Department of the Environment and Heritage

House of Representative's Standing Committee on Environment and Heritage

Inquiry into

CATCHMENT MANAGEMENT

Submission by the Department of
Environment and Heritage

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Contents

ABBREVIATIONS

AFFA	Agriculture Fisheries and Forestry Australia
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ARCCD	Australian Rivers and Catchment Condition Database
ASS	Actual Acid Sulphate Soils
AusRivAS	Australian River Assessment Scheme
BSP	Basin Sustainability Program
CBD	Convention on Biological Diversity
CDI	Catchment Disturbance Index
CMP	Coastal Monitoring Program
CMPP	Coastal and Marine Planning Program
COAG	Council of Australian Governments
CSP	Clean Seas Program
EA	Environment Australia
EPG	Environment Protection Group (part of EA)
ERIN	Environmental Resources Information Network
FAO	Food and Agriculture Organisation
FRDI	Flow Regime Disturbance Index
GAB	Great Artesian Basin
GABCC	Great Artesian Basin Consultative Committee
GIS	Geographic Information Systems
GPT	Gross Pollutant Traps
GSAM	Generalised Southeast Australian Method
GTSM	Generalised Tropical Storm Method

GSDM	Generalised Short Duration Method
IBRA	Interim Biogeographic Regionalisation for Australia
ICM / TCM	Integrated or Total Catchment Management
LGA	Local Government Association
LWRRDC	Land and Water Resource Research and Development Corporation
MDB	Murray Darling Basin
MOU	Memorandum of Understanding
NEPC	National Environment Protection Council
NHT	Natural Heritage Trust
NLWRA	National Land and Water Resources Audit
NSCABD	National Strategy for Conservation of Australia's Biological Diversity
NWQMS	National Water Quality Management Strategy
NWRA	National Water Resources Assessment
PASS	Potential Acid Sulphate Soils
RDI	River Disturbance Index
SCARM	Standing Committee on Agriculture and Resource Management
SLWRMC	Sustainable Land and Water Resources Management Committee
SMP	Strategic Management Plan
SoE	State of the Environment
SoER	State of the Environment Reporting
SCDI	Sub-catchment Disturbance Index

UNCSD	United Nations Commission for Sustainable Development
UNEP	United Nations Environment Program
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNDP	United Nations Development Program
USE	Upper South East

Executive Summary

Environment Australia strongly supports integrated catchment management in Australia as a means of protecting our land and water resources, native vegetation and biodiversity.

Since European settlement, Australia has generally sought to address individual land and water issues through ad-hoc activities and initiatives that have not necessarily considered the bigger environmental picture. Over the past decade, the relatively new approach to conservation and sustainable use of resources - the integrated catchment management approach - has proven more holistic, recognising that land and water use and environmental impacts are interconnected and that actions in a catchment have cumulative impacts on areas downstream. Integrated catchment management is also increasingly seen as critical to the coastal zone as nutrients, sediments and other pollutants arising from within catchments can have a significant impact on the health of coastal and marine ecosystems.

Integrated catchment management is a system-based approach, attempting to blend the objectives of environmental protection, sustainable agriculture and natural resource management within catchments with the principles of ecologically sustainable development. The approach also attempts to ensure all interested parties in a catchment (those involved in land use planning, natural resource management, primary production, conservation and the community) work together in planning and implementing catchment management policies. The approach provides a focus for translating national and state natural resource management strategies into coordinated and effective on-ground action. It is at this level of resolution that integration can achieve maximum synergies between primary production and biodiversity outcomes.

This holistic approach provides a more effective way than previous approaches of managing production and development activities in sympathy with the landscape's natural values. Moreover, it provides a better way of dealing with some issues that simply cannot be addressed at a smaller scale - threats such as dryland salinity and the management of blue-green algae, for example. Catchments are a natural and obvious scale that can be used to frame such resource management issues. Further, the holistic approach maximises the benefits obtained from more specifically targeted activities in the catchment (such as water allocations for environmental flow purposes) and assists in effective implementation of broader strategies such as the National Water Quality Management Strategy or the National Strategy for the Conservation of Australia's Biological Diversity.

Environment Australia has supported the development of integrated catchment management in Australia through a range of activities for over ten years. They include membership of the Murray-Darling Basin Commission

(one of the first and most notable exponents of the approach) and supporting the Minister in his role as a member of the Australian and New Zealand Environment and Conservation Council (ANZECC) and its committees. Other activities have been participation in the development of a number of national strategies impacting on natural resource management and the delivery of a wide range of Commonwealth environmental programs, particularly through the Natural Heritage Trust. Details of these activities are spelt out in the rest of this submission.

Environment Australia recognises, however, that although some initiatives and agencies are proving very successful in adopting a catchment management approach, the Australia-wide picture of the effectiveness of catchment management is far from clear. Whereas integrated catchment management has become increasingly influential in Australia and has now spread into most areas of natural resource and environmental management, catchment management structures are not necessarily reflected in statutory planning or regulations that have any real legal force. Or if they are included, the focus is often restricted to specific issues such as water quality. There may also be several overlapping regional processes within a given catchment.

The issue is that integrated catchment management in Australia has to date largely been driven by voluntary action through the Landcare movement or, more recently, as a result of facilitation processes through the Natural Heritage Trust. This has been extremely important in raising awareness of the catchment approach. However, in order to take the next step, greater degrees of intervention at the catchment level are warranted. Examples of the trend towards this approach are the statutory planning and rating powers recently given to catchment management boards and authorities in Victoria and South Australia.

Catchment management without statutory underpinning has limited impact on agency decision-making or decisions made through the Courts on appeal. Appeal Courts are less likely consider the views of a catchment management authority in the absence of a planning requirement. Without planning coordination either by statute or agreement, catchment management will remain a concept with merit but without the capacity to realise its full potential for on-ground application. There is a need to improve vertical integration, in terms of national sustainability principles cascading through Statewide or regional planning, and given effect in local planning, zoning and rating schemes. Delivery of better horizontal integration is also essential, where management of rivers, catchments, coastlines, vegetation, wildlife and land use is considered as an inextricable whole and planned accordingly. This is both feasible and imperative at the catchment, or regional, scale.

Another key issue concerns the availability of, and access to, relevant data at the catchment scale. Although many individuals and organisations collect and analyse data across Australia, often it is not readily available to those

who are responsible for catchment planning and implementation. Further, where data is available, it is often not suited for day-to-day land management as it either monitors past impacts, or is a snapshot in time. Measurement is further impaired because appropriate standards or measures of water, habitat and catchment health are still under development. To ensure more effective catchment planning and local action, data must be collected and managed at an appropriate scale, over time, and must be easily available to those with the responsibility for managing catchments, particularly land owners and managers.

Improving catchment-based responses to natural resource management issues also requires consistent and effective monitoring of resource condition and other indicators of catchment quality, including biodiversity. Any approach to monitoring within catchments needs to involve the full range of local organisations and groups to ensure local ownership. This is essential to avert the risk of establishing monitoring regimes which are not capable of long-term implementation (because of lack of local support) or local groups developing parallel systems of data collection which may not be consistent nor meet catchment-wide needs.

In addition to better regulatory or institutional frameworks and improved data and monitoring regimes, Environment Australia believes integrated catchment management would be enhanced in Australia through greater incentives for better management. For example, through market-based mechanisms, and increased strategic investment, including by the private sector, designed to deal with natural resource management issues.

Environment Australia is contributing to improvements in integrated catchment management in Australia through a range of activities including participation in intergovernmental consultations through the Murray-Darling Basin Commission and ANZECC, and through its policies and programs as outlined in this submission. In particular, the Natural Heritage Trust, and the partnership between Environment Australia and Agriculture, Fisheries and Forestry – Australia for its implementation, are providing an enhanced integrated and strategic approach to environmental protection, sustainable agriculture and natural resource management in a regional or catchment context.

1. The Australian Context: Development of Catchment Management in Australia

The development of catchment management in Australia as an influential idea dates back to the late 1980s. Internationally, the 1987 Brundtland Report *Our Common Future* alerted the world to the need for sustainable development as a way of engaging in economic growth within the planet's ecological means. At about the same time, Australian authorities began to give attention to catchment management as a means of integrating environmental, economic and social considerations into decision-making processes.

This is perhaps best epitomised by the signing of the Murray-Darling Basin Agreement in 1987 by the Governments of the Commonwealth, New South Wales, Victoria and South Australia. The Murray-Darling Basin Initiative, which now includes Queensland and the Australian Capital Territory, is the largest integrated catchment management program in the world, covering more than a million square kilometres.

The Australian Environment Council (now ANZECC - the Australian and New Zealand Environment and Conservation Council) was also involved in the move towards integrated catchment management. Together with the Australian Water Resources Council and the Australian Soil Conservation Council (now combined as ARMCANZ - the Agriculture and Resource Management Council of Australia and New Zealand), it held a national workshop on integrated catchment management in 1988. The workshop built on State and Territory initiatives and explored opportunities for further development of the concept. The workshop concluded that:

- integrated catchment management is an effective tool to achieve improved natural resource management;
- joint action involving all levels of government plus relevant groups within the community is required;
- successful implementation requires coordinated action to be taken at the catchment level; and,
- solutions should be 'tailor made' to suit the needs and problems of each particular catchment.

These conclusions remain relevant today and have influenced the development of natural resource management across Australia. In the decade since the workshop, most States and Territories have developed regional consultative mechanisms and are progressing with the development of integration processes with a focus on regional or catchment management. There have also been a number of strategies and policy documents underpinning the development of the catchment management approach. Details of these are at appendix A.

Value of the Catchment Management Approach

The primary value of integrated catchment management is that it promotes management of natural resources in a balanced and sustainable manner. It recognises that the effects of land and water use and environmental impacts are interconnected, that actions in a catchment will have cumulative impacts on other areas downstream, and that an holistic approach to the planning and coordination of land and water management is therefore essential. Many of Australia's long-term environmental degradation problems such as dryland salinity can only be addressed effectively through an integrated approach made possible through catchment management responses.

Good catchment management should also ensure that all processes take account of the terrestrial and aquatic biodiversity within the catchment, and the effects of current and proposed actions on it. Indeed, if addressed in an integrated way, catchment management can ensure conservation and sustainable use of biodiversity in conjunction with other objectives. For example, tree planting for groundwater or riparian (streamside) management can contribute to biodiversity conservation if habitat needs are considered in decisions about the locations and species chosen for planting.

Catchment management is also an important aspect of overall coastal zone management. Nutrients, sediments and other pollutants arising from within catchments have a significant impact on the health of coastal and marine ecosystems. The most obvious expression of this problem can be found in the eutrophication of coastal estuaries. Management at a catchment level will help reduce these adverse impacts.

Sustainable land management practices within catchments can also play an important part in reducing greenhouse emissions. Improving animal husbandry, adopting conservation cropping and reducing biomass burning in agricultural systems will have positive greenhouse outcomes and contribute to broader sustainability outcomes. In particular, maintaining and increasing vegetation cover plays an important role in enhancing Australia's greenhouse gas sinks capacity, while also assisting in the control of erosion and salinity.

Another benefit of the catchment management approach is the involvement of all elements of the community in dealing with the environment and sustainable agriculture across the entire catchment. In this way, the community is made aware of the communal nature of many of Australia's environmental problems, particularly the impacts of individual land use decisions on their neighbours. The catchment management approach is a very effective way of engaging all the community including those involved in land use planning, natural resource management, primary production and conservation in working together to improve the overall management of their local area. Indeed, introducing new management techniques and strategically investing in wastewater reuse technology can create regional economic

drivers for agriculture and industry, thereby turning water quality problems into economic resources.

There is a range of environmental issues, particularly related to water, where catchments are clearly the most appropriate management or measurement unit. The catchment management approach is particularly important when dealing with aquatic and riparian (streamside) weeds and invasive freshwater fish (eg carp) and invertebrates. Environment Australia recognises, however, that there are other issues, for example in relation to weeds, feral animals, migratory species and the like, where other boundaries may be more appropriate. For example, when considering ecosystems or associations of plants and animals which may occur across several catchments or only part of a catchment, use of such boundaries as the Interim Biogeographic Regionalisation for Australia (IBRA) is often more appropriate and useful. The National Strategy for the Conservation of Australia's Biological Diversity recognises that regional planning, in which environmental characteristics are the principle determinant of boundaries, is of major importance if biological diversity conservation is to succeed. These bioregions must be based on ecological parameters, vegetation types, catchment areas and climatic factors, combined with the interests of those living and working in the area.'

Nevertheless, these considerations do not diminish the value of integrated catchment management as a vital tool for effectively dealing with a large suite of environmental and natural resource problems.

2. Best practice methods of preventing, halting and reversing environmental degradation in catchments, and achieving environmental sustainability.

Best-Practice Framework

A framework for a catchment management-based approach should include:

- Identification of the issues to be targeted within catchments.
- Information and education to assist stakeholders to understand issues including the natural resource management issues
- Facilitation of the stakeholder communities' (including local government, community groups, individual landholders, industry groups and corporations) participation in developing and refining catchment strategies and implementation plan including on-ground works,
- Development of locally relevant incentives and removal of disincentives to achieve sustainable land management and adjust planning objectives;
- Identification of an appropriate regulatory environment to ensure water harvesting and land management controls result in best-practice management and resource protection;
- Development, in consultation with the community, of equitable cost-sharing arrangements within each catchment based on the best available information on the costs and benefits of interventions;
- Development of opportunities to change environmental problems into resource opportunities through creative management and technological approaches to recycling;
- Provision of leading edge scientific and technical input to assist communities to develop and implement the catchment strategy and undertake effective on-ground works; and
- Facilitation of community based ongoing monitoring and evaluation to ensure outcomes are identifiable and the strategy is adjusted whenever necessary.

Policy Options

There is a wide range of policy options relevant to implementing such a framework. They include:

Economic Incentive Initiatives

Conservation and appropriate management of native vegetation is essential to proper catchment management. There is a wide range of incentives available

to encourage and assist both landholders and communities to adopt best-practice techniques in conserving and managing native vegetation.

Incentives can be great ways to achieve conservation as they can assist to empower local landholders and communities through a partnership approach (reward-based) rather than a regulation approach (punishment-based).

There is a range of mechanisms to ensure conservation that could be considered as incentives. These include management agreements, voluntary conservation covenants, fencing assistance schemes, rate relief and differential rating schemes and the Land for Wildlife extension schemes. They may also include revolving funds, payments from vegetation management trust.

Management agreements

Management agreements are contracts between landholders and another party regarding the use and management of their land. These agreements secure vegetation objectives where site-specific management is required. They can be established when renewing, amending or upgrading leases over leasehold land and in local government development application processes.

Entry into management agreements is usually voluntary. These are potentially very flexible contracts, which can be tailored to the needs of individual sites and landholders and may involve a range of commitments from landholders. The extent to which management agreements contribute to long-term protection of native vegetation depends on the terms of the agreement and the degree to which they are implemented.

Voluntary conservation covenants

Voluntary conservation covenants are legal instruments attached to land titles for conservation purposes, binding current and all future owners. Covenants registered on the title are seen to be the most secure form of long-term protection for native vegetation.

Fencing assistance schemes

Fencing assistance schemes are established for the protection of areas of remnant vegetation, strategic revegetation and habitat rehabilitation. Such schemes often provide increased support for those who make the strongest commitment to the long term, and for vegetation that meets regional conservation priorities.

Rate relief and differential rating schemes

An important incentive for landholders to conserve native vegetation is to have their efforts formally recognised. One way of doing this is by reducing

their council rates. Subsidised rate relief or differential-rating schemes may be established by councils, making reduced rates conditional on land managers' demonstration of commitment to ongoing native vegetation management. The financial reward involved in receiving rate rebates is often very small, but the acknowledgment the landholder receives is important.

Payments from vegetation management trust

Payments from vegetation management trusts are stewardship payments for ongoing management needs of areas covered by in-perpetuity management agreements or covenants. Such trusts provide payments to landholders based on applications for funding linked to monitoring of management agreements. The basis for calculating reasonable payments would be tied to the relative significance of the vegetation being managed and the degree of long-term security being offered.

Environmental levies

Environmental levies and charges are occasionally used by State and local government or regional organisations to raise funds for specific environmental initiatives. These schemes need to be publicly transparent and connected with high profile environment projects like habitat management or flagship species.

Tax Rebate

The Commonwealth has set aside $80M from the NHT to fund a tax rebate[1] of 34 cents in the dollar, available to primary producers and businesses, for works including the control of pest plants and animals. The rebate will help reinforce landcare and related works as an important part of farm management.

Removal of perverse incentives

Perverse incentives such as some taxation provisions, local government rating systems and land development policies often have undesirable indirect effects that promote inappropriate behaviour by landholders. Rural rating systems in urban-fringe regions generally provide rating discounts for land used for primary production, creating a perverse incentive to clear the land and get the cheaper rates. These perverse incentives need to be identified and removed.

Market-based incentives

Indirectly, encouraging entrepreneurial approaches to addressing environmental problems can create market-based incentives. Through

[1] This will be available for the same type of expenditures, and over the same times, as the current tax deductions for preventing and treating land degradation and for conserving or conveying water (subdivisions 387-A and B respectively of the *Income Tax Assessment Act 1997).*

wastewater reuse, for example, the market operates to generate a demand for effluent and stormwater through industrial, agricultural and community uses. Not only does this reduce polluting discharges to the water bodies, but, by reducing pressure on potable supplies, it increases environmental flows and reduces the need to construct dams.

Legislative reform

To allow for the broader delivery of the incentives discussed above by local and regional organisations it may be necessary in some jurisdictions to enact enabling legislation for covenanting, management agreements and revolving funds.

In addition, some jurisdictions have legal restrictions placed on local government, joint authorities and regional organisations which limit their ability to raise revenue for environment programs. This acts as a significant impediment to both the devolution of responsibilities to the local and regional level and also on their ability to support innovative schemes in the long term.

Legislative and institutional reform should focus upon providing an arena that fosters and advances the conservation of native vegetation.

Duty of Care

A relatively recent approach to encouraging best practice lies in the concept of 'duty of care'. A duty of care "should require each duty holder, as far as is reasonable and practical, to:

a. identify, assess and manage the risks of the duty holder causing harm to the environment;

b. inform those directly at risk of foreseeable personal or financial harm from the activities of the duty holder;

c. inform the regulating agency of the risk of foreseeable harm to the environment from the activities of the duty holder; and

d. consult with those at risk of foreseeable harm.

The concept of duty of care can be built into legislation, but more importantly it defines the expectations a society has in regard to the stewardship of land that a land manager is responsible for. Adoption of a duty of care would lead to a best-practice approach to catchment management.

'Duty of care' is being discussed in considerable detail as part of consideration being given to the Productivity Commission's Report recommendations arising from its Inquiry into Sustainable Land Management.

Importance of Research for Best-Practice Methods

Many land degradation issues are insidious in nature – developing slowly since European settlement and accelerating over the last four decades. Much of the landscape is now in crisis - this is evidenced by, among other things, the decline of bird numbers in woodlands, and the increasing threat of rising watertable and algal blooms on the Darling River.

In addition to being a significant threat to economic production, the impacts of invasive species of plants and animals have been identified as second only to habitat clearance as a major threat to the conservation of native plants and animals. While invasive species may be an obvious component of the landscape in many areas, for many of these species it is often unclear whether their presence is the cause of degradation in the systems, or a symptom of degradation caused by another agent. In these circumstances, research is critical to determine cause and effect relationships as well as to identify effective control measures for those species that are identified as a known threat to biodiversity or primary production.

Most of what we know about land management has come from research that has focussed on understanding processes and developing understanding. There is a need to apply this research at the property and catchment scale to address the important issues such as loss of biodiversity and dryland salinity.

One of the priorities for the NHT's Bushcare program (described in chapter 3) is to develop best-practice approaches through research and development activities to provide land managers with real options for vegetation management and restoration.

Resources for research are scarce. Rather than doing new research in every catchment it is important to apply knowledge and information gained from areas where research has been undertaken to other areas. An adaptive management approach can be used to facilitate this.

National Activities Encouraging Best Practice

National Water Quality Management Strategy (NWQMS)

The importance of the NWQMS is recognised in the COAG Water Reform Framework. The Strategy emphasises an integrated catchment management approach to protecting water quality, and is examined more fully in Appendix A.

The strategy's major elements, which should encourage best practice, include:

- **a process** for water quality management involving the development and implementation of State and regional goals and action plans. The NWQMS's *Implementation Guidelines*, which adopts a catchment management approach, describes how local communities within the

framework of State legislation and policies may use the documents to produce water quality management plans. The Strategy envisages use of both regulatory and market-based approaches; and

- **national guidelines** which are technical papers providing guidance on many of the aspects of the water cycle. These guidelines are regarded as "best practice" requirements that serve as performance benchmarks and are not prescriptive. (Standards are presently being pursued for ambient marine and estuarine waters. A further possible area for improvement might be the development of national mandatory standards for fresh (inland) waters. These standards should be developed through the National Environmental Protection Council – NEPC).

Community views form a crucial part of the NWQMS and public comment is sought during both the development and implementation of the strategy.

Under the National Strategy, several guideline documents are being developed that have applicability to catchment management. These include:

- Guidelines for Groundwater Protection;
- Rural Land Uses and Water Quality - A Community Resource;
- Australian and New Zealand Water Quality Guidelines for Fresh and Marine Waters; and
- Australian Guidelines for Water Quality Monitoring and Reporting; and
- Implementation Guidelines.

The National Strategy guidelines provide guidance on important matters such as stormwater management, groundwater protection, effluent management and rural land and water use. Also, Environment Australia will be managing, as part of the Living Cities Program, a Commonwealth Stormwater Initiative. The cost of the program will be $10.3M and it will be run over three years, from 1999 to 2002. This Initiative should encourage innovative best practice in stormwater management. Stormwater management is an important consideration in catchment management, particularly for urban environments.

The full list of documents and their current status, together with other information are on the National Strategy website at http://www.affa.gov.au/nwqms.

Implementation of the NWQMS policies and processes by jurisdictions is well advanced. Progress in finalising the series of documents under the Strategy has been slow, however. At present, 15 of the 21 documents have been finalised. The remaining documents are at various stages of development, with some still to be released for public comment. In order for the strategy to

be completed and fully implemented, there needs to be increased commitment by jurisdictions.

Environment Australia Activities Encouraging Best Practice

Bushcare

The NHT's Bushcare program (described in chapter 3), in conjunction with the Land and Water Resources Research and Development Corporation (LWRRDC) has jointly funded six pilot projects to demonstrate best practice within a catchment and regional planning process. The projects aimed to demonstrate integration of national and local perspectives - how local conservation goals and specific on-ground activities can specifically contribute to national objectives.

Each project aimed to:

i) Assist government agencies, community and rural industry groups and researchers to develop and test methods for planning and implementing vegetation management at catchment or regional scales;

ii) Encourage the use and uptake of research results and knowledge, to help establish programs of sustainable vegetation management that meet the aims of Bushcare; and

iii) Provide a series of documented case studies, with written records of both processes and outcomes, which can be used by others in preparing regional vegetation plans, including proposals for Bushcare funding.

The projects have provided a solid basis for regional conservation planning. Actions resulting from the plans will assist communities in their quest for sustainable land management and the continued conservation of Australia's biodiversity.

Bush for Wildlife

To achieve best practice in catchment management an integrated approach is required. Bushcare is currently developing Bush for Wildlife which recognises the importance of wildlife and habitat protection as a major part of an integrated approach.

In 1998, the Commonwealth Government made a commitment to place greater emphasis on wildlife and habitat protection through the Bush for Wildlife initiative. The national approach of Bush for Wildlife further strengthens Australia's off-reserve conservation of biodiversity in both rural and urban areas. The initiative will bring together a number of existing Commonwealth Government Natural Heritage Trust programs such as

Bushcare, the Endangered Species Program and the National Reserve System Program.

Bush for Wildlife has three mechanisms for bringing about change:

1. National Coordination to improve access to information about wildlife habitat management and protection by existing urban and rural conservation groups and programs throughout Australia. This will provide the opportunity for highlighting and sharing best practice, and coordinating communication activities. One important example of the national coordination is working with state based *Land for Wildlife* schemes.

2. Bush for Wildlife Revolving Fund(s) – to be established nationally, modelled on the Victorian Trust for Nature fund. These will be managed by organisations that will identify and purchase land containing significant native vegetation, place a covenant on the title to the land to protect it in perpetuity, and then resell the land to sympathetic owners. Funds from property sales will be returned to the Revolving Fund(s) for further property purchases. The areas of native vegetation protected through Revolving Funds will complement and extend existing State reserves systems, including those established with the assistance of the National Reserve System Program. Revolving funds can provide an avenue for protecting significant native vegetation that fails to meet the strict criteria of more formal reservation processes.

3. Refocussing existing Natural Heritage Trust grant guidelines – to place a greater emphasis on wildlife and habitat protection and management within existing Natural Heritage Trust programs including through the One-Stop-Shop grant funding process.

Coastal and Marine Programs

As discussed earlier, catchment management is an important element in coastal zone management. Environment Australia's marine group manages a number of programs aimed at improving management of coastal zones and reducing levels of marine pollution. These include the NHT Coast and Clean Seas and programs under Australia's Oceans Policy. These are discussed fully in the next chapter.

Other issues

Invasive Species

Invasive species are a significant cross-sectoral issue. This has been recognised in the National Weeds Strategy which was jointly endorsed by ARMCANZ, ANZECC and the Forestry Ministers.

The impact of invasive species on primary production is difficult to estimate, but weeds are estimated to cost agricultural industries alone over $3.3 billion per annum.

The significant damage caused to Australia's biological diversity by plants, animals and micro-organisms that have been introduced into Australia over the last 200 years is recognised in *The National Strategy for the Conservation of Australia's Biological Diversity*. Introduced species that have a deleterious impact on conservation of biological diversity range from disease-causing organisms (eg *Phytophthera cinnamomi* - an introduced fungus responsible for dieback of native vegetation) to higher vertebrates (eg foxes and feral cats).

While there has been general recognition of the threats posed by a number of invasive species to primary production, there is considerable room for improvement in the recognition of the threat posed to the conservation of biodiversity within catchments by invasive species. Effective management of invasive species issues requires improved coordination of activities within catchments. In addition, action against invasive species needs to be coordinated between catchments, whether they are a threat to primary production values or a threat to biodiversity and environmental values.

Acid Sulphate Soils

One of the major management issues in coastal catchments concerns acid sulphate soils. Appendix B sets out a discussion of strategies and programs aimed at developing a best-practice approach of addressing these issues.

Dryland and In-Stream Salinity

The integration of biodiversity conservation perspectives in dryland and in-stream salinity management could be improved. A more thorough understanding of the impacts of salinity on biodiversity, and particularly of how current salinity mitigation methods impact on biodiversity, is required with some urgency. Work along these lines has commenced at State and Commonwealth levels.

Flood Warning Systems

Environmental changes within a catchment can greatly effect the likelihood of an area flooding. Obviously this can greatly impact the sustainability of an area. A flood warning system could, if used to its full potential, reduce flood impacts.

Emergency Management Australia in association with the Bureau of Meteorology has produced the document *Flood Warning - An Australian Guide* in 1995. An overview of this "best-practice" guide is included in appendix A.

The Subcommittee on Water Resources' Floodplain Management Committee has recently completed a similar "best-practice" guide for Floodplain Management.

3. The role of different levels of government, the private sector and the community in the management of catchment areas (including planning, resourcing, implementation, coordination & cooperation)

This section includes a discussion of the roles of the different stakeholders in catchment management, and their involvement in its planning, resourcing, implementation, coordination and coordination.

As has been discussed previously, for integrated catchment management to be successful, joint action is required from all levels of government, together with stakeholders and the community. Under the Australian Constitution, the primary responsibility for land use and management resides with State and Territory governments, which administer specific legislation within their jurisdictions. The Commonwealth Government must consider any approach to catchment management in terms of its roles and responsibilities under the Constitution, (especially in relation to the governments of the States and Territories of Australia who have the prime responsibility for land and natural resource management issues).

The following table represents an indication of the various levels of responsibility for natural resource management in catchment areas. This can only be an indication; the particular responsibility will vary according to the legislative environment and the administrative arrangements within a particular region.

Activity / Jurisdiction	Adherence to International/National conventions	Leadership and catalysing change	Administer Land and water Legislation and regulation	Undertake regional and local Planning	Support for Research and developmnt	Developmnt of National NRM Policy	NRM Extension and community capacity building	On-ground mngmnt (except for crown lands)	On-ground mngmnt (Crown lands)
Commonwealth	***	***	*	*	***	***	*	-	***
State	**	***	***	**	***	**	***	-	***
Region (eg Catchment Management Authority)	*	***	-	***	*	*	**	**	**
Local government	*	***	**	***	*	*	**	**	*
Individuals/corporations	*	*	-	*	-	*	*	***	-

Levels of responsibility

-	Not relevant
*	Low
**	Medium
***	High

It can be seen from the table that local and state agencies generally have high levels of responsibility for natural resource management (NRM) in catchment areas. Indeed, it could be said that, as development consent and construction authorities, local councils have the greatest influence on catchment management effectiveness. The evolution of community participation in the last two decades has broadened management responsibilities by bridging

bureaucracies with other stakeholders. Nevertheless, local and state agencies remain the main decision-making powers.

National Initiatives

Basin Management

A number of initiatives are proving effective in achieving an integrated approach to catchment management at the river basin scale. The river basin commissions, for example, have developed significant expertise in bringing together governments and communities to work on major natural resource management issues through ICM. The role of the Commonwealth in promoting ICM for these areas (Murray Darling Basin, Lake Eyre Basin and Great Artesian Basin) is through a cooperative approach between governments, involving the community and landholders.

Lake Eyre Basin

A Heads of Agreement relating to the sustainable management of the Lake Eyre Basin was signed by the South Australian Minister for Environment and Natural Resources, the Queensland Ministers for the Environment and Natural Resources and the Commonwealth Minister for the Environment in May 1997. The Heads of Agreement provides, inter alia, for the development of a formal inter-governmental Agreement and associated institutional arrangements for the integrated catchment management of the water and related natural resources of the Basin.

In line with the Natural Heritage Trust objectives, the proposed formal Agreement will facilitate the establishment of a cooperative approach by relevant governments to the sustainable management of the Basin, and, in particular, the management of cross-border river systems. On May 14 1999 the Commonwealth, South Australian and Queensland Governments released a Discussion Paper that canvasses opinion for the proposed formal Agreement and associated institutional arrangements. The Lake Eyre Basin Agreement also provides a framework for ensuring that the community remains actively involved in the sustainable management of the Basin.

The local communities in the Lake Eyre Basin are responding positively to this. In 1997 the Lake Eyre Catchment Protection Group and other interested members of the local community resolved to set up a number of community-based Catchment Management Committees and a Lake Eyre Basin Coordinating Group.

Commonwealth funding has been provided under the NHT to support the development of a community-based regional initiative to ensure the

sustainable management of the Lake Eyre Basin and the protection of related biodiversity values. Under the Lake Eyre Basin Catchment Management Regional Initiative, catchment committees are currently developing management plans for major catchments within the Basin.

Murray Darling Basin (MDB)

The Murray-Darling Basin is the largest of Australia's major drainage divisions, covers about one seventh of the continental land mass, and includes areas of NSW, Victoria, Queensland, South Australia and the Australian Capital Territory. The Commonwealth and all four States and the ACT are signatories to the 1992 Murray-Darling Basin Agreement, which is overseen by the MDB Ministerial Council. The Council is chaired by the Commonwealth Minister for Agriculture Fisheries and Forestry. A Community Advisory Council provides a formal body for community input, and operates through the Council, and the MDB Commission.

The MDB Commission is the executive arm of the Council, and is the primary agency involved in Basin planning and management. The six governments through the Ministerial Council, their agencies through the Commission, and communities through the Community Advisory Committee, make up the Murray-Darling Basin *Initiative.* The Commission is advised by four technical committees and several Working Groups.

The Murray-Darling Basin Natural Resources Management Strategy (NRMS) provides the framework to coordinate integrated natural resources management within the *Initiative.* The NRMS is delivered through the Basin Sustainability Program (BSP). Funding is provided from the Council through the BSP, from the Natural Heritage Trust (through Landcare, Murray-Darling 2001 and the National Landcare Program), through State government programs, and community investments.

Great Artesian Basin (GAB)

The GAB is over 1.7M square kilometres in area and underlies four States and Territories of Australia. Its management therefore requires a coordinated approach. Primary responsibility for regulating and managing the use of water resources rests with State and Territory governments. The Commonwealth Government provides leadership, in consultation with the States, in developing strategic national approaches and principles, and ensures that matters of national interest relating to environmental protection, sustainable agriculture and natural resources management are appropriately addressed.

The basin-wide management of the GAB is facilitated through the Great Artesian Basin Consultative Council (GABCC) established by agreement of the relevant Ministers in Qld, NSW, NT, SA and the Commonwealth in 1997.

The GABCC comprises representatives of key industry, environmental, Aboriginal and community groups, and the State and Commonwealth governments. Each of the States and the Northern Territory has a community-based committee with an advisory role to the GABCC (the South Australian committee has a statutory role). State Advisory Committees are responsible for regional coordination and implementation of the strategies and actions in the draft GAB Strategic Management Plan (SMP) which was released by Ministers in November 1998. Preparation of the SMP involved extensive consultation with representatives of key sectors of the community, industry and government in the Basin. The draft plan (which is currently being finalised) provides a framework for the integrated sustainable management of the water resources of the GAB and the protection of associated groundwater-dependent ecosystems.

The SMP aims to reduce waste and associated land degradation, and to make water resources available for higher value uses. The Plan will guide Government investment in infrastructure rehabilitation programs, including bore capping and piping works, which are required to increase artesian pressure and realise opportunities for new uses. The Plan also provides for targeted research into bore corrosion, recharge estimation, guidelines for recharge area management, piping technology, a range of biodiversity issues and economics of GAB water use.

In the 1999-00 Federal Budget, the Commonwealth Government committed an amount of $31.8 M over five years towards implementation of the SMP, with the bulk of this assistance being directed to the infrastructure renewal components of the SMP. This assistance is to be complimented by matching State funding.

National Water Quality Management Strategy (NWQMS)

Another national initiative important in catchment planning is the NWQMS. This adopts a catchment management approach and describes how local communities within the framework of State legislation and policies may use the documents to produce water quality management plans. This strategy was discussed more fully in chapter 2.

Environment Australia Initiatives

Natural Heritage Trust (NHT)

The Commonwealth Government has a wide range of catchment-related investment. The Commonwealth's role is to ensure landholders have the necessary knowledge and skills, with appropriate support to enable them to invest in NRM activities.

The NHT, through its Trust Partnership Agreements with the States, is the Commonwealth Government's major contribution to NRM. The NHT funds projects intended to catalyse landholder, industry (which includes vessel users and those involved in aquaculture), council and community action addressing NRM issues. The Trust helps increase communities' effectiveness through such activities as planning, trialing new techniques, skills development and group coordination.

Bushcare

The Bushcare program, the largest NHT program, aims to reverse the long-term decline in the quality and extent of Australia's native vegetation communities by working with community groups, land managers, industries and government agencies at all levels. Bushcare gives priority to projects at a regional or catchment scale which integrate management of remnant vegetation with extensive revegetation. The Bushcare program will invest more than $350 million over the life of the Trust in three main areas:

1. to conserve, enhance and sustainably manage remnant native vegetation;
2. to greatly increase and improve revegetation activities; and
3. to encourage the integration of native vegetation into conventional farming systems.

Approximately 92% of the projects funded, and 80% of the funding allocated in 1998-99 went directly to community-based groups such as landcare, Bushcare groups and total catchment management groups. Some major regional projects funded by Bushcare at the catchment and regional scales are presented in appendix D.

Bushcare has funded a number of devolved grants projects, where the Commonwealth devolves some financial responsibility for project approvals and administration to a regional organisation or local government, under certain conditions.

To be eligible for a devolved grants project, regional organisations or local governments must demonstrate community and stakeholder support for the regional strategy and action plans underpinning the regional application. Ideally devolved grants will be based on a proactive process in which the community is approached with the regional goals and asked to submit projects specifically directed toward regional priorities.

Typical devolved grants projects are the remnant vegetation fencing incentive schemes established in a range of regions around Australia. These projects offer flat rates per kilometre for fencing vegetation remnants consistent with catchment strategies and an ecological assessment of the vegetation. Every site protected is subject to a management agreement, and involves site visits and technical advice. Vehicle sponsorship and subsidies from fencing suppliers support some of these fencing incentive schemes.

These schemes are very popular with landholders because they can apply at any time of year with a one or two page expression of interest, they get technical advice in their own paddock about how to manage each site, they see a direct and quick connection between expressing interest and getting support (subject to the site being assessed as of high public benefit) and they often decide to do more (at their own expense) than they originally received assistance for. Devolved grants provide the opportunity for timing of applications and funding to be more appropriately matched to regional circumstances, for example, to reflect planting seasons or adverse weather conditions, and be on an ongoing basis, rather than one annual application opportunity. This type of approach clearly links on-ground-action to a regional strategy and is a demonstration of a successful and workable partnership.

Coast and Clean Seas

Coast and Clean Seas is a major component of the NHT. The goal of Coast and Clean Seas is to accelerate activities in the national interest to achieve the conservation, sustainable use and repair of Australia's coastal and marine environments. There are a number of Coasts and Clean Seas programs. The main programs involved in efforts to improve catchment management are the Clean Seas Program (CSP), Coastal and Marine Planning Program (CMPP) and the Coastal Monitoring Program (CMP).

Clean Seas Program (CSP)

The CSP finances capital works that:

- create opportunities for wastewater reuse
- improve water quality through the construction of pollution control infrastructure
- spread the benefits of practical and / or innovative technologies and management techniques
- involve waste management techniques in the maritime, aquaculture, urban development and rural industries

The CSP works with institutions associated with urban catchments. It focuses on business and community empowerment, encouraged through strategic allocations of NHT funds. CSP works with a range of urban communities to target their particular problems, encouraging innovative solutions to problems where there are barriers to conventional approaches (low ratepayer bases or large seasonal tourist fluxes, for example).

CSP also targets the source of problems. This can involve on-site audits at industrial and commercial premises to inform specific pre-treatment technologies which need to be installed (for 'dirty' urban industries such as

bus and truck depots and vehicle washing). CSP has also taken a lead in promoting wastewater reuse as a tool in reducing catchment, coastal and marine pollution. Such initiatives require full commitment from enforcing authorities and the clients within their jurisdiction.

Employing a budget of $51M, 72 locally significant projects and 16 nationally significant projects are already being implemented to improve water quality in the lower parts of the catchments. Examples of CSP projects can be found at appendix A.

Coastal and Marine Planning Program (CMPP)

The CMPP plans to engender integrated approaches to management by:

- coordinating independent authorities into regional and sub-regional teams and;
- addressing coastal planning and management deficiencies.

CMPP emphasises plan making. As integrated planning (catchment / estuarine) mostly relies on partnerships, project success requires agreement at each stage in the planning process. This represents agency and public commitment to apply prescribed actions. The program encourages agency integration rather than the creation of additional management structures such as authorities and commissions. Agencies maintain jurisdictional independence but agree to apply respective laws and policies complementary to other CMPP partners. Agreements encourage horizontal and vertical integration within and between agencies by resolving general policy conflicts. General agreement provides a platform for more complex negotiations over subsequent detailed planning and management decisions.

CMPP cultivates an increased awareness and capacity for integrated coastal and marine planning at all stages. Further details of the program are at appendix A.

With a budget of $5.5M, the program has so far initiated 10 Steering Committees with an average of 10-15 representative interests on each Committee. At full capacity (estimated 45 projects) CMPP will engage between 450 and 700 coastal and marine management agencies and participants from government, the community and industry into its integrated planning process.

CMPP's 41 projects extend over 35% of Australia's coastline covering more than 90% of Australia's coastal population (by Local Government Association - LGA). This includes 4 planning "hotspots" (Botany Bay, Port Phillip Bay, Derwent Estuary and Perth Coastal Waters) characterised by large numbers of interests, managing agencies and intense environmental, economic and social issues. With its remaining funds CMPP will now target selected locations and

regions to increase its effectiveness in other planning "hotspots" and existing coverage gaps.

Coastal Monitoring Program (CMP)

The Coastal Monitoring Program (CMP) promotes projects that identify threats to coastal and estuarine environments and relate management and planning actions to address those environmental threats. For example, the CMP has funded several projects around Australia to address the important issues of water quality and habitat decline in estuaries. Results from monitoring projects can contribute a reduction in threats by influencing changes in management practices and planning.

Capacity Building Program for Coasts and Clean Seas

A Capacity Building Program, designed to support, resource and provide impetus to stakeholders and encourage them to create the necessary change to improve their management approaches and reduce their impact on the coastal and marine environment, has been running for 3 years. The program is aimed at managers from all spheres of government, resource extraction or resource management sectors, recreational user groups, tourism industry, scientific institutions, and community interest groups. It supports a range of education, training and information exchange initiatives ranging from development of national codes of practice and guidelines with key industry and professional associations, to the establishment of a series of short courses around Australia to enable professional development and training specifically designed for local managers.

Coast Care Program

Under the Coast care Program many local community groups have become increasingly involved in repairing damaged coastal environments. Groups undertake many types of projects including remediation of catchments. An example of the type of work that can be undertaken is the Swan Bay Rehabilitation Project (see appendix F).

Other Activities

Flood Warning

A further example of successful involvement of all levels of government in a catchment-based approach is the Flood Warning Consultative Committees that operate in all States and Territories. Represented in these committees is the Bureau of Meteorology, the State Emergency Services and water-related organisations, Local Government, and in some instances local community groups. The committees set the priorities for flood warning system

enhancements in each State and identify the roles of the relevant organisations in the provision of the Total Flood Warning Service. The committees have been so successful that in some States they have evolved into Floodplain Management Committees, taking a wider interest in catchment-based floodplain management activities.

The existing flood warning arrangements are tenuous, however. The current political and economic environment is one where the role of Government in the provision of services is being closely scrutinised and many agencies are not identifying the provision of flood warning services (or general community service obligations) as being part of their core business activities. The 1995 Portfolio Review of the Flood Warning Program Upgrade recognised this, recommending that any arrangements involving the coordination of all levels of government be formally ratified.

Data and Indicators

Effective planning and management requires good information to form the basis of sound decision-making. The role of state of the environment reporting (SoER) is to assist in providing such information. Indicators from the land, inland waters, biodiversity and estuaries and sea themes are particularly relevant to catchment management (see http://www.erin.gov.au/environment/epcg/soe.html). However, national state of the environment reporting may provide information more relevant to policy development as the scale of information provided may not be sufficiently detailed for local management decisions. A set of core indicators have been developed in conjunction with the ANZECC SoE Taskforce which are intended for use at all scales. A number of these indicators, relating to the land and inland waters, are relevant to catchment management. For example, the inland waters indicator relating to nutrient loads and concentrations will help identify sources of nutrients, thus indicating areas that require improved management.

4. Mechanisms for monitoring, evaluating and reporting on catchment management programs, including the use of these reports for state of the environment reporting, and opportunities for review and improvement.

Assessing catchment-based responses to natural resource management issues requires consistent monitoring of terrestrial and aquatic biodiversity and water quality. Data must be collected and managed at an appropriate scale to ensure effective catchment planning and local action.

To be of any real use to stakeholders, who manage the land and water resource data must be available to catchment planning and implementation organisations. These organisations need to be aware of all the data available within the catchment and the means to address any significant data gaps.

Any approach to monitoring within catchments needs to include the full range of local organisations and groups to ensure local ownership therefore averting the risk of local catchments developing parallel systems and collecting data that they feel meets their needs.

There are great differences across Australia in the levels of data and the ability to manage this. Overall there are likely to be more data poor areas than data rich ones. It is important to identify where these data poor / data rich areas are and which are the missing data layers. In determining what data to collect to fill gaps, an assessment of the need for the data, the collection methods and the data's usefulness in addressing environmental or natural resource issues needs to be balanced against the cost of collecting and maintaining in the long-term.

Nationwide Initiatives

Australian River Assessment Scheme (AusRivAS)

Nationally consistent methods for monitoring river health are being implemented Australia-wide using the Australian River Assessment Scheme (AusRivAS). In addition, significant resources are being devoted to improving, upgrading, and refining existing methods. By the end of 2000 the Assessment will have measured river condition by taking approximately 8548 samplings at approximately 3810 sites throughout Australia.

These sites were selected by State and Territory water agencies in consultation with regional catchment and water managers, and with local community groups. Initial assessments, based on early outputs of the AusRivAS tools, are progressively being incorporated into State of the Environment reporting in most States and Territories and are progressively being made available via the World Wide Web. Final results covering all of Australia will be available in

late 2000 and will be reported in the next national State of the Environment Report and in the National Land and Water Resources Audit. It is also anticipated that the results of the Assessment will be available electronically via the World Wide Web from Environment Australia (EA).

Australian Rivers and Catchment Condition Database (ARCCD)

The Environmental Resources Information Network (ERIN) is the custodian for the ARCCD (previously known as the Wild Rivers Database). This is a product of the Wild Rivers Program initiated by the Australian Heritage Commission in 1992. This database is useful for monitoring, evaluating and reporting on catchment management programs, and for developing such programs.

Environment Agencies in each State collaborated in the data gathering and the identification of rivers to be managed for natural values.

The database is provided to Commonwealth and State agencies. Most State agencies continue to update information in their State's domain, and provide the updated material to the Commonwealth under reciprocal arrangements with the supply of the collated database.

The intention is to make this information available via the "Australian Atlas". A prototype of this on-line mapping facility is on Environment Australia's Internet site, with the complete application forming part of the National Land and Water Resources Audit.

Database

The ARCCD has defined sub-catchments based on elevation and flow properties of continental drainage lines. These can be used to create geographically accurate catchment boundaries at a useful scale for management purposes. The data can also provide information on disturbance levels and river condition within catchments.

The data was collected by relevant Commonwealth and State agencies, and derived from other programs such as the National Wilderness Inventory (which generated the Australian Land Disturbance database).

River Disturbance Index (RDI)

The goal of the original Wild Rivers Project was to identify "wild" rivers. These are rivers for which the biological, geomorphological and hydrological processes of river flow have not been significantly altered by colonial or modern society. The River Disturbance Index, a rating on a zero-to-one scale,

provides a comparative measure of wild river potential along the continuum from undisturbed or "wild" (RDI=0) to grossly disturbed (RDI=1).

It includes two components, measuring disturbance within the catchment (Catchment Disturbance Index (CDI)) and to the flow regime (Flow Regime Disturbance Index (FRDI)).

A Sub-catchment Disturbance Index (SCDI) is first derived by rating small sub-catchments using data on the location of settlements, infrastructure, point sources of pollution (including extractive industries), landcover and dominant landuse. CDI then combines the SCDI values for all upstream sub-catchments weighted according to an estimate of their relative contribution to total runoff. Thus the wild river potential of a sub-catchment may be enhanced by 'dilution' from less disturbed confluent tributaries or diminished by upstream disturbances. FRDI is derived using data relating to flow impediments (dams, weirs, locks), flow diversions, channels and levees. All component factor and index scores for each stream section are stored in a GIS database which can be readily interrogated or displayed allowing closer examination of individual rivers and the factors affecting their RDI.

State of the Environment

The first independent national State of the Environment Report was published in 1996 (see http://www.erin.gov.au/environment/epcg/soe.html). This assessed the condition of terrestrial environments in Australia. National SoE reports must now be produced every five years as a requirement of the recently enacted Environment Protection and Biodiversity Conservation Act 1999. These reports will thus provide ongoing monitoring of the state of catchments in Australia and provide an indication of the success of ICM programs.

Monitoring of catchment management programs will be required to assess their effectiveness. Information generated as part of this assessment could be highly useful for SoE reporting, particularly if similar indicators are used. There is a great opportunity for the environmental indicators developed for SoE reporting to be used as performance indicators for catchment management programs if appropriate.

The monitoring of catchments also provides opportunities for cooperation and coordination between agencies or projects. For example, the SoER Unit and the National Land and Water Resources Audit are cooperating in a project to examine the occurrence of exceedances of water quality guidelines. This project will provide information for the 2001 State of the Environment Report. The SoER Unit has also commissioned a project to identify the extent of the occurrence of algal blooms that will provide information for the inland waters theme of the SoE report.

National Land and Water Resources Audit

The Commonwealth Government policy documents *Sustainable Agriculture* and *Saving Our Natural Heritage* included a commitment to a National Land and Water Resources Audit at a cost of $32M over five years. The Audit is intended to address the need for a nationwide appraisal of the state of Australia's natural resources base. The Commonwealth Government's policy documents indicated that the Audit would include a National Water Resources Assessment (NWRA). This Assessment will be carried out as an integral part of the Audit and focus on the extent, supply capabilities and demand for water, including environmental needs. As an initial step in the NWRA, the Sustainable Land and Water Resources Management Committee (SLWRMC) Subcommittee on Water Resources agreed to organise a workshop among the key players in the Commonwealth, States and Territories. The workshop's task was to scope the NWRA and to ensure that the objectives can be met in a manner which recognises the practicalities of using existing data sets and the limits on the resources available. The workshop was held in August 1997. The National Land and Water Resources Audit (NLWRA) Management Unit has now identified seven major themes that the Audit will address. The first of these themes - Surface and Groundwater Management - Availability, Allocation, Use and Efficiency of Use – is especially relevant to catchment management.

Surface water resources assessment

The Bureau of Meteorology has responsibility for the measurement and assessment of meteorological elements such as precipitation and evaporation in support of the measurement and assessment of Australia's surface water resources. Activities in the area of water resources assessment include the upgrade of climate monitoring networks to meet the needs of the water industry, the identification of a network of benchmark streamflow gauging stations for monitoring the effects of climate variability and change on water resources, and the compilation of a national catalogue of gauging stations operated by the various water-related agencies.

Waterwatch Australia

Waterwatch Australia was initiated by the Federal Government in 1992 in recognition of a growing concern for water quality by the Australian people. It recognises that a community-driven approach to catchment management and improving the health of our waterways is of utmost importance. Successful and effective community involvement can only be achieved by raising the knowledge and skill-base of the community and through the creation of effective partnerships between community, all spheres of government and the private sector. The primary strategy for achieving this has been to assist the community to establish waterway-monitoring networks. These networks collect meaningful information about the environment, which

they share with catchment managers and other sectors of the community. Information collected about environmental issues catalyse community groups to take action to address such issues. Further information about Waterwatch is at appendix A.

Program Evaluation

Evaluation and review of the programs / initiatives that look to address catchment management issues is also vital. The NHT and its component programs are currently undergoing an externally conducted mid-term review. The report, due in November 1999, will assess the progress of the Trust towards attaining its objectives, and will recommend measures for ongoing monitoring of Trust outcomes. Regional and catchment issues are one of the key themes being reviewed.

Coast and Clean Seas, one of the NHT's programs, is also subject to evaluation at a different level. Each of its funding programs and their derivative initiatives has a particular set of evaluation measures relating to funding, coverage and effectiveness. At the project level, each set of management and planning activities has an evaluation component designed to feed back into that activity and make on-going changes as required.

Future monitoring Responsibilities and Opportunities for Review and Improvement

To ensure effective catchment planning and local action, data must be collected and managed at an appropriate scale and *must be easily available to those with the responsibility for managing catchments*. Currently, data loss is a considerable issue across Australia. Many individuals and organisations collect and analyse relevant data that never sees the light of day, or they move on, and another group or individual later repeats their effort. One way of preventing data loss and ensuring data is available to those who need it, is to establish and maintain regional meta-databases, located within the catchment organisation. These databases would list the type, location and parameters of all data sources within the catchment. Clearly the National Land and Water Resources Audit would be important in the development of such databases.

Work is already well underway to establish a national meta-database that includes such information on water quality monitoring programs. Environment Australia's Environmental Protection Group, in partnership with the National Land and Water Resources Audit, is currently developing the *Water Quality Monitoring in Australia* database. This database will contain listings of water quality monitoring programs throughout Australia. The database is expected to be available on the Internet in mid-2000 and should facilitate improved water quality monitoring throughout Australia.

The Australian River Assessment Scheme (AusRivAS) could also be useful in the development of such meta-databases. As already explained, by the end of 2000, the Australian River Assessment Scheme will be able to provide an Australian-wide perspective on the current status of river health. However, the data set obtained will not, in most cases, be able to provide information on trajectories in river health at a particular site. To determine whether management actions are required, what type of action is required and the necessary intensity of management, this information is vital. It would therefore be useful to continue running a scheme like the Australian River Assessment Scheme after the year 2000, to undertake repeat sampling the sites sampled during the present program and thereby provide the essential information about the stability of river health.

Given its national and international roles in hydrology and water resources and the monitoring of Australia's weather and climate, the Bureau of Meteorology is another essential component of any future mechanism for monitoring the impacts of water resources management practices. In some states, the last ten years has seen an increase in project-specific data collection, at the expense of a decline in the amount and quality of hydrological data collected for resource management purposes. Background information on climate variability, in particular temperature, rainfall and evaporation are essential to the interpretation of hydrological records impacted on by both catchment management policies and natural climate variability.