of agencies at all levels means all this activity could take place in the context of a severe shortage of public funds and resources.

Most States/Territories are moving towards using a hierarchy of plans accompanied by clear definition of roles and responsibilities at all levels. Deciding which matters are best addressed at which level is critical. Decisions are often made too remote from where the results of them are felt. Conversely, at the local level, difficulties may arise about making the tough political, economic and ecological decisions given the pressure of multiple and often conflicting missions. A balance has to be found between State/Territory decision making to establish the principles and set the framework, and local decision making to adapt the framework to local circumstances.

## Criteria for legislative best practice

No single agency, no single program, no individual initiative can deliver protection and management of water quality in Australian rivers. Nor is a plethora of programs, agencies or policies any assurance that it will be delivered. An appropriate water quality management system is a complex mixture of processes, mechanisms, principles and policies administered by a number of Government agencies and applied at the State, regional or local level (Welker 1996).

At the industry or farm level, agencies and programs must be integrated, without competition for recognition, power or control between the agencies. Plans may be developed but if there is no cooperation between stakeholders and competition between agendas then the causes and management of water quality problems, particularly diffuse nutrient pollution, will not be addressed. Without strong leadership social, economic and environmental policies will conflict.

A desired future requires leading, rather than being led by, change. Such leadership requires communication of information, active public participation and changes in governance (Mitchell 1999).

Legislation needs to facilitate these elements of water quality management. Legislation on its own will not suffice however, and must be seen as one part, important as it may be in setting the scene for most other measures, of an overall package of measures. The question of how much reliance should be placed on legislation pervades this exercise.

Figure 16 summarises changes to water quality legislation and the main mechanisms for its operation (pre 1990, 1990s and beyond 2000).

## Critical success factors for water quality legislation

Critical success factors for water quality legislation are identified as:

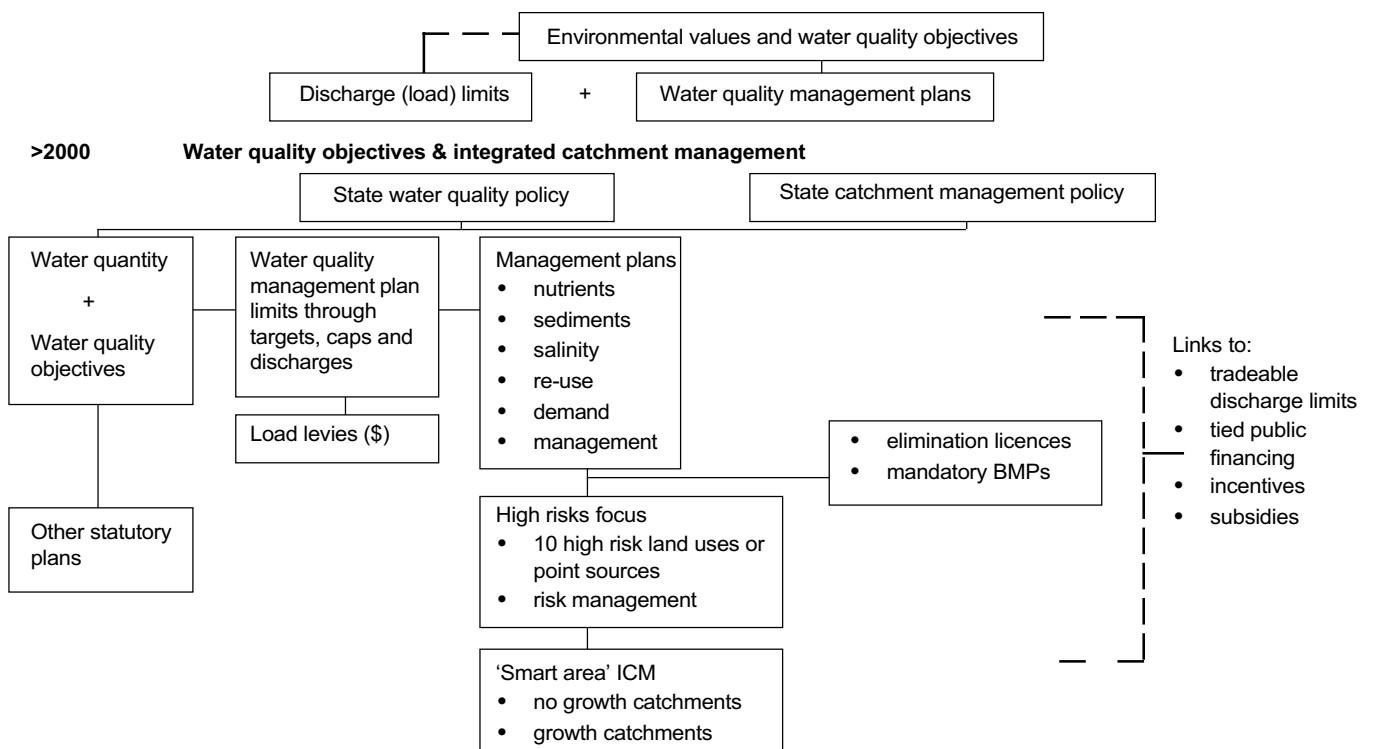
- statements in the objects and principles of legislation which ensure resource use and access is accompanied by river management and restoration /ecosystem protection expressed as the over-riding objective;
- rationalisation of conflicting legislation and incorporation of water quality into all relevant legislation and simplification;
- catchment-specific definition of water quality objectives and management mechanisms;
- clear definition of the hierarchy of responsibilities for policy-setting, planning, management and implementation in relation to all key legislation for water quality;
- enforcement and administrative measures aimed at consistency of agency approaches, culture change about pollution elimination, as well as achieving successful prosecutions;
- setting up participation arrangements for planning, implementing and reviewing progress at the correct level;
- ensuring public accountability for impact assessment, licensing and planning processes particularly where agencies have discretionary powers; approval processing arrangements which are streamlined but not restrictive of appropriate levels of agency or community review;
- greater use of land use planning powers including caps on further development in stressed catchments (smart growth) and incentives for preferred development;
- ensuring funding for implementation through revenue raising powers and cross-subsidies (point source to diffuse source management);
- removing obstacles to economic measures such as tradeable discharges or cost-sharing programs; building regulatory incentives for best practices by industries and agricultural land uses (linked to public financing innovations); and
- accountable administrative measures for ensuring an effective and credible system of industry self-regulation or any co-management arrangements, and third-party appeal and injunctive rights.

**Figure 16.** Development in legislation: water quality.

**Pre 1990s** Command and control of major point sources

Discharge limits: end of pipe

**1990s** Minimising pollution from point and non-point sources



## 6. RIPARIAN MANAGEMENT

### Introduction

Riparian areas are a significant ecological element of the Australian landscape. However, they are afforded little or no active protection or management under existing legislation. In the Australian landscape, their utility value is high: for grazing, agriculture, extraction, housing and recreation. Riparian vegetation controls the export pathway of sediments and nutrients to rivers. As Cullen (1999) noted at the recent International Conference on Diffuse Pollution, the key aspect of land management in the drought context is keeping some vegetative cover on the land around the river.

Little distinction has been made between management of the land and management of the adjoining watercourse. The linear nature of riparian corridors has not had recognition in the thinking of adjoining land managers except where the water resource itself has been threatened.

Given the significance of riparian areas and their critical condition across the country, this has become a serious oversight.

Riparian area protection and management is part of the larger policy framework for streams as a whole, their protection and rehabilitation. Several policy goals may be pursued for riparian areas as part of an overall river system. These goals range across:

- protection of high conservation value riparian areas;
- slowing the processes of degradation, or gaining a level of control over degradation;
- stabilisation and maintenance of existing riparian conditions under circumstances of ongoing degradation pressures; and
- rehabilitation or improving upon existing conditions, restoring to some identified original condition.

Protection and management efforts will differ depending on the policy goals sought. The legislation then will vary in both content and its operational mechanisms depending on the preferred goal(s).

This policy intent will also vary spatially and temporally and river management legislation needs to provide for these variations in intent.

Working with these policy goals is not a straightforward matter. In essence, river systems and their riparian areas have been subject to major modifications. Where river managers may gain some comfort from the prospect of targeting management efforts at a degree of protection or rehabilitation, the

reality is that the forces of change acting on rivers, in the past and presently, seriously limit what is practically achievable in modified systems, and what level of 'return to a past condition' is politically, socially and ecologically possible.

Discussion of relevant legislation here proceeds from an analysis of existing legislative approaches to riparian areas, an outline of legislative trends, identification of critical gaps and limitations of current legislation, and a scoping of criteria for legislative best practice in the future.

### Desired ecological outcomes for riparian management

Riparian land is land that adjoins or directly influences a body of water. It includes:

- the land immediately alongside small creeks and rivers, including the riverbank;
- gullies and dips which sometimes run with surface water;
- areas surrounding lakes; and
- wetlands on river floodplains which interact with the river in times of flooding (LWRRDC 1996).

The difficulty of drawing demarcation lines between the terrestrial and aquatic aspects of riparian land is one challenge for resource managers. Distinguishing between the two becomes most difficult in areas where rivers have extensive floodplains or large seasonal variations in water flows. The riparian area of streams in drier parts of Australia is also difficult to determine due to poorly defined channels caused by low gradients in the land and high variability of flows.

These demarcation problems underline the significant role which this land plays in the interplay of ecological processes between land and water in any landscape. This significance derives from the habitat and biophysical conditions it supports by virtue of the connection it maintains between these two environments. While there is a good deal of literature documenting the degraded state of these areas, work still remains to be done on stream behaviour, particularly in specific environments, as well as case studies of stream management practices and techniques.

In most landscapes, riparian land is often the most productive in biodiversity terms because it has deeper soils, greater soil moisture and, as a result, denser and more diverse vegetation for wildlife habitat. Effective management of riparian lands involves protecting riparian values and rehabilitating the riparian area (Table 10.).

Desirable ecological outcomes will then be expressed in terms of:

- width of riparian vegetation cover, depending on stream order (the higher the stream order, as taken from the stream's source, the wider the riparian vegetation buffer needed for the stream);
- percentage of vegetation which is in good condition (structure, composition, weed cover) and habitat conditions for flora and fauna species;
- percentage of vegetation which is intact or unfragmented throughout stream length (connectivity of vegetation, composition and condition);
- inundation by water from stream or overland flow, resembling natural levels and frequencies, and comprising sediment, nutrient and other chemical contents similar to the composition in natural flows; and
- percentage bank stability or instability and percentage differences in rates of change to banks.

These outcomes need to be tailored to specific parts of the waterway. Buffer widths, bank stability needs and corridor widths will vary with stream length.

Development of measurable aspects of riparian areas are the subject of extensive investigations by research groups such as the CRC for Catchment Hydrology, Monash University; and the Centre for Instream Research, Griffith University. No single formula for biophysical protection or rehabilitation is possible.

Targets, thresholds or 'caps' on riparian area conditions are not only the domain of scientific investigation. Resource managers must examine social, economic as well as ecological objectives to determine the formula for riparian area protection or management.

Ecologically, the formula will be determined depending on the specific river conditions and on the policy goals for the river's protection, rehabilitation or stabilisation, adopted for the stream as a whole or for reaches within it.

#### Existing legislative arrangements

Cripps (1998) found no clear recognition in legislation of riparian management. It is treated as a sub-component of land use and land management, though legislation relating to water management is also relevant. For riparian areas, values to be protected along with pressures to be managed through the legislative framework relate to the following:

#### Management of direct pressures on riparian areas

- Encroachment or degradation from land-based activities such as those resulting from pastoralism and agriculture, settlement and infrastructure development.
- Changes to flow dynamics from river works activities including bank stabilisation, alignment training, levee banks and stream clearing.
- Flow velocity and volume impacts from stream channelling by straightening, enlargement and realignment for navigation, drainage, agriculture and urban development.
- Flow regime impacts from flow regulation, water storage and diversion including dams, weirs, flow diversions for water supply, irrigation, hydroelectric power and flood control.
- Changes to habitats and bed and bank conditions through aggregate extraction and mining.
- Bank and channel impacts from recreation.

**Table 10.** Management of riparian lands.

Protecting riparian values	Rehabilitating the riparian area
<ul style="list-style-type: none"> <li>• Conservation, scientific, cultural and education values</li> <li>• Recreation, amenity and scenic values</li> <li>• Aquatic environment values</li> <li>• Water production and food supply values</li> <li>• Water conveyancing and drainage, catchment ecology values</li> </ul>	<ul style="list-style-type: none"> <li>• healthy aquatic environments characterised by improved water quality, increased fish stocks, decreased algal growth, and lowered water tables</li> <li>• healthy land-based and river ecosystems, including re-instatement of corridors for wildlife</li> <li>• retention of nutrients</li> <li>• decreased erosion of streambeds and banks</li> <li>• stabilised river courses, with river flows maintained within the channel</li> <li>• identification of acceptable uses, activities</li> <li>• opportunities for diversification of land-uses</li> </ul>

(LWRRDC 1996)

**Management of indirect pressures**

- Modified water and sediment flow regimes through catchment land use activities such as agriculture, forestry, urbanisation.
- Pollution from diffuse and point source discharges brought by runoff from catchment activities.

**Protection, conservation and restoration**

- Natural water flow conditions and water quality conditions in relation to the riparian lands.
- Vegetation cover, and the structural complexity of vegetation communities, and fauna species/communities.
- Rare and threatened species.
- Connectivity (along the stream and with the floodplain) and the associated exchange of water, nutrients, sediments.
- Stability of the stream channel and banks.
- Wild or heritage rivers, or reaches within them.

Much legislation to date has been directed towards protection and management of the water resource itself or of the productive lands alongside the stream. Very little of it has been directed towards protection and maintenance of ecosystem values.

Ultimate control over riparian areas rests with the States and Territories. Riparian protection and management is exercised through a number of legislative mechanisms.

Table 11 summarises the mechanisms available for riparian area management through legislation up to 1998. They are grouped into four categories of mechanisms that may specify protection and management requirements in terms of:

- riparian area protection through planning such as land and/or water plans;
- permits, licences and procedures for obtaining approvals or demonstrating compliance with conditions;
- penalties and requirements for repair, rehabilitation or dealing with illegal activities; and
- structures and processes for administration of plans or permits.

**Table 11.** Riparian management: summary of existing legislative mechanisms

Category	Range of mechanisms
<b>Land, water plans</b>	
	Policies: State, regional, local
	Water allocation or entitlement plans
	Management plans: for catchment management, vegetation management, coastal management, protected area management
	Conservation plans
	Property plans
	Control districts
	Declared area
	Local government codes
	Plans of allowed/prohibited development (e.g. development control plans)
	Local government planning schemes
<b>Permits, licences and procedures</b>	
	Codes of practice
	Regulations Interim conservation orders
	Leases, lease conditions on public land
	Licences, licence conditions
	Development consent conditions
	Permits, permit conditions
	Impact assessment and approvals
<b>Penalties, repairs, and rehabilitation</b>	
	Declared area (e.g. degraded areas targeted for protection and restricted usage)
	Notices (e.g. improvement notice, soil conservation notice)
	Orders to remedy or restrain an offence (e.g. soil conservation order)
	Plans (e.g. for environmental improvement, rehabilitation, recovery of species)
	Penalties (fines, rehabilitation or re-instatement)
	Agreements/covenants with landowners (voluntary—may be accompanied by incentives)
<b>Administrative processes and structures</b>	
	Committees (e.g. catchment management committees)
	Authorities Boards Councils (e.g. water resources councils)
	Trusts (e.g. catchment management trusts, river improvement trusts)
	Commissions



## Management challenges for legislation

### 'Riparian area' definition

Across the States and Territories, legislation presents conflicting concepts of the riparian zone. In NSW it refers to areas within 20 m of the bed or banks (*Native Vegetation Conservation Act 1997, s. 7 NSW*); but in Queensland, it refers to all land within the high banks of a stream or lake (*Water Resources Act 1989*). This confusion about the term 'riparian' makes comparisons between legislative provisions difficult.

Each State can be said to have legislation that allows or enables riparian protection and management through both planning and enforcement provisions. This potential to address riparian needs is mainly contained within the general legislative provisions of resource management and land use planning, for both public and private lands. However, no specific reference is made to riparian protection.

In addition, there is legislation that relies on the nomination of specific locations or types of riparian areas (particularly soil erosion problem areas, key locations for water resource or catchment protection, or 'critical habitat' for threatened species). This nominated area legislation may restrict specific uses or activities such as destruction of vegetation, or it may require impact assessment of specific uses. Under this legislative framework, most of the planning, enforcement provisions and incentives for riparian management have to be triggered by a concern or an issue rather than on a strategic basis.

Protection and management of riparian areas is not systematically undertaken through existing legislative frameworks across the States and Territories, though legislation generally does not prohibit such a proactive approach.

### Tenure

Any actions aimed at protection or management of riparian areas must recognise the predominantly freehold nature of the tenure of streams and their riparian areas which exists throughout Australia.

Queensland and Victoria acted in the last century to protect the stream bed and banks by declaring these Crown land (Table 12).

Crown land is subject to its own legislation and associated legislation where land is leased; privately owned land is covered by land use legislation (Cripps 1998).

In Victoria, the problems of ownership are well illustrated despite the scope for achieving better results. Last century, Victoria acted to preserve some areas of river frontage for public purposes by declaring the bed and a specified distance from each bank as permanently reserved in the form of crown land. The rationale for this involved a mix of

objectives including continued public access to watercourses, restrictions on landowner monopoly over their water, and development of water-related public utilities (Terrill 1998).

The reality however is somewhat less than envisaged. Where frontages are publicly owned, the width of the reserve varies: from 20–60 metres. Terrill claims that much of this publicly owned land has been licensed to the adjacent landowner, to be managed as part of the adjoining farmland. Licence conditions, for example those covering controls over clearing, vary across the State and these licences have a maximum life of 35 years.

The result is that the public frontage to rivers and its associated management regime in Victoria, is either non-existent at the least; and non-continuous at the most (Terrill 1998).

*... Land tenure has the potential to restrict (agency) management activities where existing land management is incompatible ... particularly where pastoral leases exist over ecosystems or where Native Title claims have been lodged. Management activities may be restricted according to the wishes of the lessee or claimant.*

(Allan & Lovett 1997)

**Table 12.** State protection of streambeds.

State	Action
<b>Qld**</b>	All land below tidal high water mark is Crown Land Crown maintains ownership of the bed up to the top of the low bank
<b>NSW</b>	All land below tidal high water mark is Crown Land Above tidal high water mark, stream bed and banks are usually freehold land (ownership is centre thread of stream where stream forms the boundary)
<b>WA</b>	Crown ownership of tidal watercourses Bed and banks ownership travels with ownership of the land surrounding the stream except in proclaimed areas (Rights in Water & Irrigation Act) where the bed of a stream is owned by Crown
<b>Vic**</b>	Bed and banks usually property of Crown (some private: Western district) On larger streams, 20–60m from top of each bank is Crown Land frontage = 25,000 km of frontage 'reserves' and 38,000 kilometres of river frontage privately owned.
<b>SA</b>	Ownership of bed and banks travels with ownership of surrounding land; in urban areas river frontages have 'reserve status' and are managed by local government
<b>Tas</b>	Most non-tidal frontages are in private ownership; tidal frontages are owned by Crown

(adapted from Amprimo, QDNR 1998, pers. comm.)

Private property in itself may be a positive rather than an inhibiting feature. Motivation, a much needed ingredient in improved techniques and continuous improvement of rivers, can be very high for private property owners. Public lands are not necessarily better cared for. Certain policy goals sought for riparian areas (e.g. rehabilitation) may be more readily realised under private ownership depending on incentives or support arrangements.

Protection however may be more difficult where a property owner faces high opportunity costs from a decision taken to protect and conserve riparian values along the stream banks or in riparian buffers.

As Fisher (1987) points out, powers of intervention have considerable potential to impact on the common law status of landowners and occupiers. Executive powers to intervene in the resource use activities of private owners/occupiers have grown substantially.

With the maturation of natural resources legislation, one extension has been the provision of more detail about how all these approaches allow for the exercise of legislative powers. Policies cannot simply be articulated overnight; not just because of traditional common law restrictions, but also because the statutes increasingly incorporate statements of purpose and limitations about the use of the powers in the implementation of policies.

Ownership then is a mixed blessing for riparian areas. Private ownership brings challenges of conflicting goals for ecology and productive usage. Public ownership does not ensure achievement of the balance between ecological and economic objectives. Tenure-related legislation alone cannot deliver protection without the accompanying set of policy directions for that protection and management. The statutory framework then for riparian management must define these ecological objectives and make full use of the powers in the legislative provisions which direct usage of land in private or public ownership.

#### Heritage or wild rivers

Riparian areas of high conservation value may occur in several settings ranging from degraded to high conservation value rivers. In terms of high conservation value or 'wild' rivers, the lack of action specifically aimed at addressing protection needs is notable, despite numerous investigations by most States and Territories in the last decade (Kunert & McGregor 1996).

Most States and Territories have a variety of Acts with the potential to protect aspects of wild rivers (e.g. forestry, parks and wildlife, environmental protection, environmental assessment, planning, soil conservation, land, coastal and estuarine protection, water supply and Crown land management. Only

Victoria however has enacted legislation for management and protection of heritage rivers and natural catchment areas; NSW and Western Australia have incorporated protection into policies (Table 13).

**Table 13.** State legislation for management and protection of 'wild' rivers.

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#### **Qld, Tas, SA,**

Various Acts for mineral, forestry, water resource, national parks, pollution control

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#### **NSW\***

Draft SEPP for Wild and Scenic Rivers State Rivers Policy (water quality objectives, water flow objectives, management plans)

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#### **WA\***

Endorsement of need for legislation (potential amendments to Water & Rivers Commission Act)

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#### **Vic\*\***

*Heritage Rivers Act* (1992) (prohibits new dams or impoundments, barriers or new water diversions; declares Natural Catchment Areas and prohibits in these the clearing of native vegetation, timber harvesting, plantation, mining, motorised craft, grazing, upgrading roads) 18 Heritage Rivers, 26 Natural Catchment Areas (1,000–10,000 ha) Management plans in preparation Some recommendations for management of all public lands in rivers.

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From the specific summary above, it is apparent that not many States and Territories have sought to develop legislation which proclaims the values to be protected or the activities prohibited in their high value river systems. Without this recognition factor, the risk is that high value rivers are subject to decisions about the river or its catchment made by numerous agencies.

In most States and Territories, different agencies are responsible for various resource decisions for example, forestry, minerals, water, impact assessment decisions are taken by separate agencies.

Notwithstanding the argument that these decisions may be taken as whole-of-government decisions, the lack of recognition of high conservation value rivers in themselves makes it difficult to assume the necessary protection regime is assured.

Protection and management of high conservation value rivers, and their accompanying riparian areas, has not received recognition as a discrete river management policy goal in most jurisdictions in Australia. No information is available as to the

effectiveness of existing legislation for their management. In most States and Territories, heavy reliance seems to be placed on protection through legislation for national parks and native vegetation. This is an indirect and inadequate approach.

Legislation is needed which ensures:

*... conservation of wild river values – by protecting them from hydrological, geomorphological and biological disturbance and by allowing the associated natural systems and ecological processes to continue indefinitely.*

(Kunert & McGregor 1996, p. 31)

Table 14 shows international examples of management of wild and scenic rivers.

#### Water flows

Water flows to and from riparian and riverine land is a fundamental feature of this ecozone between terrestrial and aquatic ecosystems. Under natural conditions, these flows provide hydrological, chemical and biological sustenance to the land. Overland and underground flows also provide vital chemical supplies to the aquatic ecosystems.

Under regulated or otherwise modified river or land drainage conditions, the riparian area may be deprived of seasonal variations in volumes and sediments or it may experience unnatural fluctuations in seasonal or daily regime. In many parts of Australia, riparian areas also experience crippling acid-sulfate or salinity problems as a result of flows from land which has been drained or cleared. The problems are transferred to the stream.

To date, the legislative basis for managing this aspect of riparian areas has been addressed only insofar as general legislative provisions have affected riparian and floodplain water movements. Since COAG 1994, water flows to riparian areas will be treated as part of the process of defining environmental flows. Social and economic as well as ecological assessments are progressing as part of this process. Ensuring flows to sustain riparian areas and their communities is a litmus test for the formula set as the basis for environmental flows.

#### Land development

Certain developments of private and leasehold land require agency approval, either by local governments or lands agencies in terms of leasehold land.

Approvals may be treated as individual project applications assessed against criteria (e.g. primary uses or secondary uses of leasehold land). In these instances, there may or may not be a requirement for environmental protection.

In the case of planning schemes administered by local governments, protection and/or riparian area restoration may be built into the zoning or performance requirements for an area. Without preparation of the environmental strategies (e.g. catchment plans or waterways plans to inform them) planning schemes will not generally make provisions specifically tailored to the full range of riparian area needs. These needs must also be built into the triggers for and extent of planning assessment needed in relation to various land use activities.

**Table 14.** International examples: managing wild and scenic rivers.

Country	Acts/policies	Features/limitations
United States	<i>Federal Wild and Scenic Rivers Act 1968;</i> similar legislation in States	3 categories: wild, scenic, recreation <i>Narrow corridor emphasis, upstream-downstream uses dependent on no impact on protected reaches, management vague, permitted use levels not identified, only affects water resource use projects, uneven geographic representation of rivers</i>
Canada	National Policy: Canadian Heritage Rivers	1 category: national level significance on natural heritage, human heritage, recreation (Canadian Heritage River) Broad scope: catchment processes as well Cooperative designation process between levels of government; River management overseen by Canadian Heritage River Board, management plan <i>Reliance on cooperation, slow process, permitted uses vague</i>
New Zealand	<i>Resource Management Act 1991</i>	1 category: Conservation order <i>Water rights remain intact until reapplication after 10 years; recreation focus, 'instream' values only</i> <i>No central organisation, low numbers to date</i>

(adapted from Kunert & McGregor 1996)

However, these schemes are subject to exemptions in legislation, which often include most land activities impacting on rivers and their related riparian areas. For example, it is a matter for concern that local governments have shown reluctance in requiring development applications for agricultural or pastoral land development. Very few planning sentences deal with agricultural activities as development.

#### Hinchinbrook Shire Council

Recently, urged by the re-discovery of the endangered Mahogany Glider in the Shire, Hinchinbrook Shire Council has gazetted in its planning scheme that cane expansion requires a development consent.

#### Noosa Shire Council

The Council is in the process of gazetting a planning scheme amendment requiring impact assessment/

planning approval of activities including agriculture, proposed for high value areas.

#### Degraded areas

Many of the degrading actions affecting riparian land management are not easy to regulate: they are small, site-specific and cumulatively degrading in the main. Legislation to date has mostly dealt with the degradation once it has occurred, in the interests of protecting the resource base of the stream or the paddock. Legislation based on declared sites of concern—declared areas, critical areas, critical habitats—has had limited impact on overall riparian condition in Australia.

Most legislative mechanisms have been reliant on declaration of specific types of problems and / or specific geographic areas. They have proven insufficient in the face of riparian problems. They

**Table 15.** Regulatory controls for riparian areas.

State	Approval (A), permit (P), permits or licences with public notification (L)	Comment
Qld	(P) Minor instream works, native vegetation within banks, native vegetation on leasehold (40 m buffer) (L) water extraction, dams	Removal of native vegetation allowed outside banks on freehold No statutory authority for catchment management plans (except when incorporated into LG schemes)
NSW	(A) native vegetation removal within 20 m high bank, removal of exotic vegetation, abstraction of water or construction of instream structures, bed and banks interference, channel realignment	Various Acts, DLWC has approvals responsibilities No statutory authority for catchment management plans except when incorporated into LG schemes)
WA	(A) instream works, clearing on leasehold land in declared areas, modifying bed and banks by extraction.	Community based management authorities for the six declared management areas (Swan River, Peel Inlet, Leschenault Inlet, Avon River, Wilson Inlet, Albany waterways); statutory catchment management plans for these six. Weaker control in undeclared areas Numerous management agencies (6) Few restrictions on impoundments outside proclaimed water supply areas or declared catchments
Vic	Works around the 18 Heritage rivers must be in accordance with management plans Removal of exotic vegetation, stream works. No clearing within 30 m of waterway; no destruction of vegetation >.4 ha (A) for works or construction	Routine stream management by catchment management authorities (CMA): they have capacity to make by-laws (e.g. for activities on waterways, statutory catchment management plans) Onus of proof for ecological protection under <i>Flora and Fauna Guarantee Act 1988</i> (Vic)
SA	(P) native riparian vegetation both aquatic and terrestrial; exotic vegetation (A) for abstraction in prescribed watercourses; for sediment from works	Four main authorities involved in stream management; strong role for local government Series of catchment management plans defining stream works (prescribed watercourses) Duty of care on all landholders to prevent damage and maintain their watercourses in good condition; Codes or practice apply
Tas	(A) clearing of willows, fencing, revegetation	

have been hampered by the fact that use of the 'declared areas' for mechanism aimed at rehabilitation is an ad hoc, non-systematic approach to riparian management, as well as being reactive, and administratively impractical. It is an approach with limited impact on a degradation problem with contributing factors which are multiple and entrenched.

Legislation based on control of specific issues (e.g. tree clearing within 20 m of banks) has performed marginally better, particularly where community vigilance has had a strong role to play in alerting enforcement agencies.

The following observations can be made from Table 16:

- Much of the legislation for riparian areas relates to prohibiting and permitting activities, individually or by areas. There is no strategic approach or definition of objectives.
- The jurisdictions display varying controls over vegetation protection and clearing:
  - Victoria has a 30 m limit, NSW has a 20 m limit, Queensland has a 40 m limit for leasehold land;
  - some States/Territories restrict clearing of exotic vegetation or planting of native vegetation depending primarily on flood effects; and
  - few require positive action such as fencing or revegetation.

- Focus for concern varies. The area of concern is either between the banks or with the addition of buffer areas outside banks.
- Priorities exist in some States and Territories with controls more stringent in declared, proclaimed, prescribed or gazetted catchments. Elsewhere it is understood that fewer (or few) controls are in place. Priorities have been defined either in terms of water supply protection or in some cases in terms of the degraded condition of the rivers themselves.

Administrative and statutory processes also lack a consistent approach. Not all developments of private and leasehold land require development approvals and not all approvals processes assess impacts on riparian areas as part of their approvals or conditions-setting processes.

Trends in legislation

The main legislative challenges for riparian area management are associated with the following needs:

- greater integration of plans, policies, methodologies, hierarchies of plans (state, regional and local scales) to ensure appropriate management planning of catchments and their riparian areas;
- moving economic measures into the protection and repair activities of landholders by removing legislative obstacles to catchment bonds, levies per landowner for catchment management, levies per polluter or beneficiary, public financing of incentives, subsidies, industry adjustment, leases

**Table 16.** Legislative frameworks for riparian areas.

	<1990s	1990s	2000>
<b>Legislative basis</b>	Resource Acts: soils, water supply Hazards Acts: floodplain, drainage	Additional Acts: native vegetation clearing control threatened species protection for rivers, coasts, wetlands	Active definition of ecological needs of riparian area protection and management, driven by legislation explicitly for: native vegetation, environmental flows, catchment ecology requirements
<b>Legal mechanisms and their focus</b>	Hierarchy within the legislative repairing degraded areas through: declared areas, works required, penalties	Primarily for reducing damage, or management plans statutory plans, performance criteria approval and impact assessment procedures, compliance conditions, penalties, rehabilitation	Additional emphasis on framework Mandate for ecosystem values defined nationally, state, regionally Priority-based management plans (river, region or catchment specific targets) Conformance by resource plans, statutory plans, approvals conditions to demonstrate compliance Enforcement provisions for protection, repair, rehabilitation

which allow payment of landholders for protection of riparian values and best management practices and voluntary codes of practice;

- combining controls and incentives to promote protection and repair on private and leasehold lands;
- regional delivery of planning, permitting, and support programs utilising integrated structures for catchment management and local government; and
- ensuring compliance with plans through routine reviews, community participation in planning and performance evaluation, and independent evaluation.

Legislative frameworks for riparian area protection, management and restoration have migrated in a number of ways (Table 16).

This migration of legislation beyond 2000 is accompanied by parallel developments in:

- community participation and formal engagement mechanisms;
- ecological data and information system access;
- funding and fund-raising programs to match the level of investment required;
- market-based mechanisms: payment for resources used, ecological services accessed, degradation produced;
- building better partnerships between catchment managers, resource managers, landholders and the general community; and

- capacity-building for environmental management by landowners, industries and regions across Australia.

Below is the summary of the main trends shaping legislation for protecting and managing riparian areas (Table 17.). It highlights the two aspects of riparian area management: protection of high value, intact areas and stabilisation and rehabilitation of degraded/ degrading areas.

Where systematic planning and management of catchments is specifically required by legislation, as in South Australia and Victoria, a recent development has been the legislative requirement for plans, and for compliance with enforcement provisions.

Legislation aimed primarily at protection of riparian areas is mainly found in native vegetation legislation, with NSW, Victoria and South Australia having such legislation.

Under the *NSW Native Vegetation Conservation Act 1997*, the Minister can declare certain land to be State protected land. Where land is declared State protected land, it cannot be cleared except in accordance with development consent that is already in force (s. 22) (Cripps 1998, p. 10). Clearing of land covered by the Regional Vegetation Management Plan (RVMP) is by permit, and the RVMP has to be incorporated into local government planning schemes. Financial assistance subject to voluntary agreements for conservation is also made available through the Act. However, this Act has been considered a good example of how not to devise catchment management legislation, partly because it is subject to so many exemptions and exclusions.

**Table 17.** Trends shaping legislation for protecting and managing riparian areas.

**General riparian**

Soil and water focus, stream stability focus	focus on full spectrum of ecological functions and biophysical needs of riparian areas
Management aimed at repair	management aimed at protection, stabilisation, rehabilitation
Passive, indirect management	active (direct and indirect) management

**Protection & stabilisation**

Limited protection of high value areas	active management through catchment management plan, statutory planning scheme
Property rights	property plans attached to water licences, landowner's duty of care
Standard buffer (0 m, 10 m 30 m) based on 'acceptability' or land tenure	riparian area size (formula based on stream order)

**Repair/rehabilitation**

Controls through declaration of areas of concern	whole of catchment plans, targets, controls
Lack of funds	fund-raising capacity
Landholder focus	regional /catchment / local operations
Specific area or issue legislation	package of measures: legislation and market mechanisms plus public financing

In Victoria, under the *Catchment and Land Protection Act 1994*, the objectives are to establish a framework for the integrated and coordinated management of catchments. The aim is to maintain and enhance long-term land productivity while also conserving the environment, and to ensure that the quality of the State's land and water resources and their associated plant and animal life are maintained and enhanced.

This Act has several mechanisms. It places a general duty on landowners to avoid land degradation. It also declares areas 'catchment and land protection regions' and the boards for their management. Each region is to have a regional catchment strategy prepared the scope of which includes protection of catchments through land use planning and management. Planning schemes may be amended subject to these strategies.

The strategy may declare special areas within a catchment for which more detailed management plans are to be prepared (Special Areas Plans). These Plans may amend planning schemes and they are binding on landowners.

Management plans are an important part of the new era of legislation (Figure 17). Legislative developments in relation to management planning set down legal requirements such as:

- specification of plans to be prepared;
- specification of activities to be assessed in depth because they involve changes to riparian areas;
- permit requirements and conditions;
- compliance requirements (for the plans prepared, as well as for enforcement of permits);

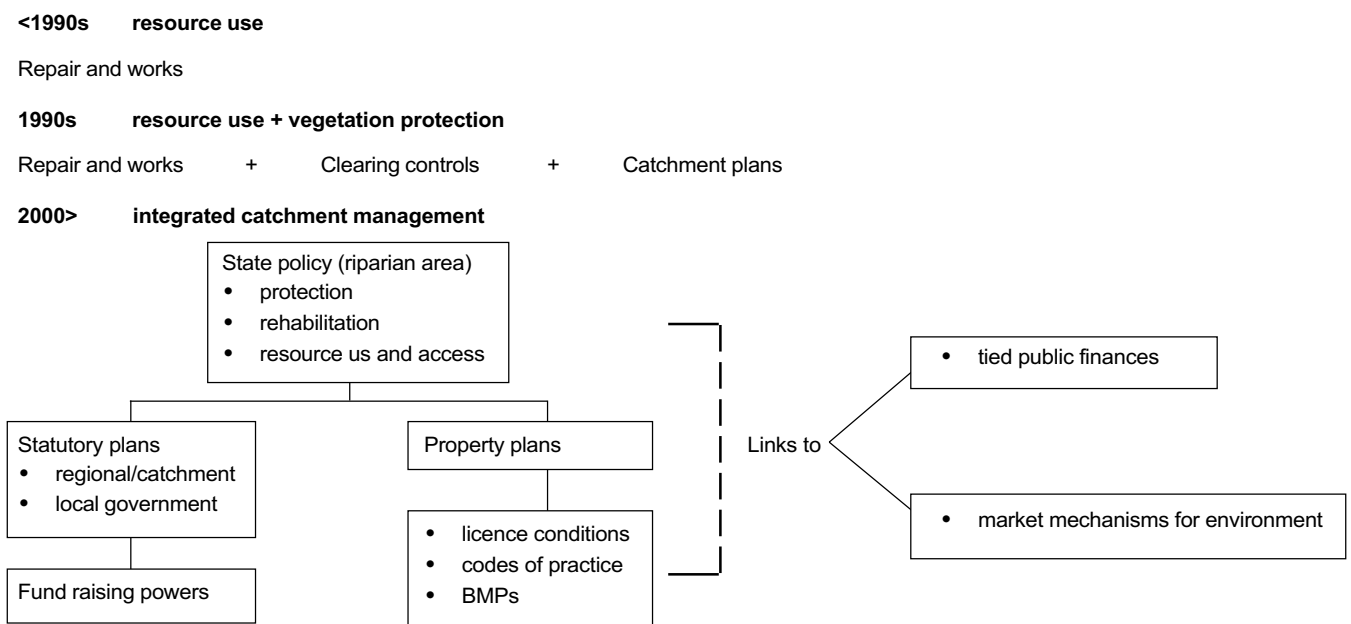
- roles and responsibilities, delegations; and
- fund-raising powers, financial assistance, voluntary components.

### Critical success factors for riparian area legislation

The essential components for incorporation of active management of riparian land into statutory powers can be defined as including:

- A State/Territory framework for protection and rehabilitation of riparian land and its water flows; State- and Territory-based reporting on stressed riparian land/streams, and on progress.
- Plans of management for riparian land of high significance (e.g. through integrated catchment management plans addressing riparian lands, water resource management plans setting environmental flows needed to supply riparian land and plans for protection of wild and scenic rivers or for stabilisation of targeted riparian areas).
- Requirements for plans of management for highly stressed riparian areas primarily as part of overall stream condition planning or water quality planning.
- Requirements for compliance with these plans of management (through the setting of targets, timeframes, specification of organisational structures, requirements for progress reporting, and arrangements for funding of implementation projects).

**Figure 16.** Riparian area: development of legislation.



- Statement of a landowner's duty of care to avoid land degradation.
- Arrangements for fundraising for example through levies or subsidies from other catchment resource users.
- Development controls and operational controls (permits, licences, conditions) over activities and practices with potential to degrade riparian land or functions it relies upon; stewardship and best practice requirements of primary producers.
- Enforcement provisions (interim orders, fines, penalties, replacement conditions; and third party appeal and injunction rights) where intervention is necessary to prevent potentially degrading actions.
- Administrative arrangements which provide a framework for addressing the interconnectedness of land and water ecosystems without the arbitrary splits between traditional and present natural resource management agencies; to provide workable structures for allocation of responsibilities, with appropriate delegations and outcomes-based performance measures.

- Greater means of incorporating integrated catchment management plan requirements into other plans particularly statutory planning schemes, water allocation plans.

The challenge then is about ensuring riparian land is legislatively recognised as an area for 'active management' by agencies and by individual landowners and agency managers. Active management needs to be aimed at producing results on multiple objectives and, more specifically, on those objectives addressing protection of non-resource based values, namely ecosystem or cultural values.

Active management also means shifting the focus for regulation. Though there is a continued need for powers to repair and rehabilitate degrading or degraded riparian areas, there is much to be gained from directing regulation at proactive protection of intact areas or areas which will respond readily to forward planning and restrictions in degrading activities.

**Table 18.** Critical legislative package for riparian area protection and rehabilitation.

Riparian areas framework	Components
<b>Heads of power</b>	<p>State Policy (SEPP, EPP, SPP) on either healthy rivers/catchments in general, including riparian areas, or riparian areas specifically.</p> <p>Policy to clarify commitment to protection and/or rehabilitation of streams working methodology for the approach to riparian areas (e.g. no net loss, corridor and buffer widths by stream order)</p> <p>Rank ordering list of riparian areas or streams for active management</p> <p>Main instruments for policy implementation (planning schemes, leasehold land conditions, impact assessment, licences, industry codes of practice etc)</p> <p>Monitoring and reporting arrangements</p>
<b>Protection: on all tenures</b>	<p>A State framework for:</p> <ul style="list-style-type: none"> <li>• full protection of high conservation values rivers (wild and scenic rivers, heritage rivers)</li> <li>• statutory catchment or riverine management plans including the approach for defining outcomes and criteria for riparian protection</li> <li>• best management practices (mandatory) for activities of concern</li> <li>• landholders' duty of care to avoid land degradation, observance of industry codes, water licences based on approved property plans</li> <li>• full range of enforcement provisions</li> <li>• stakeholder participation, third party provisions, public register of licences and approval conditions</li> </ul>
<b>Rehabilitation</b>	<p>State framework for:</p> <ul style="list-style-type: none"> <li>• fundraising for example catchment levies</li> <li>• rebates for rehabilitation (rates, water entitlements)</li> </ul>
<b>Integration, coordination, review</b>	<p>State framework for:</p> <ul style="list-style-type: none"> <li>• stakeholder involvement/representation in plan preparation</li> <li>• integration of statutory plans at regional level</li> <li>• separation of auditing/reporting functions from river management functions</li> <li>• regular performance reporting, community review, and independent review</li> </ul>



# 7. INSTITUTIONAL ARRANGEMENTS FOR CATCHMENT MANAGEMENT

## Introduction

This theme considers criteria for a best practice legal framework to achieve the necessary institutional arrangements for effective delivery of catchment protection and management.

The catchment management focus is deliberate. The protection and restoration of rivers is essentially a catchment product. Catchments are the biophysical units in which natural resource use and ecological protection take place. They represent the level at which the new paradigm for sustainable development is to be operationalised for resources, a paradigm which recognises the interdependencies of natural systems, political systems, social systems and technology.

Institutional arrangements for performance of catchment planning and management vary in fundamental ways across Australian jurisdictions.

Models for institutional arrangements are explored through an examination of existing legislative arrangements and inherent challenges, a summary of legislative trends for catchment management and an outline of criteria for best practice legislation for the future.

## Desired outcomes: institutional arrangements for catchment management

Mitchell (1989) defines institutional arrangements as:

- legislation and regulations;
- policies and guidelines;
- administrative structures;
- economic and financial arrangements;
- political structures and processes;
- historical and traditional customs and values; and
- key participants or actors.

The legal framework is one specified component of these institutional arrangements, and may impact on others, especially administrative structures.

Exploration of criteria for the administrative component of the legislative framework involves examining:

- how to ensure protection and restoration objectives take precedence over local and sectoral objectives;

- how to move from individual plans and policies to taking coordinated and integrated river management and restoration actions;
- how to overcome the vertically structured nature of government instrumentalities (sometimes described as 'silos' or 'rods of iron') to ensure that mechanisms for horizontal communication and coordination can be established and maintained, within and across agencies and governments;
- how to achieve the integration of environmental, economic, social and cultural considerations in all decision making;
- how to secure ongoing community involvement in the process and ownership of the outcomes; and
- how to achieve commitment, compliance and accountability.

Young (1997), draws on foresighting work by the Centre for International Economics (1997), to outline best practice catchment management in Australia for the year 2020. A number of requirements are addressed in the previous three themes. For those issues falling within the administrative category, Young covered:

- institutional arrangements which see the 'hard' standard-setting decisions made and national or State levels, so as to leave the river level to focus on community motivation;
- the need for landholders to accept their duty-of-care to manage resources sustainably;
- regulatory arrangements which increase the number of people in a catchment who are intrinsically motivated to manage water resources sustainably;
- institutional reforms which empower catchment committees;
- problem-solving which is integrated, rather than controlled by different levels and sections of governments each pursuing their own agenda;
- catchment plans to become substantive legal documents; and
- institutional arrangements to encourage integration, and even amalgamation, of local government and catchment management processes.

Doolan and Roberts (1997) defined the primary goal of Victorian river management as being 'to ensure the sustainable development of natural resource-based industries, the protection of land and water resources

and the conservation of natural and cultural heritage'. They state that the primary outcomes of catchment management are:

- community involvement in and commitment to natural resource management;
- sustainable development of natural resource-based industries;
- maintenance and improvement in water quality and river condition;
- prevention and reversal of land degradation;
- conservation and protection of the diversity and extent of natural ecosystems;
- minimisation of damage to public and private assets from flooding and erosion; and
- conservation and protection of the cultural heritage.

The Victorian approach is based on the view that catchments must empower local initiatives and ensure collection and direction of government resources at the regional level. Management of catchments is envisaged as a business; an enterprise or management system through which government and community investment is directed.

**Figure 18.** Possible performance measures: institutional arrangements for catchment management

#### **Processes**

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- program evaluation
- teams involved in plans and services
- levels of achievement

#### **Ownership**

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- participation levels, response rates
- representation of agencies, sectors, areas
- awareness levels, uptake of new practices

#### **Funding**

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- % locally derived
- % from service agencies
- \$ differences between works, incentives and budgets

#### **Catchment management**

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- area of State with catchment management arrangements
- % of committees with completed plans
- % of plans reviewed every five years

## **Existing legislation for institutional arrangements**

### The national level

Key reforms under COAG (1994) agenda have set the scene for a number of initiatives within State/Territory jurisdictions relating to institutional arrangements for catchment management. These potential changes include:

- removal of organisational impediments to catchment management through promotion of integrated resource management as opposed to resource development;
- clearer identification of the full range of values of natural resources and of the need to rationalise competing demands; and
- incorporation of market signals in pricing and allocation regimes.

Through its five program areas, the Natural Heritage Trust has generated greater attention to catchment planning in an attempt to direct spending to local programs. No evaluation of its funding impacts is available as yet, although it is widely recognised that funding availability did not match the necessary levels of access to information nor the availability of integrated resource management plans.

The Murray–Darling Basin Commission, ARMCANZ and ANZECC are three Ministerial Councils bringing an interstate and national focus to water issues. The agendas of these Councils have undergone progressive development from water management to integrated catchment management.

The lack of a national legislative framework for integrated management of natural resources, catchments and their rivers is characteristic of our Commonwealth system.

### Cross-border rivers

In addition to the Murray–Darling Basin and its management through a Commonwealth–State Ministerial Council, other examples of cross-border catchment management needs include:

- Lake Eyre Basin (NT and SA);
- Coopers Creek (QLD and SA);
- Ord River (NT and WA); and
- groundwater (cross-border areas are not addressed by the Great Artesian Basin Consultative Council).

Under present arrangements, any coordination of management is the responsibility of the respective States and Territories, who may or may not decide to initiate such coordination.

## State arrangements

Specific catchment management legislation exists in Victoria, NSW and South Australia (Table 19). Other States and Territories have policy commitments to integrated catchment management and have made organisational changes to implement catchment management. Several have proposed the introduction of specific catchment management legislation in recent years.

**Table 19.** State catchment management legislation.

State	Catchment-specific legislation
Vic	Catchment and Land Protection Act 1994
NSW	<i>Catchment Management Act 1989</i>
SA	<i>Water Resources Act 1997</i> (subsumed the <i>Catchment Management Act 1995</i> )

In these three States, legislation has devolved powers for planning and management directly to the catchment/regional level.

### Structures for catchment management

Cullen (1997) argues that it is the lack of integration—between governments, between agencies, between disciplines and between knowledge providers and knowledge users—which forms the basis of water/catchment management problems. Those State governments with institutional arrangements for catchment management have recognised this and established structures and processes to facilitate and require integration (Table 20).

Structurally, the challenge is to ensure representation of all key interests, with clear definition of roles and responsibilities matched with the capabilities and resources available. The practical realities of achieving such an outcome have been comprehensively addressed in Mitchell (1987). One of the key points separates:

- the *conceptual* level, where it is appropriate and desirable to think comprehensively and to scan the broadest possible range of variables which may be significant for coordinated management of land and water resources; and
- the *operational* level, where the quest for comprehensiveness can be counterproductive by virtue of implementation processes that are time consuming, lacking in focus and of little real benefit to practitioners.

Mitchell also emphasises the need to think of management arrangements in terms of more than organisational characteristics. In developing appropriate management, it is necessary to consider a

**Table 20.** Summary of catchment management structures by State.

State	Structures
Vic	<p>Catchment Management Authority (CMA) established for each of the 9 non-metropolitan catchment and land protection regions.</p> <p>Key responsibilities include:</p> <ul style="list-style-type: none"> <li>• development, ongoing review and coordination Regional Catchment Strategies implementation</li> <li>• provision of advice to government on Commonwealth and State resourcing priorities at a regional level</li> <li>• provision of all water and floodplain-related service delivery</li> <li>• negotiation with Department of Natural Resources and Energy of an annual works program for regional service delivery</li> </ul> <p>CMAs integrate the roles of community based advisory groups (all stakeholders) and community based service delivery groups (agencies).</p>
NSW	<p>State Catchment Management Coordinating Committee: State and local government, multiple agencies, peak bodies.</p> <p>NSW has 35 Catchment Management Committees (CMC).</p> <ul style="list-style-type: none"> <li>• CMCs promote, coordinate, develop strategy, manage conflict and perform other functions relating to total catchment management. NSW has four Catchment Management Trusts.</li> <li>• They have a broader set of functions relating to works, contracts, revenue generation, and assistance to mitigate the effects of emergencies such as flood or fire.</li> </ul>
Qld/WA/Tas	<p>Policy for integrated catchment management policy at State level.</p> <p>Catchment committees process is characterised by voluntary participation for both community and government. A network of landcare and government extension officers provide process support to catchment committees.</p>
SA	<p>High level forum (Environment &amp; Natural Resources Council) with emphasis on integrated resource management. Catchment management is based around water resources and land/soils. There is no direct statutory power and only weak links to regional programs</p> <ul style="list-style-type: none"> <li>• Separation of water pollution control staff from water resource quality management</li> <li>• Separation of water supply authority and water resource management agency</li> <li>• No formal process for integration of management Catchment management through Catchment Water Management Boards</li> </ul>

complex mix of 'contextual' issues dealing with political, legal, administrative, financial and historical dimensions that provide opportunities for and constraints to change as mentioned. Many of these aspects are outside the scope of this report.

There is no one formula for getting this mix right. Human factors play a strong role in the effectiveness of management structures. There are however various combinations of structural elements which are seen to produce the results sought from catchment management. These are discussed in the models below.

#### Funding

The ability for catchment managers to generate the necessary funding for operations and services is vital. One aspect of funding is independence; the other is ensuring the funding is adequate for the priorities decided at the catchment level using criteria from local, regional and State policies (Table 21).

In Victoria, Commonwealth and Victorian governments invest \$140 m annually (since 1998) to improve the health of rivers and catchments. Also, the State Government provides \$8 m to CMAs. Local contributions have been made in eastern Victoria and in Melbourne for many years. CMAs now raise consistent rates through tariffs to fund priority flood, river management and drainage projects. The two-part tariff has a uniform regional charge for most

**Table 21.** Funding arrangements by State.

State	Funding arrangements
<b>Vic</b>	Combination of agency and catchment funds. Locally derived funding for the work of the authorities, drawn through a levy from catchment residents (see below).
<b>NSW</b>	Funding sources include NSW Government funded programs, the NHT, and community investment
<b>Qld/WA/Tas</b>	Government funds and operating grants. A number of catchment-related projects have attracted Commonwealth funding (NHT)
<b>SA</b>	Agency and locally derived funding for the work of the catchment management boards, drawn from catchment residents, through a levy collected by the Councils of the catchment. Reliance on local funding means little catchment activity where population is small.

properties and a property value-based charge for higher value properties.

Ongoing access to a level of public and agency financing has to be assured if high risk or high stressed catchments have not the populations to generate the revenue base required.

Some would argue that since the advent of large funding programs such as the National Landcare

**Table 22.** Status of catchment plans/strategies by State.

State	Status of catchment plans/strategies
<b>Vic</b>	Regional Catchment Strategies (RCSs) are given statutory force under the Catchment and Land Protection Act 1994: <ul style="list-style-type: none"> <li>• Act specifies the contents of the strategy</li> <li>• Act specifies the status of the strategy (e.g. CMAs can recommend amendments to a planning scheme to give effect to the strategy); the strategy may also be incorporated in a SEPP</li> </ul> Role: To provide an over-arching strategy for the development, management and conservation of land and water resources in each region.
<b>NSW</b>	No statutory plan status, and thus no regulation or enforcement. Reliance on a high profile for Total Catchment Management plans in terms of agency programs and services
<b>Qld/WA/Tas</b>	No formal status, advisory to planning schemes, statutory coastal plans. Statutory basis for aspects of river management through regulations attached to Environment Protection Policies or through State Planning Policies.
<b>SA</b>	In those catchments with a Catchment Water Management Board, the Boards are required to develop a Catchment Water Management Plan (CWMP) under the Water Resources Act 1997 <p>The Act requires that in preparing the plan, the Board must undertake an exhaustive process of consultation with the residents of the catchment and with responsible agencies.</p> <p>The plan must, as far as is practicable, be consistent with plans under the <i>Coastal Protection Act (1972)</i>, the <i>Development Act (1993)</i>, the <i>Environment Protection Act (1993)</i>, the <i>National Parks and Wildlife Act (1972)</i>, and the <i>Soil Conservation and Land Care Act (1989)</i>, and with guidelines relating to the management of native vegetation adopted by the Native Vegetation Council under the <i>Native Vegetation Act (1991)</i>.</p> <p>Local Government planning schemes are required to be consistent with the CWMP.</p>

Program and the NHT, regions are experiencing an over-emphasis on work relating to these funds (e.g. applications, evaluations).

#### Catchment plan status

Should catchment management plans have legal status? Plans developed under the recent legislation in Victoria and South Australia have legal status. They provide the policy directions and form the basis of works programs and budgets. They are the drivers for the various Memoranda of Understanding (MOU) between government agencies, and for partnership agreements between sectors (Table 22).

From the analysis of existing legislative arrangements it is evident that Victoria, NSW and South Australia have moved decisively towards a catchment management model, with key institutional and operating arrangements stipulated in legislation. Other States and Territories, most with critical problems of protection and degradation, have informal arrangements for catchment management, generally delivered through informal working arrangements between water, land and environment protection agencies (Table 23).

Young (1997) argues that catchment management plans in the future must constitute target-based, legally binding documents for water rights and other resource access arrangements.

### Challenges for legislation

Brandow (1992) provided some interesting insights into watershed management in the USA when he wrote:

*Most watersheds have some management. Some have a lot. It's clear that the watershed management that is taking place in most watersheds is fragmented, and in some cases management measures are working at cross-purposes. In some watersheds, while one agency is trying to reduce cumulative watershed effects by altering logging patterns to reduce peak flows,*

*another agency is trying to augment water supply via increased runoff with the effects of increasing peak flows. Embarrassment is spared by two facts. First, nobody is scrutinising objectives on an inter-agency/watershed-wide basis. Second, neither practice has produced results large enough to measure outside of experimental watersheds.*

*We have constructed artifices that keep us from efficiently managing water and watersheds. In California, we draw a legal line between surface water and ground water, a distinction that nature, in the main, does not recognise. California long ago had the foresight to place regulatory control of water quantity (except for ground water) and water quality under one board. Yet we still do a lot of things in watershed management that indicate we don't fully appreciate how interrelated water quality and water quantity are in nature. Even worse, we've almost totally ignored the fact that altering flow regimes triggers changes (in) stream and riparian habitats.*

*Finally, getting government agencies to integrate their watershed management activities is a very difficult problem. There are just too many agencies. I advocate combining and/or eliminating agencies as a means of integrating watershed management. There is a crying need to integrate the activities of government agencies, both within agencies and between agencies.*

*Indeed, our most difficult challenge may be reforming the reforms of the past century, so that watershed management is as integrated as watershed function*

(Brandow 1992, p.28)

The global nature of this challenge is reflected in the operation of the International Network of Basin Organisations (INBO), a Paris-based organisation exchanging information and addressing issues associated with institutional arrangements for river management. The priorities of INBO include:

**Table 23.** Trends in catchment management plans.

Limited data	Growth of knowledge, accessibility
Limited involvement of local government	Emphasis on local government powers
Single government agency plans	Integrated planning
Limited public participation	Formal participation in management, partnerships building
Centralised service delivery	Catchment-level service delivery
Agency staffing levels	Downsizing
Community motivation	Community cynicism (participation = cost sharing)

- laws and regulations for water resource management in each country;
- agreements, conventions and international reports on integrated river basin management; and
- statutes and missions of basin organisations.

Through the resources of the network, it is possible to follow the different approaches that are being taken to address institutional issues of river basin management throughout the world. Some recent initiatives include:

- establishment of a High Commission for Water and the establishment of River Basin Authorities for key rivers of the Ivory Coast in Africa;
- reform of the Brazilian Water Law to establish hydrographic basins as planning units, the preparation of masterplans and the creation of water agencies and basin committees;
- establishment of the Rio Tuy Basin Agency in Venezuela;
- establishment of hydrographic basin agencies in Algeria to assist existing administrations and organisations to carry out their missions of water allocation, pollution control, resource utilisation and enhanced public awareness;
- preparation of a hydrological plan and the establishment of a Basin Water Committee for the Erbo River basin in Spain;
- adoption of river contracts by the French government and the Rhone–Mediterranean–Corsica Basin Committee as a way of gathering together all water actors to define a consistent action program; and
- establishment of four river basin authorities in Slovakia with wide responsibilities for water works, pollution control, surface water supply, water transport, irrigation and hydroelectric power generation.

The issue of the appropriate institutional arrangements for successful catchment management is presently a subject for considerable debate in Australia. The report on enhancing the effectiveness of catchment management planning in Australia (AACM International 1995) identified key issues potentially relating to the legislative framework as:

- conflict between service provision and resource regulatory roles of government agencies;
- poor communication between and within institutions and weak integration of skills;
- reliance on a small number of community members with strong and capable leadership skills;
- territorial disputes and poor cooperation between agencies; and
- widely differing perceptions on the need for regulatory instruments to achieve integrated river and catchment management.

Ingram et al. (1984) found institutional arrangements to be a major stumbling block to the successful operation of water resource management programs. The main barriers to understanding were that many institutions deal with resource allocation, and that sectors in society perceive that scarce resources should be divided differently. Resource allocation is the basis of economies and therefore, these institutions are very political and sensitive subjects. Another barrier is the perception by institutions that they cannot, or do not have the right, to change other institutions. More often than not, institutions are not changed unless by an Act of parliament. Each institution protects and reinforces its own sovereignty by avoiding conflict with other institutions of equal power (Ingram 1984).

Shrubsole (1996) found from the Ontario system that key success factors were:

- the watershed as a management unit;
- local initiative;
- municipal–provincial (local–State in Australian terms) partnerships;
- a healthy environment for a healthy economy;
- a comprehensive approach; and
- cooperation and coordination.

The review of the Hawkesbury–Nepean (Healthy Rivers Commission 1997) focused on generic impediments to effective management and progress towards healthier rivers. Management of the Hawkesbury–Nepean uses a Catchment Management Trust, an Environmental Planning Strategy, a statutory Regional Environmental Plan and Action Plan, a number of locally-based subcatchment management committees and a community awareness program. Report findings on institutional issues include:

- no provision for institutional arrangements for an unambiguous role of ‘river custodian/manager’, with a perception that because everyone is (apparently) responsible, no-one can be held responsible;
- widespread fragmentation and duplication of responsibilities with no adequately directive framework within which one agency or council feels confident or is encouraged by others to take the lead in driving through the necessary decisions; and
- a need to establish a ‘river manager’ with ultimate accountability for the health of the river, and with the powers and resources consistent with that accountability. The river manager, a government entity, would be the river’s ‘custodian. The river manager must have sufficient independent status, decision-making powers, and access to resources so that it can be regarded as equal with agencies with major sectoral responsibilities.

The Fraser Basin Management Board and Program (Dorcey 1997) is a program underpinned by an Agreement signed by Ministers of Federal and provincial governments and representatives of local governments. Findings include:

- a need for the Board to be given an independent institutional base;
- that the Board should not be given regulatory powers but should be seen to be more accountable; and
- the budget of the Board should be doubled (particularly if the Board is to fulfil its auditing role).

In summary from all these reviews, it is evident that the key challenges for legislation are those of:

- setting the ground rules for protection, management and resource development;
- ensuring integration of the plans for economic production and ecological protection;
- empowering and enabling managers deliver services or to call on service providers;
- ascribing status to the partnerships and cooperative arrangements to undertake this work;
- ensuring accountability for investments, decisions and outcomes; and
- allowing for change over time.

In turn, in delivery on these challenges legislation must avoid:

- unreasonable rigidity of requirements or over-emphasis on standardisation of requirements;
- delegation to catchment or regional levels without adequate policy direction or resourcing;
- irresponsible transfer or distribution of the pains or gains from catchment management;
- barriers to leadership and innovation; and
- onerous levels of consultation or stakeholder involvement.

It is a process of building the right framework in which the actors in catchments can set up their preferred approach; a process for which there is no single, right approach (i.e. no solution can simply be imported from another jurisdiction).

## Five approaches to institutional arrangements

Mary Maher & Associates et al. (1998) investigated multiple-objective, multiple-agency models for integrated resource management from Australia and overseas, including river/catchment management and also coastal, protected area, open space and recreation, and fisheries management. Case study selection criteria included:

- an authoritative source of information (generally either published reports or Internet sites);
- a range of different approaches to management arrangements, particularly along continuums ranging from decentralised to highly centralised, and from non-regulatory to highly regulatory; and
- seeking outcomes related to sustainability, the protection of water quality and the integration of environmental, economic, social and cultural considerations.

Twenty-seven studies were reviewed and showed five broad classes of management model, the key attributes of which were then analysed (Mary Maher & Associates et al. 1998, Table 5.2). While not all related to the legislative framework, the key attributes were:

- ability to provide strong leadership;
- ability to integrate environmental, economic, social and cultural considerations;
- ability to link catchment, waterway, estuarine and marine systems and functions;
- potential to learn and adapt;
- potential for generating strong commitment from elected representatives;
- likelihood of achieving high levels of community ownership and involvement;
- extent to which responsibilities for achievement of outcomes are clearly identified;
- extent that cross-agency and cross-disciplinary linkages are encouraged and supported;
- extent that management plan actions are enforceable;
- potential for negotiated resolution of conflicts where river outcomes prevail;
- ability to attract funding over and above line agency budgets;
- ability to channel funding to areas of highest need;
- ability to audit river outcomes against and across all agencies/programs; and
- ability to integrate scientific information into decision making.

Mary Maher & Associates et al. (1998) found that the legislative framework should:

- enable the number and diversity of stakeholders to be involved;
- enable equal accommodation of both rural and urban perspectives and issues; and
- ensure downstream recipients have an equitable say in upstream actions impacting on them.

Their analysis showed five model classes, summarised in Table 24.

**Table 24.** Five approaches to institutional arrangements.

Classes	Description of models
1.	Implementation via a stand-alone policy/management plan
2.	Implementation via a policy/management plan plus some form of implementation agreement/memorandum of understanding (MOU)
3.	Implementation via a policy plan plus some form of implementation agreement/MOU and an independent coordinating entity
4.	Implementation via a policy plan plus some form of agreement/MOU and a new statutory agency to coordinate <i>and</i> take over some of the key management functions (possibly by delegation)
5.	Implementation via a policy plan plus a new statutory river basin authority to take over a broad range of river management functions

(adapted from Mary Maher & Associates et al. 1998)

Analysis by model classes showed that classes 3–5 are much more likely to achieve high degrees of ownership, accountability and integration, and sustainable river outcomes. The offset for these desirable attributes is higher extents of organisational and behavioural change, new bureaucratic structures (although not necessarily large) and a higher degree of centralised management. When all costs are taken into account, they found no necessary major cost differences between the classes.

Analysis of case studies shows communities moving sequentially through models. The community which at first is reluctant to embrace considerable change finally accepts that less effective or voluntary cooperation models are not keeping pace with the inevitable increasing pressures of growth and human activities on rivers and their restoration. More command-oriented models are taken on as the health of the river is seen as not safeguarded by the less

effective cooperative models. The sequence commonly followed can be summarised as:

1. voluntary interagency and intersectoral cooperation, with nominated lead agency and little monitoring (e.g. Victoria pre-1989, Queensland at present);
2. as 1, but with legislation requiring cooperation and setting out structure (e.g. Victoria post-1994);
3. as 2, but with greater integration in statute of functional areas including Landcare;
4. a single planning and service delivery agency for state functions affecting catchments, for coordinating with other levels of government, particularly local governments and their land use planning activities, for enforcement and auditing (e.g. Victoria post July 1997);
5. establishment of a statutory river custodian, preferably apart from line agencies (e.g. Swan River Trust, New Zealand's Parliamentary Commissioner for the Environment, as recommended in 1984 and 1997 for the Hawkesbury–Nepean); and
6. all planning, all levels of government services, enforcement and auditing are delivered by one statutorily constituted agency. A refinement of this model is for a separate independent audit of river management and restoration achievements.

Mary Maher & Associates et al. (1998) further found the model classes generally progressed from being high on initial agency acceptability and low on delivering river goals (Model 1), to the converse in Model 5 where agency acceptability may be low (at least initially) but the arrangements are effective. There is no evidence of a model that can simply be 'transplanted'; successful models are products of their context, and are tailored to meet local circumstances.

Having said that, Mary Maher & Associates et al. (1998) found some common experiences relating to legislative framework amongst models that appear to be working in the complex area of river management and restoration. These include:

- abandonment of models that rely on high levels of discretion (especially high levels of 'negative' discretion not to do things, or not to achieve the object(s) of the legislation), and on low levels of accountability;
- a growing realisation that reasonably high levels of regulatory control and/or incentives are required if desired outcomes are to be achieved across a broad range of agencies and sectors; and
- the trend towards small and purposeful statutory entities that provide a sense of leadership, ensure higher levels of accountability, take on important coordinating and auditing functions and possibly assume management responsibilities that cannot be delivered by other agencies.



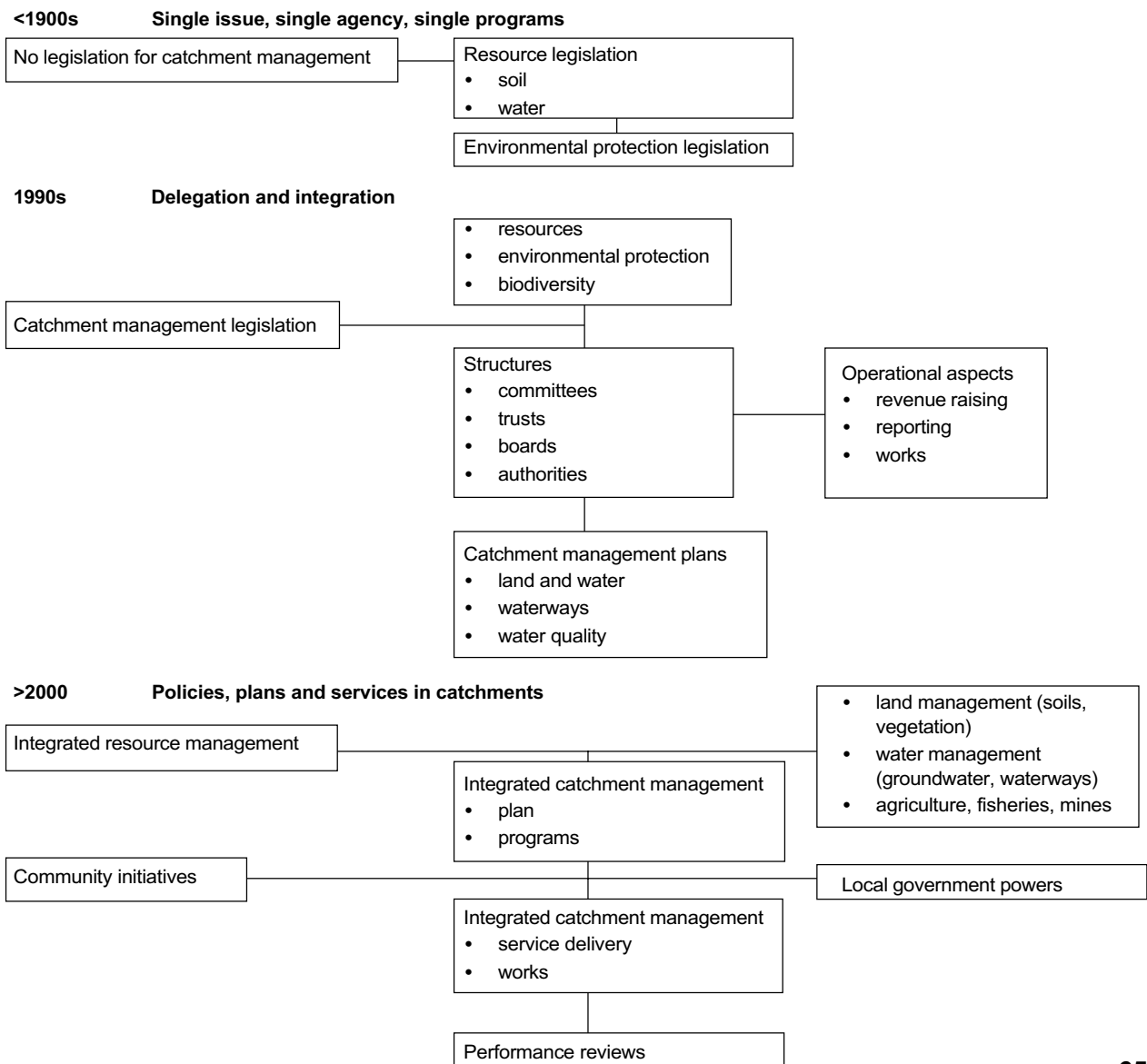
Performance measurement of the effectiveness of institutional arrangements requires a process of systematic and strategic evaluation. Such a process is rarely undertaken in the river management and restoration context (even from an overall perspective) for a variety of reasons. Evaluation is compounded in this project because many of the systems and cases studied are recent; they have not had the opportunity to produce measurable outcomes, or have not been measured.

### Critical success factors for integrated catchment management (ICM) institutional arrangements legislation

Many of the critical success factors for legislation outlined for the three other topic areas have strong links to effective integrated catchment management (Figure 19). Critical success factors specifically relating to institutional arrangements for effective ICM are identified as follows.

- Legislation which leads the way on integrated natural resources and catchment management by providing a sound basis for incorporating ecological and social dimensions into plans and decisions for economic productivity. This is likely to include management of the full range of activities on catchment lands, without the present exceptions.

**Figure 19.** Institutional arrangements for catchment management.



- Legislation which clearly rationalises omissions, duplication and inconsistencies in related legislation.
- Legislation with powers to unify (or at least ensure the coordination often missing to date) all key functions affecting river management and restoration, generally presently lying with diverse agencies.
- Legislation requiring consultation with stakeholders for planning and services on the ground, and intervention where direct action is needed. This includes third party rights of appeal and of injunctive action, and that these are actually proclaimed [not merely assented to and left unproclaimed and inactive, as at present in the Environmental Protection Act 1994 (Qld)].
- Legislation which clarifies the hierarchy of plans involved in catchment management and provides the statutory basis for catchment and waterway protection
- Legislation which regularly requires reports and audits about achievement of catchment protection goals and sector commitments.
- Legislation which plays a leading role and integrates with innovations in public financing, market-based mechanisms for environmental protection and equity, and industry strategies and practices.
- Legislation which reflects a strengthened whole-of-government approach to river management and restoration, and a strong Commonwealth lead.

# 8. THE CRITERIA FOR THE BEST PRACTICE LEGISLATIVE FRAMEWORK

## Summary of findings

From the four topics—environmental flows, water quality, riparian areas and institutional arrangements for catchment management—the following conclusions can be drawn.

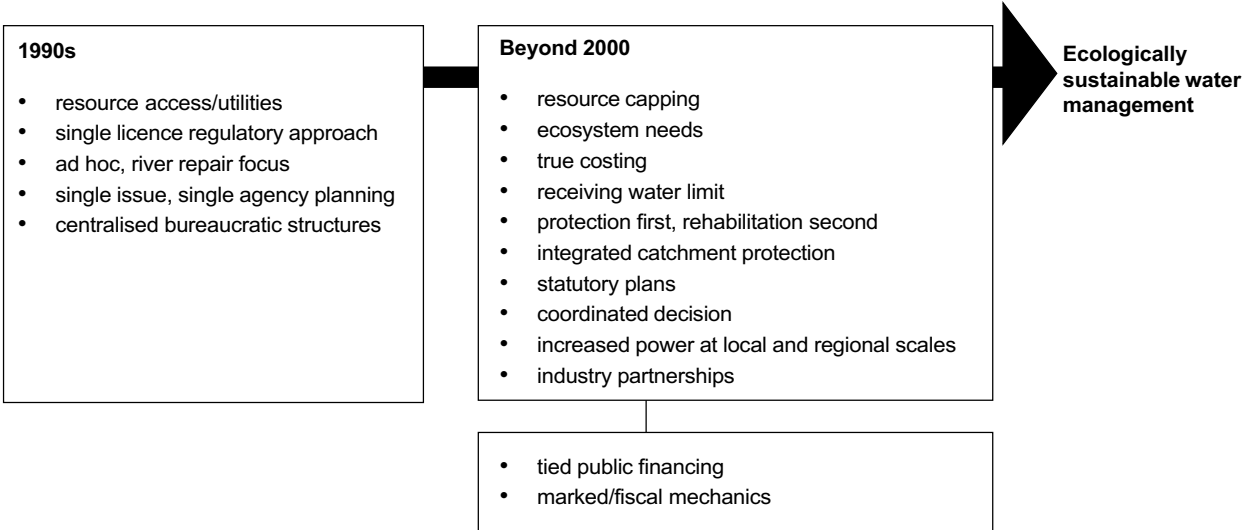
- River management is now a topic of considerable debate between government and communities. No national, binding standards have been set for river protection or management. Surrogate standards are proposed through Ministerial or council agreements, or Commonwealth 'bribery'. Stronger Commonwealth lead, in partnership with States and Territories. Limited application of Commonwealth powers to protect rivers. Confusing terminology across jurisdictions for most aspects of river/resource management.
- Water resource issues are the main focus of attention. Some degree of recognition of environmental flow needs. Narrow focus on river water, not the total water cycle. Strong sectoral interest opposition to security of environmental flows in water allocation.
- Commitment has been given by all States to Integrated Natural Resource Management/ICM. In most States, problems arise because major resource agencies are distant from the integrated planning process. Outside the cooperative arrangements for planning and service delivery.

- Evolution towards catchment-based planning. However these plans remain non-statutory or advisory only in most jurisdictions. Catchment legislation added to the plethora of other legislation relating to resource management or ecosystem protection.
- Trend towards devolution of functions and responsibilities to catchment/local level. Limited integration of statutory powers at this level. Planning emphasis mainly.
- Strengthened representation of stakeholders. Absence of national/State policy framework to ensure a level playing field. Ecosystem protection with resource management.
- Increased knowledge about ecosystem processes and resource use impacts. Resource security has to be matched with emerging requirements to provide for ecosystem needs/adjusted over time.

The drivers of recent changes in river management were found to differ between river components, indicating uncertainty of outcomes for rivers:

- catchment management driven by NHT project monies, catchment strategies;
- water quality driven by breakthroughs in the scientific basis for water quality management;
- water quantity reforms leading the way for major economic interests, driven by resource users needs and ensuing debates; and

Figure 20. Legislation's role in ecologically sustainable water management.



- riparian management driven by recognition of the degraded state of Australian rivers, and of the riparian area's contribution to water quality problems.

The main directions of the future are:

- ecologically sustainable water management (ESWM, similar to ESForestM), where equity and ecological interests are represented alongside economic and sectoral interests in water management decisions;
- development of new administrative arrangements at regional/catchment level;
- nationally-agreed binding framework for rivers (i.e. where to after COAG?); and
- development of companion mechanisms in the package (tax reform, industry adjustment, environmental accounting) in a compatible and comprehensive way; potentially decreasing role for legislation if these mechanisms perform for river management and restoration.

Figure 20 summarises these big directions. On a cautionary note, there are also counterforces which must be factored into future considerations.

Significant remaining river management and restoration challenges include:

- will water reform move from caps on development to providing primacy and adequacy for ecological thresholds?
- will water quality and water quantity planning result in rivers achieving centre stage in catchment management?
- will production-based agencies work in with sustainability planning, service delivery?
- will functional issue agencies endure, thus maintaining the probability of ongoing incoordination for river management and restoration?
- will this transition phase see a progression from ecological objectives in their separate legislation, to its incorporation in legislation and plans of producers and economic interests?
- will there be transparent use of market mechanisms, industry self-regulation, co-management, public financing for integrated resource management? Or will these mechanisms be used to stave off the reckoning between producers, resource users and other values?
- will management plans be complied with? What will compliance with regulatory plans look like?

The nature of the legislative framework appears to be at a crossroads. The regulatory model is to move forward with structures, statutory plans, administrative processes, etc; and seems to be favoured by stakeholders generally outside decision

making circles and who are disillusioned with river managers' performance and accountability to date. The other model is to move forward with inclusive, co-management, multiple mechanisms approaches, with a lower but critical profile for legislation.

Questions posed for river managers and the legislative framework to consider include:

- will it have strong central direction or will it be regionalised?
- will regional structures be effective if downsizing or self-funding is required?
- will all key players regionalise? Not just the environmental protection or resource agencies, but such areas as the land development industry, public land administration;
- how will the community hold the whole lot to accountability; against executive discretion, non-compliance with plans, non-provision of resources, etc?
- will there be multiple interacting regulatory systems applying to any one activity, in a continuation of typical superimposition of resource management, environment protection, and other legislation over earlier legislation? Or will there be use of sweeping and comprehensive new legislation, as on the New Zealand model?

Figure 21 provides a summary of the four topics and recent or emerging aspects for the legal framework presented on a continuum.

However, there was substantial commonality among researchers as to the legislative criteria. In the extensive Western Australian review of water and natural resource management (Wallis 1996), the future framework for integrated management identified the following as the major components:

- whole of catchment approach to integrating water and land management activities;
- a simple bureaucratic system with clear roles and functions at every level (Ministerial, State agency, peak councils and regional/catchment level);
- clear responsibilities and accountabilities at all levels;
- regional/catchment community groups given recognition and support as the prime means of implementation of integrated catchment/resource management;
- strong community ownership and partnering of activities between the State and incorporated ICM groups;
- an across-government portfolio coordinating mechanism;
- an across-government portfolio budget agreement and partnering mechanism; and

- clear leadership and support by government for integrated natural resource management matched by real allocation and reallocation of resources.

Some or most of these findings were generally common to others, including:

- the effectiveness of catchment management planning in Australia (AACM International 1995);
- the Ontario system (Shrubsole 1996, pp. 322–323);
- Victoria river and catchment management (Doolan & Roberts 1997);
- best practice catchment management in Australia in 2020 (Young 1997, Centre for International Economics 1997);
- the review of the Hawkesbury–Nepean (Healthy Rivers Commission 1997);
- the review of the Fraser Basin Management Board and its program (Dorcey 1997);
- investigation of 27 multiple-objective, multiple-agency studies and models for integrated resource management from Australia and overseas, including river/catchment management (Mary Maher & Associates et al. 1998); and
- a study of the Grand River Conservation Authority, Canada; and the Bay of Plenty Regional Council, New Zealand (Nichols 1998).

## The working parts of legislation

The criteria need to be operationalised through the components or ‘working parts’ of the legislative framework. Five main components can be identified as:

### Responsibilities

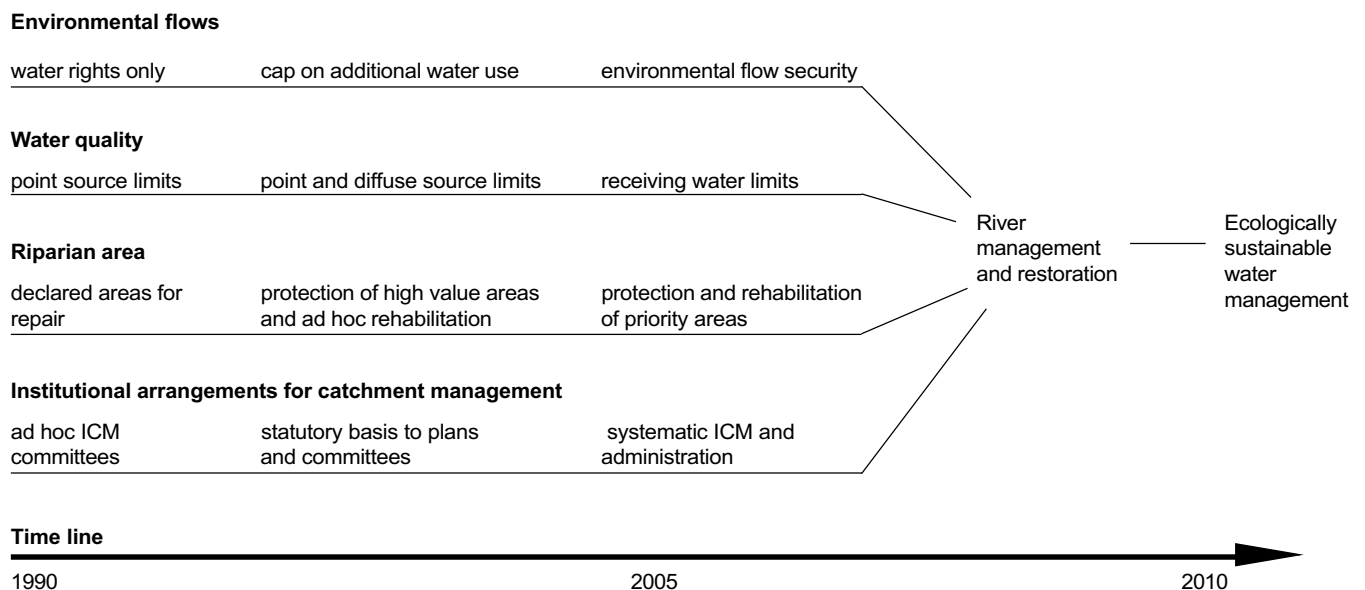
Legislation which addresses responsibilities in river management and restoration, particularly amongst and between agencies and the three spheres of government. The group includes inter- and intra-governmental matters, including in the Australian context:

- the relative river management and restoration responsibilities and roles of the Commonwealth and the States and Territories under the Constitution;
- the administrative arrangements legislation and related subordinate legislation of each jurisdiction, which establish government agencies, define lead agencies, define spatial, functional and statutory responsibilities, define the relationships between lead and related agencies in river management and restoration; define inter-agency jurisdictional boundaries, and establish coordination mechanisms; and
- cooperative arrangements such as the Murray–Darling legislation are in this group.

### Structures

Legislation which establishes the structures through which river management and restoration is actioned, including policy, operation and service delivery aspects. It includes components such as regional

**Figure 21.** Trends and futures: legislative framework for river management and restoration .



structures for the lead or other agencies; and frameworks and processes for stakeholder and community involvement. The latter may be inter-and intra-governmental; on an interstate, state, regional and/or local basis; and includes structures addressing the inter-relationships between related functional areas and programs (e.g. ICM and Landcare).

#### Approach and outcomes

Legislation which sets out approaches for determining desired ecological and resource use outcomes such as water entitlements, risk assessment, community consultation, setting of water quality objectives, and catchment-specific outcomes. The resulting plans, schedules or systems, tailored to a specific issue or a geographical area, may be legislated in the form schedules or other subsidiary legislation.

#### Permitting and enforcement

Legislation which addresses compliance requirements for statutory plans as well as licences, permits and approvals. It covers statutes setting standards applying to river management and restoration, such as minimum water quantity and quality specifications, processes and/or timetables for them to be established, and reviewed. It includes legislation which codifies the standing and entitlements of river water 'beneficiaries' (in the widest sense, including state and local governments, the environment, the community qua community as well as sectors and classes in the community) to water meeting relevant specifications. It includes regulatory enforcement for example, anti-pollution and pollution licensing statutes, whether by public agencies or private recourse.

#### Checks and balances

This legislation is of two main groups:

- monitoring and reporting legislation, including agency periodic reporting, external/independent performance auditing, River Ombudsman, State of River reporting including those in State of Environment reports; and
- legislation which relates to community empowerment, including generic and specific statutory review and appeal provisions, whether of public agencies or otherwise.

### **Criteria for the best practice legislative framework for river management and restoration in the twenty-first century**

Recommended criteria for the best practice legislative framework for river management, restoration and rehabilitation are to be 'practical'. This term is seen as being measured against the capacity and necessity of recommendations to achieve the community's agreed extent of river management, restoration and

rehabilitation; not by the extent to which they may or may not cause discomfort to the present temporary incumbents of public office, or to sectoral interests.

Taking these matters together, a degree of tension (almost contradiction) is apparent. In the Snowy River Inquiry Commissioner's words,

*It could be argued that the Terms of Reference were almost contradictory in the way they required the Inquiry to identify the environmental issues arising from the operation of the Scheme and then provide a range of fully-costed options to deal with these issues while balancing the needs of competing users of water. I therefore took the view that the only way we could succeed in providing Governments with tangible options was to deal transparently with each of the areas of consideration without any bias towards any particular partisan position or stakeholder viewpoint.*

(Snowy Water Inquiry 1998, p. 5)

A set of criteria reflecting best practice river management and restoration frameworks has been developed, primarily from the four topics; and also from the literature, and from professional experience including that of practitioners, mainly in the public sector. The criteria are:

1. Setting binding, measurable river management and restoration standards should be a national function, requiring a strong leading role by the Commonwealth. A general duty-of-care should be legislated for all landholders and all others to manage all aspects of surface water and groundwater resources sustainably, and to achieve ESD as the primary object (not just as one of several) of their activities.
  - This is particularly the case given the trans-boundary nature of many Australian rivers.
  - It will enable river-level agencies can focus on community education and motivation (Young 1997).
  - River health in Australia is a critical issue to all Australians.
  - National leadership in this nationally important area has continued and can be enhanced for better overall river management and restoration achievement.
  - It will help to achieve and demonstrate a whole-of-government commitment to river management and restoration.
  - 'CSIRO already undertakes environment related research and development ...on...land and water' (Productivity Commission 1999, p. 55). Also, the Commonwealth's Department of the Environment and Heritage has commissioned the development of indicators for each of the

- seven major themes for State of the Environment Reporting, one being inland waters.
- River management and restoration legislation needs to bind the Crown in the part of the States/Territories, and in the part of the Commonwealth as far as it is able to do so. Commensurately, the Crown in the part of the Commonwealth, as far as it is not legally bound, should commit to achieving at least the same provisions.
2. A statutory definition of 'river' is needed in river management, restoration and rehabilitation, on an extensive basis to include floodplains, all related wetlands, etc.
    - This will ensure all hydrological components of the river are comprehensively managed towards restoration and rehabilitation.
    - River restorers cannot have responsibility and accountability for river management and restoration without spatially commensurate powers.
    - It will have regard to the whole water cycle, including groundwater.
  3. There needs to be a single, multi-functional agency for a river's restoration and rehabilitation.
    - Lack of inter-agency cooperation and integration, turf wars and other similar activities are a constant negative finding in analyses of river management performance in Australia.
    - A single agency has been demonstrated to be better structured to provide a unified approach and consistent actions towards river management and restoration, and to resolve conflicts, than are multiple agencies. While there has been improvement, and while some inter-agency cooperative models are demonstrating more achievement, this is generally assessed against the past (how poor performance has been before?), rather than the future (what performance is needed to achieve the objectives?).
    - It will bring benefits of efficiencies of scale.
    - A single agency may have a problem, real or perceived, about conflict between service provision and resource regulatory roles that should be resolved in formulating and reviewing the river plan.
    - There is a need for an unambiguous role of 'river custodian / manager'.
    - The ability to ensure agreed river management and restoration objectives needs to take precedence over sectoral/local objectives.
  4. River management and restoration agencies need a catchment-wide spatial characteristic.
    - There is a need to address all areas impacting on river management and restoration.
    - Responsibility and accountability for river management and restoration require spatially compatible coverage.
    - This will require and ensure a comprehensive approach to river management and restoration, and is generally accepted in Australia (Hooper 1997, p. 237).
  5. River management and restoration agencies need a statutorily-based set of powers commensurate with their responsibilities (i.e. for planning, funding, educating, regulating and achieving all components of river management and restoration).
    - Commensurate powers are required for responsibility and accountability for river management and restoration.
    - There is a need to address all matters impacting on river management and restoration, and set out binding objects and river management and restoration objectives.
    - The objects clause should state that in the interpretation of river management and restoration legislation, constructions that promote the achievement of the underlying purpose or objective shall be preferred to constructions which do not.
    - As river management and restoration covers environmental, economic, social and cultural considerations, its powers need to cover its range of functions.
  6. River management and restoration agencies need to include in their decision-making processes all stakeholders in an open, equitable and adequately resourced manner.
    - Composition should reflect all stakeholders (including urban, environmental and non-commercial) to ensure there is cross-community involvement in and commitment to river management and restoration.
    - There is a need for a strong local base (to ensure continuity as a local initiative), fiscal equity (no taxation without representation) and social equity.
    - Upstream activities impact on downstream users.
    - Best practice principles of incorporating stakeholder input (see for example Productivity Commission 1999, p. 10) should be required.

7. Given the previous three principles, and the extent to which local government is already involved in some environmental and other aspects of river management and restoration, there need to be close links between river management and restoration agencies and local governments.
  - Such synergy will maximise coordinated river management.
  - some communities may find benefits (economies, no 'turf wars', simpler community education and better understanding, enhanced achievement, etc.) by increased commonality between these two sets of agencies, such as the river agency and the local government having the same chair; or amalgamating. These matters could be statutorily based; if they are not, systems requiring ongoing close and coordinated linkages will be needed.
  - Greater combined autonomy through full agreement and commitment on river management and restoration plan, will lead to a lack of interference from other levels of government.
  - The logical conclusion of such a progression may be the installation of a two-sphere system of national and regional governments based on river catchments, in lieu of the present tripartite system of Commonwealth, State and local governments with multiple overlays and combinations.
8. River management and restoration agencies need a statutory, comprehensive river management and restoration plan.
  - The plan should be prepared following statutorily required inclusive processes including principles of good policy making (see for example Productivity Commission 1999, p. 86), with statutorily required periodic reviews. Government, ministerial or agency discretions about the occurrence, timing and depth of plan reviews should be eliminated.
  - Periodic reviews of the effectiveness of plans will ensure good management practice.
  - ESD should be promoted as a primary goal in river management and restoration plans, because it incorporates social economic and environmental issues in a whole-of-government approach. It is the mainstream philosophy of Australian resource management (Hooper 1997, p. 237).
  - River management and restoration plans need to be based on scientific data and assessment (e.g. the Brisbane River and Moreton Bay Water Quality Management Strategy).
  - River management and restoration plans should be comprehensive and should cover and integrate all the multi-factorial aspects of river management and restoration, including water allocation, sustainable resource-based industries, ecosystem restoration, instream activities, impacting land management activities whether changing or ongoing, minimisation of damage by flooding and erosion to appropriately located assets, salinity, land degradation and erosion, local laws, land use regulation, rural drainage and urban stormwater plans.
9. There needs to be a statutorily required regular, publicly available audit of river management, restoration and rehabilitation, independent from the restoring/rehabilitating agency.
  - River management and restoration plans should be required to include all aspects of river management (e.g. land use planning impacts on rivers, urban stormwater and rural drainage plans, water allocation plans from all water sources).
  - River management and restoration plans should be rolling plans (with a five year turnover) for long time periods (over at least thirty years).
  - Performance, and accountability for it, are only achieved through audit.
  - Meaningful audit must be independent from river (and any) manager.
  - Good management practice to audit performance on a regular and independent basis.
  - Models include State of River reporting, the Parliamentary Commissioner for the Environment (or Rivers), the River custodian role.
  - Data collection should be standardised, spatially and over time, for comparability and efficiency. The work of CSIRO, the National Land and Water Resource Audit and the Department of the Environment and Heritage relating to State of the Environment Report indicators has been mentioned. Several recommendations of the Productivity Commission relating to standardised data collection by ABS for ESD implementation are also relevant (Productivity Commission 1999, draft recommendations 6.1 and 7.3 to 7.5).
  - This full accountability includes third party rights of appeal and injunction.
10. The legislative framework for administrative components of river management and restoration should contain a requirement for specified periodic reviews.



- Given our early comprehension of the water cycle, it is not to be expected that the first framework designed will get it right. The framework needs to respond to flaws found through experience, as well as to incorporate developing best practice and innovations from our growing understanding.
- Reviews should follow statutorily required inclusive processes.
- Reviews avoid government, ministerial or agency discretions about the occurrence, timing and depth of framework reviews.
- Periodical measurement and review the effectiveness of arrangements it is good management practice.

11. All legislation with a direct or indirect effect on river management and restoration needs to have and maintain primacy over all other legislation, including that applying to for utilities and emergencies. In other words, for the avoidance of doubt, legislation which implements the suggested criteria should be given ongoing legislative priority despite the provisions of any other law, including subsequent law. Achieving the suggested criteria should be given greater statutory weight than any other objective. Consequentially, any legislation which ignores the criteria above needs to be reviewed or eliminated to bring it into consistency, and kept so reviewed. Integration and consistency are key issues in river management and restoration.

## 9. THE WAY FORWARD

### Implementing best practice legislative framework

The suggested criteria do not necessarily require new administrative structures and processes. For example, it is quite possible to meet the relevant criteria by organising local governments onto a river catchment basis, rather than create a separate system of new catchment agencies. During a 1994–95 National Landcare Program project, Queensland and Tasmania were considering watersheds as an appropriate boundary in considering amalgamations of local authorities.

Similarly, much of the catchment activity regulation could be through the land use planning process, rather than through either a new process, or by an extension of existing concurrence systems. The concurrence system is seen as having limited effectiveness in achieving river management and restoration, as it is based on a continuation of agency plurality: itself clearly a causative factor in present river degradation.

Use of either existing land use or new regulatory systems is likely to mean the cessation of traditional exemptions for agricultural, forestry and other catchment land activities; and, similarly, the end of exemption of agriculture, forestry and other related practitioners from occupational licensing.

### Actions in the short term

Moving the focus from water management to integrated resource management/river management through:

- environmental protection, ecosystem processes legislation;
- resource use and access legislation; and
- land planning, development and impact assessment legislation.

Achieving ICM through:

- structures for integrated planning; and
- structures for coordinated decisions.

River protection/restoration legislation including:

- wild rivers;
- environmental flows; and
- water quality/environmental flow management plans.

Powers and capabilities for service delivery at local level:

- greater use of local government status, powers; and
- fund raising, across-government budgets.

Maintenance of effective controls (the legislative 'sticks') for:

- pollution from point sources;
- control of high risk activities; and
- powers of Boards and similar entities.

### Actions in the longer term

National framework to set binding standards for river management and restoration

The project found significant evidence for a strong role for the Commonwealth in the best practice legislative framework. Factors in favour of a significant and increased role for the Commonwealth in the future of river management, restoration and rehabilitation include:

- 'the Commonwealth is responsible for national policy issues' (Productivity Commission 1999, p. 23) and there is arguably no more national or important issue than river management and restoration facing Australia;
- clear and firm leadership is appropriate, especially in view of the trans-boundary characteristics of some Australian rivers;
- the most successful models of integrated natural resource management come from structures which are not the orthodox 'business-as-usual' examples of the Australian tripartite government arrangement. Rather they are special arrangements between these three and all other stakeholders (e.g. Great Barrier Reef Marine Park Authority, Wet Tropics Management Authority, Trinity Inlet Management Plan [Mary Maher & Associates et al. 1998]);
- Commonwealth initiatives on NSESD since 1989 have accelerated the move towards sustainable water management (Hooper 1997, p. 238);
- the success of the 1994 COAG Water Reforms has been significantly due to the Commonwealth playing a lead role, including a financial one;
- Commonwealth law prevails where there is a conflict over coexisting powers (Productivity Commission 1999, p. 19);
- the Commonwealth has already commenced a National Land and Water Resource Audit, designed

to develop nationally comparable data which provides a measure over time of land and water resource quality;

- the most successful federal models of river management, restoration and rehabilitation found were the USA and Canada, both with a key success factor being a firm role by the federal government;
- such a framework is within the capacity, and perhaps the intention, of the Commonwealth *Environmental Protection and Biodiversity Conservation Bill 1998*; and
- the Commonwealth can ensure equity across States and Territories. Where the scale of the problems varies greatly and resourcing issues arise; it can ensure benchmarks are maintained but flexibility is maintained to deal with pressures of inequities.

The option of moving local governments to catchment boundaries has been suggested as one possible method of achieving the relevant suggested criteria. If this occurred, the Australian community might then choose to migrate to a national, rather than a federal, government model. The suggested criteria for a legal framework is capable of implementation under either constitutional arrangement.

Mix of mechanisms including market, fiscal, public financing, co-regulation and community empowerment

The importance of a comprehensive set of provisions embodied in a unified framework together with mandated standards for ecosystem protection cannot be overstated (Industry Commission 1997).

The nature and extent of the role of legislation in ecologically sustainable water management (ESWM) however will depend to a large extent on the degree to which other non-statutory mechanisms are utilised.

The desired transition to ESWM must involve a mix of mechanisms, the effectiveness of the mix determining the level of reliance on the legislation. These other mechanisms include:

#### **Market mechanisms**

Improving the markets for natural resources is a strategy which policy makers are presently examining (Productivity Commission 1999). However some see the market as fundamentally flawed in its ability to deliver the scale of protection needed for the public interest or they see the reforms coming too late and too minimally. There is no question that major reforms are needed to direct the operation of market mechanisms to ensure that:

- markets facilitate efficient use of resources (true costs, rights mechanisms);
- markets recognise non-use values (environmental accounting);

- market failure and negative externalities are reduced; and
- markets promote technologies and products based on the full set of sustainability criteria.

(Lockwood 1999).

#### **Public financing**

Public funds may be used in a number of innovative ways. Subsidies, incentives, industry assistance and others are usually contingent upon landowner participation being demonstrated through either a management agreement such as conservation agreements under the *Nature Conservation Act (1992)* in Queensland for example, or through a property plan which may be required for assignment or say a water licence in a regulated river system.

Integral to these requirements is the specification of what is required for environmental protection and demonstrated adherence to these requirements. Sustainability is increasingly specified through best management practices (BMPs) and industry codes of practice.

Examples of this incentive-based approach include:

- local government-initiated rate rebates for voluntary conservation agreements;
- rate rebates through funds from State or Federal governments; and
- reduced fees for licences or permits (initial fees and annual fees).

Direct government assistance usually relates to some form of ties for landholder performance. This tied arrangement can be applied to:

- allocation of leases or issue of licences;
- landholder compliance with best management practices (government code of practice) or licence requirements when licensing of agriculture is introduced under a State's environment protection legislation; and
- landholder agreements for example conservation agreements.

A critical appraisal and analysis of initiatives on tax incentives for environmental protection is urgently needed as part of the current investigations of tax reforms. This applies to taxes by Commonwealth and State governments. Investigations should include:

- accelerated depreciation on capital expenditure incurred by a taxpayer undertaking measures for protection of the environment or to address degradation;
- rates reductions or exemption;
- exemption from capital gains tax;
- deductibility of non-income producing expenditure;
- deductibility for donations; and

- recognition of vegetation management in primary production category to allow exemption from land tax.

While there is considerable debate about the potential which market mechanisms have to deliver ecological objectives the next five years will no doubt see their greater application to water resource management and sustainable use (Young 1997).

### **Dissemination of environmental knowledge and know-how**

Dissemination of environmental knowledge and know-how is an important mechanism in promoting river management and restoration at all levels. The need for know-how exists in agencies as well as in the community. Although education cannot function as an alternative to regulation, legislation can be seen to initiate the culture change which creates 'readiness' to receive information.

### **Future LWRRDC investigations**

Future work should address specific questions arising from this report about legislative frameworks, legislative mechanisms as well as the effectiveness of the legislation in practice including legislation's role in the mix of mechanisms.

Several suggestions for future investigations directly resulting from this project are made here.

1. Conduct of a five-yearly update of all or selected river-related legislation in each State and Territory, on the lines of the NSW EDO review of inland rivers legislation in 1994 (EDO 1994). This work could be desk top based or with considerably more funding, could evaluate the legislation in practice.
2. Comparative study of key water resources (specifically Water Acts) legislation in leading jurisdictions in Australia and internationally. This study would assess the comprehensiveness of the statutes in terms of river management and restoration objectives; the priority and weighting (primacy) given to these objectives, and the mechanisms used to achieve integrated planning, coordinated decisions, agency accountability and industry/landholder duty of care. This comparative work needs to address legal interpretation and legal processes (legal research) as well as examining legislation in its broader policy context (social research).
3. Selected evaluation studies of the legislation in practice, and outcomes it contributes to. Farrier (1999) values investigation of key river-related legislation in selected catchments in leading jurisdictions as a way of understanding how the legislation works in terms of overlaps, enforcement mechanisms and integration.

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# GLOSSARY

**Access licence**

A licence issued for the future right to take water

**Allocation**

Giving a person an entitlement to use water or setting aside a water resource for a designated use

**Basin**

The area that drains water into a river system, including all its tributaries

**Biodiversity**

The variety of all life-forms; the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form; often considered at three levels; genetic diversity, species diversity and ecosystem diversity

**Catchment**

The area determined by topographic features within which rainfall will contribute to run-off at a particular point under consideration

**Codes of practice**

Sets of guidelines adopted by management agencies concerned with minimising impacts of operations on the environment (for example soil erosion) and safety

**Consumptive use**

Any activity that depletes the total flow or volume of water in a water body

**Diversion**

The movement of water from a river system by means of pumping or gravity channels

**Diversion licence**

Specified licences issued for a specific annual volume and diversion rate

**Ecologically sustainable development (ESD)**

Development of the State's water resources in a way and at a rate which provides for and protects the well-being of people and their communities.

**Ecosystem**

A dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit

**Entitlement**

The right to make use of water resources.

**Environmental indicator**

Physical, chemical, biological or socio-economic measures that can be used to assess natural resources and environmental quality

**Estuary**

Area of an inlet or river mouth that is influenced by the tides and also by fresh water from the land; area where fresh and salt water mix

**Floodplain**

The floodplain, which includes the riparian zone, is that part of the land adjacent to the river that is subject to flooding (to the 100 year level) and consists of a mosaic of aquatic and terrestrial environments that are intricately linked with the river

**Impoundment**

A pond, lake, tank, basin, or other space, either natural or created in whole or part by the building of engineering structures, which is used for storage, regulation and control of water

**Indicator species**

A species used to assess the health of an ecosystem

**Irrigation**

Supplying land or crops with water by means of stream, channels or pipes

**Murray–Darling Basin Agreement**

The agreement between the Governments of the four Basin States and the Commonwealth.

**National Competition Policy**

Provides for the application of third party access, competitive neutrality and prices oversight principles to Government business activities, and incorporates the COAG water reform agenda.

**National estate**

Those places, being components of the natural environment of Australia, or the cultural environment of Australia, that have aesthetic, historic, scientific or social significance or other special value for future generations as well as for the present community



**Permanent transfer**

The transfer of water entitlements on a permanent basis. The right to permanent transfers allows irrigators to make long term adjustments to their enterprise and enables new operators to enter the industry.

**Point source pollution**

Pollution from an easily discernible, single source such as a factory

**Pollution**

The direct or indirect alteration of the physical, thermal, biological or radioactive properties of any part of the environment in such a way as to create a hazard or potential hazard to the health, safety or welfare of any living species

**Precautionary principle**

Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation

**Regulated flow**

Flow that is controlled through the use of dams and weirs to supply water for consumptive uses. Regulation usually has consequent impacts on the natural hydrograph.

**Rehabilitation**

Process of improving the physical and biological condition.

**Riparian zone**

The riparian zone is the channel margin, under the immediate influence of median flows.

**Riparian land**

Any land which adjoins or directly influences a body of water. It includes:

- land immediately alongside small creeks and rivers, including the river bank itself
- gullies and dips which sometimes run with surface water
- areas surrounding lakes
- wetlands on river floodplains which interact with the river in times of flood (LWRRDC 1996)

**River**

The river is a channel, channel network, or a connected network of waterbodies of natural origin and exhibiting overland flow (which can be

perennial, intermittent or episodic) in which they following operate:

- the biological, hydrological and geomorphological processes associated with river flow; and
- the biological, hydrological and geomorphological processes in those part of the catchment with which the river is intimately linked (adapted from Kunert et al. 1997 viii). A river has been defined in California's *Wild and Scenic Rivers Act 1972* as: *...the water, bed, and shoreline of rivers, streams, channels, lakes, bays, estuaries, marshes, wetlands and lagoons up to the first line of permanently established riparian vegetation.* [www.habitat-restoration.com/1ca.htm](http://www.habitat-restoration.com/1ca.htm) p4, accessed 22 February 99

**River regulation**

The formulation and execution of a specific operating plan for flow modification of water in a river system; may involve the creation of impoundments and diversion and the control and flow to and from such storages

**Restoration**

Returning existing habitats to a known past state or to an approximation of the natural condition by repairing degradation, by removing introduced species or by reinstatement (Australian Natural Heritage Charter, 1997 p8)

**Unregulated flow**

Tributary inflow events downstream of storages or flows over storage spillways

**Water allocation and management plan (WAMP)**

A basin-wide process involving the identification of environmental flow objectives, water entitlement security objectives and development opportunities. Under proposed water resource management legislation an approved WAMP will be subordinate legislation.

**Watercourse**

A watercourse can be a river, creek or stream in which water flows permanently or intermittently including natural channels and natural channels artificially improved or which have changed the course of the watercourse, upstream of the tidal limit. It includes bed and banks and any other element of a river, creek or stream that confines or contains water.

# APPENDIX 1. KEY ATTRIBUTES OF DIFFERENT CLASSES OF MANAGEMENT MODELS

CLASS 1	CLASS 2	CLASS 3	CLASS 4	CLASS 5
Stand alone policy plan	Policy plan plus agreement/MOU	Policy plan plus agreement/MOU plus independent co-ordinating entity	Policy plan plus agreement/MOU plus new agency with limited management powers	Policy plan plus new authority with broad range of powers
<b>Ability to provide a strong sense of leadership</b>				
Very limited	Limited	Achievable	Achievable	Achievable
<b>Ability to integrate environmental, economic, social and cultural considerations</b>				
Generally unachievable	Difficult to achieve	Achievable	Achievable	Achievable
<b>Ability to link catchment, waterway, estuarine and marine systems and functions</b>				
Generally unachievable	Difficult to achieve	Achievable	Achievable	Achievable
<b>Potential to learn and adapt</b>				
Generally low	Low–moderate	Can be high	Can be high	Can be high
<b>Potential for generating strong commitment from elected representatives</b>				
Generally low	Generally low	Can be high	Can be high	Can be high
<b>Likelihood of achieving high levels of community ownership and involvement</b>				
Low	Low–moderate	Moderate–high	Moderate–high	Moderate–high
<b>Extent to which responsibilities for achievement of outcomes are clearly identified</b>				
Generally low levels of accountability and highly dispersed	Generally low levels of accountability and highly dispersed	Higher levels of accountability but still dispersed	Higher and more focused accountability	Higher and more focused accountability
<b>Extent that cross agency and cross-disciplinary linkages are encouraged and supported</b>				
Not at all	Generally low	Can be high	Can be high	Can be high
<b>Extent that management plan actions are enforced</b>				
Generally low and sporadic	Low–moderate but often sporadic	Moderate–high	Generally high	Generally high
<b>Potential for negotiated resolution of conflicts where whole of river and bay outcomes prevail</b>				
Low	Low–moderate	Can be high	Can be high	Can be high
<b>Ability to attract funding over and above line agency budgets</b>				
Often limited	Some potential	Moderate–high potential	Moderate–high potential	Moderate–high potential
<b>Ability to channel funding to areas of highest need</b>				
Very limited	Limited	Some potential	Good potential	Good potential
<b>Ability to audit against whole of river and bay outcomes and across all agencies/programs</b>				
Very difficult to achieve	Difficult to achieve	Achievable	Achievable	Achievable
<b>Ability to integrate scientific information into decision making</b>				
Very limited	Limited	Good potential	Good potential	Good potential

## APPENDIX 2. LEGISLATIVE DATABASES

State	River management aspect	Statutes
Victoria	Pollution/water quality	Catchment and Land Protection Act 1994 Local Government Act 1989 Environment Protection Act 1970
	Resource & access	Water Act 1989 Water (Amendment) Act 1995 Water Industry Act 1994
	Ecosystem values	Water Act 1989 Water (Amendment) Act 1995 Catchment and Land Protection Act 1994 Crown Lands (Reserves) Act 1987 Flora and Fauna Guarantee Act 1988 Heritage Rivers Act 1992 Forests Act 1958
	Catchment, land/water management	Catchment and Land Protection Act 1994 Planning and Environment Act 1987 Conservation, Forests and Lands Act 1987 Land Act 1958 Land Conservation Act 1970 Land Government Act 1989 National Parks Act 1975 Reference Areas Act 1978 Urban Land Authority Act 1979 Victorian Conservation Trust Act 1972 Coastal Management Act 1995 Conservation, Forests and Lands Act 1987 Environment Effects Act 1978 Alpine Resorts Act 1983 Alpine Resorts (Management) Act 1997
	Institutional arrangements for catchment management	Local Government Act 1989 Catchment and Land Protection Act 1994 Groundwater (Border Agreement) Act 1985 Melbourne Water Corporation Act 1992 Murray–Darling Basin Act 1993 Snowy Mountain Engineering Corporation Act 1992 Water (Rural Corporation) Act 1992
Queensland	Pollution/water quality	Environment Protection Act 1994 Soil Conservation Act 1986 Soil Survey Act 1929 Contaminated Lands Act 1992 Agricultural Chemical Distribution Control Act 1966 Chemical Usage (Agricultural and Veterinary) Control Act 1988 Agricultural and Veterinary Chemicals (Queensland) Act 1994 South-East Queensland Waters Act 1979
	Resource & access	Water Resources Act 1989 River Improvement Trust Act 1940 Sawmills Licensing Act 1936 Mineral Resources Act 1989 Mining (Fossicking) Act 1985

Ecosystem values	Water Resources Act 1989 Nature Conservation Act 1992 Rural Lands Protection Act 1985 Land Act 1994 Soil Conservation Act 1986
Catchment, land/water management	Local Government Act 1993 Integrated Planning Act 1997 Water Resources Act 1989 Land Act 1994 Rural Lands Protection Act 1985 Recreational Areas Management Act 1988 Coastal Protection and Management Act 1995 Forestry Act 1959 Fisheries Act 1994 Wet Tropics World Heritage Protection and Management Act 1985 State and Regional Planning and Development Act 1971 Integrated Resort Development Act 1987 Transport Infrastructure Act 1994
Institutional arrangements for catchment management	Native Title Act 1993 Integrated Planning Act 1997
<b>New South Wales</b> Pollution/water quality	Protection of the Environment Administration Act 1992 Pollution Control Act 1970 Contaminated Land Management Act 1997 Environmental Offences & Penalties Act 1989 Protection of the Environment Operations Act 1998 Clean Waters Act 1970 Water Act 1912
Resource access & use	Environmental Protection & Assessment Act 1979 Irrigation legislation (range of Acts) Soil Conservation Act 1938 Snowy Mtns Hydroelectric Agreements Act 1958 Forestry Act Water Act 1912 Fisheries Management Act 1994 Crown Land Act Irrigation Act 1912 Rivers and Foreshores Improvement Act 1948 Water Supply Authorities Act 1987 Mining Act 1992
Ecosystem values/Riparian/Fish habitat	Coastal Protection Act 1979 National Parks & Wildlife Act 1974 Threatened Species Conservation Act 1995 Native Vegetation Conservation Act 1997 Crown Lands Act 1989 Fisheries Management Act 1994 Environmental Planning and Assessment Act 1979 Local Government Act 1993 Rivers and Foreshores Improvement Act 1948 Soil Conservation Act 1938 New South Wales – Queensland Border Rivers Act 1947
Catchment, land/water management	Catchment Management Act 1989 Rivers and Foreshores Improvement Act 1948 Coastal Protection Act 1979 Coastal Protection Amendment Act 1998

		Commons Management Act 1989
		Drainage Act 1939
		Forestry Act 1916
		Commons Management Act 1989
		Conveyancing Act 1919
		Western Lands Act 1901
		Irrigation Act 1912
		Crown Lands (Crowns Lands Consolidation) Act 1989
		Environmental Planning and Assessment Act 1979
		Local Government Amendment (Ecological Sustainable Development) Act 1997
		Rivers and Foreshore Improvement Act
		1948 Roads Act 1993
		Rural Fires Act 1997
		Rural Lands Protection Act 1989
		Wilderness Act 1987
	Institutional arrangements for catchment management	
		Local Government Act 1993
		Murray–Darling Basin Act 1992
		Water Administration Act 1986
<b>South Australia</b>	Pollution/water quality	Environment Protection Act 1993
		Waterworks Act 1932
		Public and Environmental Health Act 1987
		Water Administration Act 1986
		Catchment Water Management Act 1995
	Resource & access	Water Resources Act 1997
		Water Conservation Act 1936
		Southern Eastern Water Conservation and Drainage Act 1992
		Metropolitan Drainage Act 1935
		Irrigation Act 1994
		Irrigation (Land Tenure) Act 1930
	Ecosystem values	Water Resources Act 1997
		Development Act 1993
		Native Vegetation Act 1991
		Wilderness Protection Act 1992
		National Parks and Wildlife Act 1972
	Catchment, land/water management	Water Resources Act 1997
		Soil Conservation and Land Care Act 1989
		Water Conservation Act 1936
		Pastoral Land Management and Conservation Act 1989
		Forestry Act 1983
		Development Act 1993
		Crown Lands Act 1929
		Country Fires Act 1989
		Coastal Protection Act 1972
		Heritage Act 1993
		Land Acquisition Act 1969
		Local Government (Forestry Reserves) Act 1944
	Institutional arrangements for catchment management	
		Water Resources Act 1997
		Murray–Darling Basin Act 1993
		Local Government Act 1934
		Ground Water (Border Agreement) Act 1985

<b>Northern Territory</b>	Pollution/water quality	Water Act 1992
	Resource & access	Pastoral Land Act 1992 Stock Routes and Travelling Stock Act 1954 Water Supply and Sewerage Act 1983
	Ecosystem values	Territory Parks and Wildlife Conservation Act 1977 Bushfires Act 1980 Conservation Commission Act 1980 Soil Conservation and Land Utilisation Act 1970
	Catchment, land/water management	Water Act 1992 Soil Conservation and Land Utilisation Act 1970 Crown Lands Act 1992 Environmental Assessment Act 1982 Parks and Wildlife Commission Act 1980 Planning Act 1993 Heritage Conservation Act 1991
	Institutional arrangements for catchment management	Water Act 1992 Power and Water Authority Act 1987
<b>Tasmania</b>	Pollution/water quality	Water Act 1957 State Policy: Water Quality Environmental Management and Pollution Control Act 1994 Sewer and Drains Act 1954 Rossarden Water Act 1954
	Resource & access	Water Act 1957 Water Resources Investigation Act 1937 West Tamar Water Act 1960 North West Regional Water Act 1987 North Esk Regional Water Act 1960 Mineral Resources Development Act 1995 Land Use Planning and Approvals Act 1993 Groundwater Act 1985 Farm Water Development Act 1985 Hydro-Electric Commission Act 1944
	Ecosystem values	State Policy: Water Quality Crown Land Act 1976 Inland Fisheries Act 1995 National Parks and Wildlife Act 1970 Threatened Species Protection Act 1995
	Catchment, land/water management	Resource Management & Planning System 1994 Local Government Act 1993 Land Use Planning and Approvals Act 1993 Roads and Jetties Act 1935 Public Land (Administration of Forests) Act 1991 Forestry Act 1920 Private Forests Act 1991 Local Government (Highways) Act 1982 Land Use Planning and Approvals Act 1993 Forest Practices Act 1985 Conveyancing and Law of Property Act 1884
	Institutional arrangements for catchment management	Local Government Act 1993 State Policies and Projects Acts 1993 Northern Regional Water (Arrangements) Act 1997 Hobart Regional Water (Arrangements) Act 1996

<b>Western Australia</b>	Pollution/water quality	Environmental Protection Act 1986
	Resource & access	Rights in Water & Irrigation Act 1914 Country Areas Water Supply Act 1947 Rights in Water and Irrigation Act 1914 Fish Resource Management Act 1994
	Ecosystem values	Environmental Protection Act 1986 Waterways Conservation Act 1976 Conservation and Land Management Act 1984 Wildlife Conservation Act 1950 Parks and Reserves Act 1895
	Catchment, land/water management	Local Government Act Western Australia Planning Act 1996 Soil and Land Conservation Act 1945 Aboriginal Affairs Planning Authority Act 1972 Agriculture Act 1988 Land Acquisition and Public Works Act 1902 Land Administration Act 1997 Main Roads Act 1930 Town Planning and Development Act 1928 Transfer of Land Act 1893 Bushfires Act 1954
	Institutional arrangements for catchment management	Waterways Conservation Act 1976 Waterways and Rivers Commission Act 1997 Water Boards Act 1904 Water Corporation Act 1995 Water Agencies (Powers) Act 1984 Water Services Coordination Act 1995 Metropolitan Region Town Planning Scheme Act 1959 Swan River Trust Act 1988 Agriculture Protection Board Act 1950 Western Australia Planning Commission Act 1985
<b>Australian Capital Territory</b>	Pollution/water quality	Water Pollution Act 1984 Environment Protection Act 1997 Cotter River Act 1914
	Resource & access	ACT Water Resources Act 1998 ACT Water Quality Guidelines 1997 (before water resources Act) Lakes Act 1976 Canberra Water Supply (Googong Dam) Act 1993
	Ecosystem values	Federal Environment Impact (Impact of Proposals) Act 1974 State Nature Conservation Act 1980 Environmental Protection Act 1997 Commissioner for the Environment Act 1993 Energy and Water Act 1988 Protection of Lands Act 1937 Public Parks Act 1928 Lakes Act 1976 Water Resources Act 1998 Environment Protection Act 1997 Land (Planning and Environment) Act 1991 Cotter River Act 1914 National Land Ordinance 1989

Catchment, land/water management    Federal ACT (Planning and Land Management) Act 1988 with National Capital Plan National Land Ordinance 1989  
 State Land (Planning and Environment) Act 1991 with The Territory Plan 1993

Institutional arrangements for catchment management  
 Federal ACT (Planning and Land Management) Act 1988  
 State Land (Planning and Environment) Act 1991  
 ACT (Self Government) Act 1988

**Murray–Darling Basin**

Institutional arrangements for catchment management  
 Murray Darling Basin Act 1993 & mirror legislation in all States  
 Murray–Darling Basin Agreement (1997)  
 Murray–Darling Basin Ministerial Council (the decision-making forum)  
 Murray Darling Commission (the executive arm)

**Country**

**River management aspect**

**Statutes**

**New Zealand**

Pollution/water quality

Resource Management Act 1991  
 Soil Conservation and Rivers Control Act 1941  
 Environment Act 1986  
 Conservation Act 1987  
 Health Act 1956  
 Litter Act 1979

Resource & access

Resource Management Act 1991  
 Fisheries Act 1996

Ecosystem values

Resource Management Act 1991  
 Environment Act 1986

Catchment, land/water management

Resource Management Act 1991  
 Land Drainage Act 1908  
 Reserves Act 1977

Institutional arrangements for catchment management

Resource Management Act 1991  
 Rivers Board Act 1908  
 Environment Act 1986  
 Local Government Act 1974

**Canada**

Pollution/water quality

Constitution Act

Resource & access

various provincial legislation, except as above

Ecosystem values

various provincial legislation

Catchment, land/water management

Canada Water Act 1970  
 Canadian Environmental Assessment Act 1992

Institutional arrangements for Catchment Management

Constitution Act 1982  
 Canada Water Act 1970

**USA Federal**

Pollution/water quality

Federal Water Pollution Control Act 1956/1972  
 Water Pollution Control Act 1972  
 Compensation and Liability Act 1972  
 River and Harbors Act 1899

Resource & access

Watershed Protection & Flood Prevention Act 1985  
 Water Resources Development Act 1986



Ecosystem values	North American Wetlands Conservation Act 1989 Emergency Wetlands Resources Act 1986
Catchment, land/water management	National Wild and Scenic Rivers Act 1968 Coastal Zone Management Act 1972 Estuary Protection Act 1968 National Flood Insurance Act 1968 Coastal Wetlands Planning and Protection & Restoration Act 1990 Ramsar Convention 1972 National Environmental Policy Act 1969 Comprehensive Environmental Response, Compensation & Liability Act 1980, 1986 Food & Security Act 1985

<b>USA California</b>	Institutional arrangements for catchment management California Environmental Quality Act 1970 California Water Code Porter-Cologne Water Quality Control Act 1970 California Wild and Scenic Rivers Act 1972 California Coastal Act 1976 State Forest Practices Act 1974 Subdivision Map Act 1975 Surface Mining and Reclamation Act 1975 Senate Concurrent Resolution 1979 Urban Creek Restoration and Flood Control Act 1984 Wetlands Resource Policy California Riparian Habitat Conservation Act 1992 General Industrial Stormwater Control Act 1992 Streamed or Lake Alteration Agreement
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## APPENDIX 3. PEER REVIEW

### River management and restoration : legislative frameworks

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I have been asked to peer review this draft report. In particular I am asked to comment, firstly, on whether the report provides an integrated review and a valid set of criteria for best practice legislative frameworks; and secondly on whether the individual topic reviews provide the insights and understandings to form the basis of the overall framework criteria. The terms of reference for the report, and method of approach for this review have been agreed with the client, LWRRDC, and are summarised in Part 1.

In general I would answer both questions in the affirmative. The consultants were initially selected on the basis of their insights into the problems being addressed in the report and these insights and understandings have been demonstrated and well developed in the report. The evidence accumulated during research justifies the selection of criteria for best practice legislative frameworks and the observations and recommendations made in the report. More specific comments are made below. It may be assumed that if I have not commented upon a finding, opinion, suggestion or conclusion that I am in agreement with the relevance and thrust of that finding or approach.

### Whole-of-government approach

The report correctly identifies the necessity for a whole-of-government approach to resource management as the key to achieving better riverine management. The evidence clearly suggests and justifies an integrated catchment based approach. I also agree with the fundamental assertion that the purpose of the legislative scheme should not just be to hold the bottom line (an approach that has clearly failed to date) but should encompass steady restoration. Equally clearly, current legislative and institutional arrangements generally do not recognise nor support such an approach. How legislative and policy initiatives can deliver such an approach is obviously the fundamental issue to be addressed.

Some specific criteria for legislative initiatives will be discussed shortly. It seems to me however that before the specifics of legislation can be addressed, we need to consider whether, and if so how, current institutional arrangements could deliver the preferred approach. The report correctly identifies inter-agency rivalry, lack of jurisdictional power, and narrow vision as adverse influences arising from current legislative

and institutional arrangements. Many of the influences that impact on riverine environments are expressly permitted by government authorities that have no mandate to act in the best interests of the environment; or if they do, in fact operate within a narrow band of legal authority rather than ecological reality, dictated by the legislative framework under which they derive their powers. The first crucial question therefore in redesigning legislative approaches must be to determine how we deal with this in the legislative scheme.

As a preferred approach to drafting legislation, I think the fundamental objective must be to give decision makers a wide range of discretionary tools to enable them to adopt preferred management approaches; that is, the flexibility stressed in the report. We can be prescriptive about what decision making should seek to achieve, and the criteria that must be taken into account; but we should not be too prescriptive about directing what needs to be done and how it should be done. Legislation must enable the best management decisions to be determined, implemented and enforced; although within a structure that directs a preferred approach.

### Commonwealth role

The report suggests firstly a national binding framework for rivers and that the Commonwealth should play a key and enhanced role. It is not entirely clear whether these objectives are to be realised by legislation or policy development. The latter would be in accord with the current concept of cooperative federalism presently supported by Commonwealth and State governments; that the role of the Commonwealth should be one of initiation, coordination of effort, and support. This approach has seen the development of a number of national strategies for addressing environmental issues during the 1990s, including water reform. Under such an approach, the Commonwealth clearly relies on implementation by the States of a negotiated agreed national approach. As a preferred approach for riverine management this has the advantage of not only reflecting current practice and political reality; but arguably, if standards of management are agreed by all parties, they are more likely to be implemented than if national standards were simply imposed by the Commonwealth using its undoubtedly superior constitutional powers. Any suggestion for national legislation is not likely to be supported; except perhaps to the extent that a body similar to the National Environment Protection Council (NEPC) could be established to draw up proposed standards, guidelines, goals and protocols for riverine

management; for example the river management and restoration standards referred to in the report. These recommendations would then be incorporated into State legislation or policies.

Either way, implementation of river management policies will depend upon State initiatives.

The other significant role for the Commonwealth recognised in the report is, of course, project funding, particularly through the Natural Heritage Trust. In this regard note that the Commonwealth Auditor General has declared that it is impossible to evaluate the effectiveness of Commonwealth funding of natural resource conservation initiatives because of inadequate auditing of performance (Commonwealth Natural Resource Management and Environment Programs, Audit Report No. 36 1996–97

It follows from these comments that I do not consider that a Commonwealth interventionist approach, (if that means exercising legislative muscle, see p. 52 of the report) would be an appropriate model for Australia. Rather that national standards should be introduced by way of a national strategy developed and agreed to by all governments.

#### State approaches

The suggested approach at state level seems to be for a single agency to take control of riverine management on the basis that the current division of legislative and management responsibilities leads to a fragmented, inefficient and inconsistent approach to river management. This opinion is clearly supported by the research and by evidence of current practice. The report seems to suggest that such a riverine agency should be established for each catchment rather than accord power to one single agency of central government; although inevitably such catchment based authorities are likely to operate under the umbrella of a central government authority. Certainly there is no reason why catchment management authorities could not be given blanket powers to control riverine management in each catchment, and I am in general agreement that the powers of such authorities, or indeed the powers of any central government authority if that is the preferred alternative approach, need to be radically improved if the objects are to be achieved. In this regard note that the NSW approach is not one that gives enforceable powers to the catchment management authorities to manage catchments; they are very much advisory only. However the germ of such a legally empowered catchment management authority has now been introduced in NSW following the public disquiet evidenced during the Sydney Water crisis that inadequate catchment management was the prime source of the problems affecting Sydney's drinking water quality. Under the Sydney

Water Catchment Management Act 1998 the Sydney Catchment Authority will now regulate activities in the catchment.

If catchment management authorities are to be created then their functions will need to be defined by legislation, and they will need to be invested with powers by legislation. Even if this option of creating separate agencies is rejected, the evidence suggests that existing legislation and institutional arrangements simply are not adequate to achieve acceptable riverine protection and in any case legislative amendment of some sort will be required.

Given that adverse effects on catchments are caused by a wide range of activities, carried on or sanctioned by a wide variety of government agencies, what are the essential legislative amendments that need to be introduced? Are other government authorities undertaking or authorising activities that might adversely impact on catchments going to be required, through legislative amendment, to undertake environmental investigations and have regard to environmental considerations before making decisions? The report indicates at page 62 (and see also page 85) that a critical factor is rationalisation of legislation, and I agree with this assessment. Existing legislation could be amended; but perhaps an easier way to achieve desired objectives is to introduce concurrence requirements for any activity that might significantly affect a catchment. All such proposals would then need concurrence from the catchment management authorities. The advantage of this approach is that it builds upon recognised procedures for concurrence in most jurisdictions; while the concept of a 'significant effect' is also one that has already been introduced and indeed judicially examined, in most jurisdictions, for example in relation to environmental assessment of development. This can be accompanied by attempts to change culture within existing development oriented institutions of government; but reliance on this alone will not achieve the desired objectives in the short to medium term. I think it is unavoidable that catchment authorities will need regulatory powers of concurrence for all activities that might significantly impact upon the achievement of their objectives.

#### **Criteria for legislative reform**

The Report correctly identifies the main criteria for directing a whole of government approach to riverine management. Some further suggestions in relation to specific issues are made below.

#### The Crown

Legislation needs to specifically bind the Crown. The general presumption at law is that the Crown is not bound by legislation unless specifically, or by

necessary implication, so bound. All modern environment protection legislation, for avoidance of doubt, binds the Crown

### **General purpose of legislation**

These comments are intended to flesh out some of the criteria identified in the report.

Modern environmental legislation can be seen to have the following priorities:

- to set up government regulatory structures for environmental management that apply both to the private and the public sector. These include the creation of regulatory authorities, such as environment protection authorities; and the creation of specialist courts or tribunals to hear both merits appeals and enforce the law.
- to invest government regulators with powers to determine how to manage the environment and provide them with management tools to control environmentally significant activities and encourage best practice environmental management.. This toolkit commonly includes the ability to develop policies and plans, determine standards, issue licences, and implement and enforce the law; supplemented, importantly, by the ability to offer economic incentives to encourage better performance 'beyond compliance' and to achieve the objectives of legislation and policy instruments. The implementation and extent of such powers may be to some extent guided by both the stated or implied objects of the legislation and by specific criteria for decision making contained within it.
- To require persons proposing to carry on environmentally significant activities to seek permission from government regulators. Depending on the activity for which permission is sought, the permitting authority may be either central government (for example permits to harm endangered species) or local government (for example development control). Often, a number of permits for an activity are required from different regulatory authorities for different aspects of a proposal
- To require activities of potential environmental significance to be assessed before permission can be granted. This usually involves initial assessment to determine the environmental significance of a proposal; together with more detailed assessment of proposals declared or found to be of major environmental significance.
- To provide that non-compliance with the law will attract liability for a range of administrative, criminal and civil sanctions; and to enable regulators and, to a more limited extent, members of the public, to enforce the law. Regulators may issue compliance and remediation notices, such as

clean-up orders, as well as institute both civil and criminal enforcement proceedings. Members of the public may be empowered also to commence civil and sometimes criminal proceedings to enforce breaches or threatened breaches of the law.

- to a limited extent, to enable the merits, rather than the legality, of decisions of government regulators to be challenged by members of the public. This right is generally restricted to the more significant proposals for development, though sometimes may extend to other activities of environmental significance, such as potential harm to endangered species

In a nutshell therefore environmental law is all about prohibiting activities that might adversely affect the environment, but then allowing those activities to be undertaken as long as permission is granted by a regulatory authority, and the conditions on which that permission is granted, are adhered to. In devising any structure for riverine management it will probably be easier to develop and adapt this recognised approach rather than attempt anything new. The fact is that the objectives of riverine management can be achieved within such a structure, even though significant amendment of and addition to the detail will be required.

Importantly, too, as the report emphasises, the last decade of the twentieth century has been marked by a move away from strict regulatory approaches as the only response to environmental management to an approach that recognises also the importance of encouraging voluntary action, supported by economic incentives and education. Economic incentives may, for example, encourage polluters to go 'beyond compliance', that is perform better than their licence allows; or encourage rural landholders, through property or conservation agreements, to conserve biodiversity by providing funds, for example for fencing. Such incentive based approaches are usually enshrined in and supported by legislation.; however they may not be. Government policy on control of greenhouse gases, for example, is in fact centred wholly on economic incentives for industry without supporting regulation. Tackling Australia's arguably biggest environmental and economic problem, dryland salinity, is also likely to follow such an approach. As the report also correctly emphasises, regulatory action is but one aspect of a whole of government approach to riverine management.

What happens when different pieces of legislation apply to the same activity?

As the report has correctly identified, the potential exists for an exercise of statutory powers under legislation that requires no or minimal consideration of environmental factors to come into conflict with the desire to exercise protective powers under other legislation that does enable protection. Although in

law there is no inherent conflict in having numerous pieces of legislation apply to the same area of land or activity, duplication of legislative powers may significantly impede measures for desirable environmental management.

Where different authorities are given jurisdiction in respect of the same piece of land or activity, then the legislature is generally taken to have conferred parallel management responsibilities on those different authorities for their different spheres of activity, with the result that neither can exercise a power of veto on the other. For example the powers of energy or fire authorities to 'do all things necessary or convenient to be done for or in connection with or incidental to the performance of' statutory functions or in the exercise of statutory powers, such as acting to secure health and safety by removing vegetation, could effectively override statutory powers to restrict damage to native vegetation. This can obviously lead to problems where a provision for conservation or protection comes up against a provision allowing damage or destruction. But such an approach also means that where a number of statutory authorities are given powers to control and licence activities, that any one of them may effectively veto a project or activity.

In the absence of clear statutory guidance as to priority, the courts favour an interpretation which treats each piece of legislation as laying down simply another layer of control. There is a strong presumption that the legislature does not intend to contradict itself; so the courts will favour an interpretation which does not lead to conflict but allows legislation to operate in parallel. Only in the event of irreconcilable conflict will the courts determine that a later statutory provision must be intended to override an earlier one; or that an explicit statutory power must be intended to have priority over a general provision. Many proposals for development for example require licensing not only from the appropriate local government authority, but also require licences to harm endangered species or to emit pollution. If one authority refuses a licence for its particular sphere of activity this will effectively put an end to the project despite the fact that all other necessary licences may have been obtained. The concurrence powers that I have recommended be given to catchment management authorities build upon this approach.

Where Parliament wishes to give some indication as to how a piece of legislation will interact with other legislation, various techniques may be employed to deal with potential duplication of powers. For example:

the legislation may state that its provisions are in addition to and are not intended to derogate from provisions in other legislation. For example in South

Australia both the Electricity Act 1996 and the Gas Act 1997 are expressed as not derogating from the provisions of the Environment Protection Act 1993. Similarly the Country Fires Act 1989 states that the provisions of that Act do not derogate from the provisions of the Native Vegetation Act 1991.

the legislation may state that its provisions prevail to the extent of any inconsistencies in other legislation. Sometimes environmental legislation is quite explicit that it will take priority; for example in relation to pollution control and 'environmental harm'. Where two or more pieces of legislation make similar statements then the later in time will prevail in the event of conflict. Alternatively the legislation may state for example that an instrument drawn up under that legislation will be of no effect if it conflicts with some other authorised statutory instrument; or there may be a statutory instruction that 'so far as practicable' a statutory instrument should be consistent with other instruments.

the legislation may state that nothing in the legislation should be read as conferring immunity from the application of other laws.

the legislation may state that its provisions are to apply despite any other law to the contrary, or despite the provisions of any other Act or law. Powers connected with public safety and removal of hazards may be accorded such superiority; for example the power under the Roads Act 1993 (NSW) to fell trees or other vegetation applies 'despite any other Act or law to the contrary' if necessary to carry out road works or remove a traffic hazard. Similarly powers to order the destruction of native or feral animals under the Livestock Act 1997 (SA) apply despite protection under any other law.

The legislation may nevertheless accept that disputes may occur, particularly between public authorities having different interests in land or resources, and provide a dispute resolution procedure; for example disputes about clearance of vegetation around public power lines, or with respect to works to be conducted on public lands.

For avoidance of doubt, it would be better if the legislative initiatives being suggested in this report were accorded a clear expression of legislative priority despite any provision of any other law.

#### Objects of legislation (pages 29–32)

The report correctly identifies the objects clause as an important and integral part of the legislation. It has become increasingly common for modern environment protection and natural resource legislation to specify the objects of the legislation.

An objects clause is important because Interpretation Acts commonly state that in the interpretation of a provision of legislation, a construction that would

promote the purpose or object underlying the legislation shall be preferred to a construction that would not promote that purpose or object. Defining the objects of legislation is therefore more than simply an exercise in expressing the intent of the policy embodied in the legislation; it may guide the parameters of the exercise of legal powers under the legislation. This is so in fact whether or not the objects are expressed in an objects clause or simply divined from the content of the Act in general.

Objects of legislation may be, and often are, expressed simply in terms which declare the objects of the legislation or statutory authorities created by the legislation; but they may go further and bind those authorities or individual decision makers in some way to carrying out the principles expressed in such clauses. To what extent it is desirable to bind decision makers to the expressed objects is a matter of policy for government to determine.

For example in South Australia, the requirement under the Environment Protection Act 1993 is that

*(t) he Minister, the Authority and all other bodies and persons involved in the administration of this Act must have regard to, and seek to further, the objects of this Act*

In Queensland the statutory requirement under s5 of the Environmental Protection Act 1993 appears slightly stronger: a person on whom functions or powers are conferred must perform those functions or exercise those powers 'in the way that best achieves the object of this Act'.

Tasmania's Resource Management and Planning System contains perhaps an even stronger direction:

*It is the obligation of any person on whom a function is imposed or a power is conferred under this Act to perform the function or exercise the power in such a manner as to further the objectives set out in Schedule 1.*

Land Use Planning and Approvals Act 1993  
(Tas) s 8.

The objectives set out in Schedule 1 include the promotion of sustainable development, as defined.

S 6(2)(a) of the South Australian Water Resources Act 1997 contains a clause requiring all administrators under the legislation to 'act consistently with' the object of the legislation.

Under the Fisheries Management Act 1994 (Cth) s 3 '(T)he following objectives must be pursued by the Minister in the administration of this Act and by AFMA in the performance of its functions'. The emphasis of the objectives is on efficient and cost effective fisheries management and preserving the sustainability of fisheries resources.

In New South Wales perhaps the strongest provision in relation to the objects of legislation is contained in S 12 of the Crown Lands Act 1989 (NSW) which states that the Minister is *responsible for achieving the objects of this Act*.

The difficulties in enforcing such statutory instructions as legally binding duties should not be underestimated; but it is at least arguable that instructions which require decision makers to 'seek to further', 'pursue' or 'achieve' objectives may be regarded as imposing stricter or more focused duties of compliance or achievement than a mere instruction to 'have regard to' those objectives. In formulating the objectives of any riverine management legislation then very careful consideration should be given to designing the objects clause

Have regard to

Where objects are specified in legislation, then the most common instruction to statutory authorities is that they should 'have regard' to them or take them into account or consideration in making decisions or exercising their functions. The report gives some examples of this (p. 30).

Naturally the matters to which regard must be had would be expected to influence decision making. However such a statutory instruction falls short of actually requiring the statutory functions to be implemented or command decision making.

The Macquarie Dictionary definition of 'regard' is to 'take into account or consider'. Gibbs CJ in the High Court of Australia has said that a statutory instruction to 'have regard to' means 'to take those matters into account and to give weight to them as a fundamental element' in making a decision; (*R v Toohey ex parte Meneling Station Pty Ltd* (1982) 158 CLR 327, 333); but not to make it by reference to them exclusively; *Minister for Immigration and Ethnic Affairs v Baker* (1997) 24 AAR 457, 463-4. Gummow J remarked in *Turner v Minister for Immigration and Ethnic Affairs* (1981) 35 ALR 388, 392, '(m)ere assertion that regard has been had ... will not suffice, if it is demonstrated that regard has not been paid in any real sense'. This 'real sense' is more fully developed in *Parramatta CC v Hale* (1982) 47 LGRA 319 which considered the (now amended) obligation in s 90 of the Environmental Planning and Assessment Act 179 (NSW) to 'take into consideration' relevant matters. Moffitt P held that simply advertent to a matter and then rejecting it was not taking it into consideration. To do that a decision maker had to acquaint itself with such relevant material as would enable it to consider whether such matters were indeed material to the decision. In other words regard must be adequate not cursorily given. Failure to have regard to or consider any statutorily mandated factors may result in any consequent decision being declared invalid.

The question for any proposed legislation for riverine management, as suggested in the previous section, is therefore: what obligations do you want to impose on decision makers by way of an objects clause or mandated criteria for decision making? Depending upon how the obligations are expressed, various levels of required commitment or performance may be imposed.

#### Due weight

Where a number of factors are mandated for consideration without any statutory indication as to the priority or weight to be accorded to the various factors, then the relevance of each of those factors is a question of fact for the decision maker to determine. For example although application of the principles of ESD may be relevant to, even required of, decision making it is but one factor to be taken into account and does not outweigh all other considerations.

It is clear however that all statutorily mandated criteria must be given due weight, rather than no weight at all. Due weight may mean whatever weight is due as the focal point of the scheme of the legislation. In the context of any particular determination that 'due weight' could in fact be nil.

Most objects clauses and criteria for decision making in fact do not signify the relative importance of the various factors. This in itself suggests that the objects are to be regarded as carrying equal weight. In designing riverine protection legislation therefore careful consideration must be given to directing not only the objects of legislation, and criteria on which decisions must be made, but whether there are any fundamental priorities that need to be signified.

#### Ecologically sustainable development (ESD)

The Intergovernmental Agreement on the Environment recognises that implementation of ESD requires an 'effective integration of economic and environmental considerations in decision-making processes' and that to promote this approach four particular principles 'should inform policy making and program implementation'. These are the precautionary principle; intergenerational equity; conservation of biological diversity and ecological integrity, and improved valuation, pricing and incentive mechanisms. This approach has been adopted as the focus of much state based legislation. In my opinion there are serious deficiencies in the translation of ESD into a legal criteria for decision making. This is because ESD is usually mandated as something to which regard must be had (see above) in decision making and not as an objective that must be pursued or fulfilled. In my opinion ESD is, or should be, the fundamental objective and outcome of decision making, not a factor to be balanced against others in reaching a decision. In designing legislation that seeks to incorporate ESD as a fundamental

management approach, as suggested in the report, then very careful consideration needs to be given to determining the role of ESD in the decision-making process. I can provide a much more detailed analysis of this topic if required.