

National Land & Water Resources Audit  
*A program of the Natural Heritage Trust*

ESD Inquiry  
Productivity Commission  
LB 2 Collins Street East  
MELBOURNE VIC 8003

Dear Ms Thompson

Response from National Land and Water Resources Audit  
Draft Report - Implementation of Ecologically Sustainable Development by  
Commonwealth Departments and Agencies

The National Land and Water Resources Audit (the Audit) is tasked to provide nationwide assessments of Australia's land, vegetation and water resources now and in the future.

The Audit collates and assesses data on natural resource issues to provide information in forms suitable for decision makers. As part of meeting its objectives, the Audit will recommend monitoring and assessment systems for Australia's natural resources. The Audit, with its focus on providing information for decision makers, will also design and implement an Australian Atlas. This Atlas will display data collated during the Audit and forms a basis upon which a range of natural resource related data sets could be displayed within a distributed network Australia wide; for example water quantity and use and type and extent of vegetation.

The Audit's submission on the Productivity Commission draft ESD Report is confined to areas of core interest and responsibility for the Audit, namely recommendations 7.3 and 7.4.

*Recommendation 7.3: Consistent with the principles of good practice policy making, departments and agencies should regularly and as a matter of course monitor the efficiency and effectiveness of their ESD related policies, programs and regulations. As such the development of performance indicators against clearly stated objectives should be mandatory early in the policy development phase. In this regard the framework of the National Land and Water Resources Audit should be expanded and adapted to other areas, such as those highlighted in the State of the Environment Report; for example, biodiversity, air quality and fisheries.*

The Audit welcomes this recommendation and views the extension of activity within the Audit framework as the logical next step in ensuring the entirety of Australia's natural resources are monitored and assessed, and that this information is then readily available to decision-makers in forms that facilitate their deliberations on policy.

The Audit would be pleased to lead, in partnership with relevant agencies and groups, this extension of Audit role and has developed in its short time of operation some key competencies and experiences that would ensure a rapid and efficient extension of the Audit framework.

Some of the key issues that will need to be addressed in such an extension of activity are detailed in Attachment 1. Briefly, these are:

- determination of key attributes and systems that will link resource condition and trend with resource management opportunities;
- efficient collection of geo-referenced data sets;
- collation of data sets in a reporting framework that is comparable Australia wide;
- development of an analytical framework within which to assess and integrate diverse but inter-linked data sets;
- presentation of results as information in formats that will aid decision making; and
- data management, storage and updating using systems that facilitate accessibility while maintaining custodian ownership, roles and responsibilities.

*Recommendation 7.4 Data collection to ESD issues should be rationalised to avoid duplication of effort and coverage. The ABS should be given the major responsibility for developing, in consultation with stakeholders, standard classifications and consistent measurement protocols for the collection of state of the environment data and other sustainability indicators. The current work of the ABS in this area should be given a high priority.*

This Recommendation is endorsed in general intent. Australia needs an ongoing system of monitoring and assessment and interpretation of consequent data in a coordinated and integrated fashion that allows reporting in a range of formats and scales. This needs to be developed in a multi faceted system to meet the requirements of tiers of decision makers, including Catchment Committees, Local Government, State & Territory governments, Commonwealth agencies and Non Government Organisations.

In implementing the intent of this recommendation a number of issues need to be considered. These include:

Legislative framework - an Australia wide framework is required that gives recognition to the need for monitoring and facilitates data compilation, reporting and its application to policy development and decision making.

Coordination and Leadership - this needs to be undertaken in a bipartisan and independent manner suggesting that the leadership for the initiative and any coordination unit might best be located separate from the core Commonwealth, State and Territory natural resource management agencies. Partnerships - Across agency, multi tiered agreements and protocols for collecting, sharing and reporting data in forms that aid decision making are essential for the system to operate. The Audit has gained invaluable experience in this area.

Links with community and industry - Monitoring systems in Australia increasingly include a community or industry component. Links in terms of data collection standards, protocols, reporting and application of findings to improved natural resources management are essential.

Data Analysis and Data Management capability - It is recommended that any Australia wide monitoring and assessment systems need to be implemented with distributed network concepts and systems as the framework. There also is a role for some central group to analyze data sets obtained from divergent sources across environmental, social and economic attributes to provide integrated products. This central group would also need to house and manage Australia wide compiled and enhanced data sets, develop data standards and oversee improvement in data collection, analysis, reporting and links to decision making.

Resources - Resources are required for a range of component activities across the various partners involved in such an initiative, including coordination, data collection, and data management and reporting. There will be efficiencies developed over time, as existing data collections adjust to the standards and systems required. Effectiveness in decision making will also lead to substantial savings in investment in the medium to long term. Nevertheless, resources to implement such an initiative will be substantial, at least in the short term.

Links to decision making - The prime role of the coordinating group is to provide data products that facilitate informed policy development and implementation. It is important therefore that strong links and feedback mechanisms are forged between policy makers and the coordinating group. ' Continuity - An initiative such as this needs to be implemented bearing in mind the long time scales of natural systems that drive and provide natural resource management opportunities. Some guaranteed level of resourcing over long timeframes is essential.

In recognition of the complexities involved in establishing this initiative it is recommended that a Steering Group be established to work through these and related initiatives. Membership of the Steering group would need to include senior representatives of State and Commonwealth agencies, industry and community groups that are collecting and using data, experts in data management, natural resources management and policy development and representatives of Non Government Organizations. The Audit would be pleased to contribute and participate in such a group.

A client specification would be an essential first task for such a group and would provide a framework upon which to develop a Strategic Plan and Implementation Schedule.

Should you require further information please contact Colin Creighton, Executive Director, National Land and Water Resources Audit.

Yours sincerely

Roy Green

Chair  
National Land and Water Resources Audit Advisory Council

30 March, 1999

## Attachment 1: Key Issues in Auditing Australia's Natural Resources

It is the Audit's experience that monitoring and assessment of Australia's natural resources requires the following key activities.

Determination of key attributes and systems that will link resource condition and trend with resource management opportunities

*Background* Our understanding of changes in resource condition in Australia is poor. Data is patchy, trends are difficult to infer and the links between condition and management action is at best poorly defined. While much work has been done on indicators [e.g. State of the Environment], attributes and analytical frameworks that adequately define resource condition and link natural resource condition to priorities for management activity are very limited in their scope and application. Natural resource management involves environmental, social and economic components. Data sets that are both spatially and temporally located are limited.

As an example of the magnitude of the problem, the Audit is investing \$1.4M to develop for the first time in Australia a comparable monitoring system for Australia's Rangelands. Routine collection of data and interpretation effort above that effort already underway in data collection is estimated at about \$0.5M per annum.

The best Australia wide data set is probably surface water quantity. The attached paper on issues facing water resource management in Australia [Attachment 21 illustrates the range of issues yet to be resolved before this data set has an ongoing reporting capability and can be readily applied in a resource management context.

*Actions:* The Audit will provide the most integrated Australia wide assessment of the capability of existing data collection activities in terms of their ability to deliver an integrated monitoring and assessment system for Australia. As part of the Audit findings comments and recommendations will be made to improve this capability. A careful evaluation of these recommendations will need to be undertaken and resources provided where appropriate to implement Audit findings.

There also needs to be a recognition that the Audit is not able, with the resources available, to cover the full range of natural resource issues. For example, chemicals in the environment, marine systems and fisheries and air quality are not covered in the Audit with work on biodiversity limited.

Collection of georeferenced data sets

*Background* Australia does not have comparable methods and reporting systems in place. There are some exceptions. For example the Australian Collaborative Land Evaluation program has developed an excellent framework and standards for soil survey and can be used as a model for similar initiatives. Further, much of the data collection is inappropriate. For example, many agencies keep excellent records of blue green algae outbreaks whereas what is required is monitoring before events so that the

contributing factors to outbreaks such as limnology, water chemistry and physical processes are understood from a management perspective. This concern for inappropriate data can be widened to cover water quality generally. Most water quality monitoring is not correlated to flows and linked to peak and low flow periods. This implies that load information, an essential data set for management and to determine the cumulative impacts of catchment use on instream biota, estuaries and nearshore areas is not available for many Australian systems.

*Actions:* Protocols and standards need to be developed and implemented for many data collection activities. Links to industry and community monitoring activities need to be developed and systems established to collate data from a range of sources and then make these collations and their interpretation readily and routinely available.

Collation of data sets in a reporting framework that is comparable Australia wide  
*Background* There is Australia wide limited comparable reporting frameworks, integrated electronic systems and no framework of spatial data upon which to present reports. This is currently being addressed to some degree through initiatives such as State of the Environment reporting and the ANZLIC Australian spatial Data Infrastructure.

*Actions:* Increased effort is required to ensure that Australia wide comparable reporting occurs and those reporting systems are electronic and readily upgraded. As part of the Audit activities, in partnership with ANZLIC, an Australian Atlas is being developed as a framework upon which to display Audit data sets and finer scale information as held by States and Territories. Increased effort across agencies to support such initiatives is required, particularly in terms of obtaining Australia wide agreement for the sharing and ready access to core natural resources data sets.

Development of an analytical framework within which to assess and integrate diverse but inter-linked data sets

*Background* No integrated systems exist in Australia for the compilation of data sets covering environmental, economic and social attributes. The Audit will be attempting to provide such an analytical framework. This is based upon a better understanding of catchment processes such as sediment, water and nutrient movement through the landscape and by reviewing and establishing a social and economic framework data set pertaining to natural resource management. An integration Blueprint will be developed as part of the Audit to pilot the integration of diverse data sets and provide products of direct relevance to policy development.

*Actions:* R&D are required in this area, particularly from a multidisciplinary perspective. Reiterative review of proposed products is also essential, particularly from the perspective of the decision makers and their needs for information.

Presentation of results as information in formats that will aid decision making

*Background* The links between social, economic and environment attributes form a decision making and policy development perspective is poorly defined. Further, there

appears to be limited incorporation of information into policy decisions. More rigorous systems for linking information to policy development and implementation are needed. Other problems arise in that there is not a universal recognition that political time scales are much shorter than natural resource management timescales.

*Actions:* Improved Decision Support Systems are needed that make links between information and policy development explicit. This requires not only R&D but a more detailed appreciation of the various needs and requirements of policy maker.

Data management, storage and updating using systems that facilitate accessibility while maintaining custodian ownership, roles and responsibilities

*Background:* One of the key issues is apparent intellectual property. Many States and Territories are developing their policies of data access and availability. Certain data sets such as digital cadastral data bases are large revenue earners and are maintained and managed accordingly. Other data sets like water resources and soil data are unlikely to have a high 'income earning capacity and are of great public benefit if made accessible. Data custodianship and data management are associated issues that all States and Territories are addressing across their agencies.

*Actions:* Protocol and possibly legislation for sharing and making readily available at the costs of transfer core natural resources management data sets needs to be considered. This might need to be done in a similar fashion to that for demographic data as managed by the Australian Bureau of Statistics. Simultaneous to this there is a need to recognize that distributed systems and ownership and management of data rests with data custodians in States and Territories. States and Territories might need support in establishing and maintaining appropriate access systems both within their agencies and across agencies Australia wide.

## WATER ISSUES FOR AUSTRALIA

### *A perspective from the National Land and Water Resources Audit*

Following are some key issues for Australia in water management, as perceived by the National Land and Water Resources Audit as it develops and implements its Australia-wide assessment of Australia's natural resources.

#### 1. Regular reporting and a framework for this reporting

*Problem Statement-* Despite numerous excellent activities and a wealth of information on water resources being amassed [e.g. Water Allocation Management Planning activities] there is neither Australia-wide nor State by State reporting frameworks within which assessments of the status, trends and condition of our water resources can rapidly occur.

Data is still patchily reported in most jurisdictions. In most jurisdictions there is limited effort to turn data into information that is publicly accessible, and limited effort in ensuring this information includes interpretation of the implications to resource management of changes and trends.

*Audit Contributions:* The National Land and Water Resources is required, as one of its objectives, to provide national land, vegetation and water - surface and groundwater - assessments as integrated components of the Audit.

Software and electronic systems are available so that regular reporting could be easily facilitated, with readily available public access to summary information through the worldwide Web. The Audit will display an example of a reporting system as part of its work and will include in this reporting both Review 85 and current data.

*Suggested Actions:* A system based on the Audit activities in partnership with States and Territories, with modifications as necessary, could be adopted Australia-wide as an ongoing reporting tool.

#### 2. Volumetric allocations

*Problem Statement.* It is very difficult for licensing officers across Australia to carefully consider further allocations when the quantum already allocated remains unknown.

*Audit Contributions:* The Audit will compile use data based on that the States and Territories can readily collect. At most this data set will point out [through comments made by States and Territories] key basins within which conversions to full volumetric allocations are regarded as a priority.

*Suggested Actions:* All States need to move to volumetric allocations, reviewing all existing non-volumetric licenses and providing for those licensees a seamless transfer to a volumetric license as soon as feasible. Once all licenses are volumetric, reporting and analysis on abstractive use of our water resources will become a much more



achievable task and will provide managers with a better platform upon which to base further allocation decisions.

### 3. Use and metering of our water resources

*Problem Statement.* Catchments across Australia are at differing levels of water resource development and use. In parallel with the need to move towards full volumetric allocations is the need to tag allocations with use. For those water resources systems where total abstractive use seems to be approaching sustainable yield, initiatives to ensure that metering and water quantity management are in place then need to be evaluated.

For example, a priority system for metering and license change would be where a cap is placed on the resources of a particular catchment or region. Analysis of system use within this cap would then determine if it were appropriate for those license types that allow for unquantified and uncontrolled abstraction of surface or groundwater resources to be reviewed.

*Audit Contributions:* The Audit will fund State and Territory agencies to compile use data where this is readily available. Compilation will be based on use types as defined by the Australian Bureau of Statistics. The Audit will not make any detailed assessment of the need or otherwise for metering or change in license type. Rather, the Audit data compilation will include interpretation to categorize water resources in terms of their level of development and therefore the relative need for management techniques such as licensing, conjunctive use and metering.

*Suggested Actions:* Application and regular updating of an agreed and comparable system of use attributes is required across Australia. This would aid analysis, decision-making on further allocations, any review of allocations, management and reporting as might be required by catchment, State or Australia-wide. The Audit compilation will provide a framework upon which this initiative might be developed.

Review of systems management arrangements will be facilitated based on the categorization developed and applied during the Audit and would be a useful follow up activity by States and Territories in the context of their particular Water Resources Acts.

### 4. Understanding of catchment hydrology

*Problem Statement.* One of the key challenges before the Audit is to make an assessment of the change in catchment hydrology as reflected by stream flow and groundwater quantity. Despite having in excess of 100 years of stream-gauging records in many catchments, researchers suggest that competent systems are not available that allow for a rapid interpretation of changes in catchment hydrology. This has implications for assessment for development opportunities, environmental flows and assessment of any remedial works or major changes in land use patterns.

*Audit Contributions:* The Audit is discussing this issue with the CRC for Catchment Hydrology and will pilot the application of methods of assessment, probably using Victorian water resource data.

*Suggested Actions:* Further R&D is required to maximize the application of existing data to resource management.

## 5. A systems approach

*Problem Statement.* Ground and surface waters are inextricably linked with conjunctive use a key issue in many of the highly developed rural areas of Australia. Management in many organizations still separates ground from surface water in terms of inventory, data, reporting and, most importantly, licensing requirements.

*Audit Contributions:* The Audit will characterize Australia's water resources as a framework for improved systems management.

*Suggested Actions:* For any complete assessment of water resources for a catchment and the meeting of requirements such as environmental flows, water resource managers need an integrated system. We need to ensure that surface and groundwater with their various attributes are recognized, particularly in terms of licenses, as linked systems. Some further analytical work is needed in many catchments to fully characterize system behaviour and to underscore systems management.

## 6. Groundwater

*Problem Statement.* Groundwater is selected as a particular issue, while recognizing the need for a systems approach, because quantification and management of groundwater resources is so far behind surface water management in Australia. We still do not have recognized and agreed management zones for groundwater across Australia. Most groundwater licenses do not involve metering or reporting, nor do we have agreed systems and methods for assessing sustainable yield.

*Audit Contributions:* The Audit through its contracts with States and Territories, will be defining groundwater management areas and collating existing groundwater resource and management data.

*Suggested Actions:* States and Territories might wish to base an analysis of the needs for improved groundwater resource definition and management requirements based on the findings of the Audit.

## 7. Water quality

*Problem Statement.* According to an Environment Australia review, Australia-wide we expend between \$80-110 million per annum on water quality monitoring. While much of this monitoring is specific purpose, it is to be noted that despite this investment Australia cannot provide integrated and comparable water quality reporting across Australia.

Not only can we not rapidly provide reporting in terms of condition and trend, but also most importantly from an ecosystem and resource management perspective, we can provide only very limited information on loads. Loads are essential if we are to link water quality to water quantity / catchment hydrology and to catchment management. This would then provide a framework for reviewing land use and land management and prioritizing remedial actions.

*Audit Contributions:* The Audit in partnership with States and Territories will compile Australia wide water quality data for key parameters only - EC, pH, total N, total P and turbidity. Where possible, trend data will be reported. As part of the Audit's task to recommend assessment and monitoring systems for Australia's natural resources, the Audit will make general recommendations only on the need for improved water quality monitoring and the need to establish water quality links with catchment hydrology / water quantity.

*Suggested Actions:* Water quality monitoring, its nature, extent and application of results together with the implementation of systems for comparable Australia wide reporting need to be addressed.

## 8. Resource protection

*Problem Statement.* Increasingly, as a policy issue we are likely to see across Australia calls for resource protection. '*Resource protection*' here is used separately from conservation and deals particularly with the protection of the status of our natural resources as they are used by others in a particular catchment. An example is dryland salinity. If we are to address dryland salinity, Australia will require in many catchments major changes in water balance and therefore major changes in land use pattern and land use activities that will protect down slope land and water resources.

*Audit Contributions:* The Audit will be collecting information to illustrate the policy issue of resource protection through its work on dryland salinity in a series of case study catchments. These will include Wanilla, Eyre Peninsula and Esperance, WA. Case study catchments in the Murray Darling Basin are yet to be determined.

*Suggested Actions:* The concepts of resource protection and implications for natural resource management policy need to be addressed in an integrated fashion. Water resource management is a key part of such deliberations.

## 9. Guidelines for water resource infrastructure development

*Problem Statement.-* There is much discussion across Australia about water resource development, particularly for tropical systems, or redevelopment for more efficient and effective water use, such as within the irrigation areas of temperate Australia. Discussion is often polarized. Adoption of Australia-wide guidelines would assist in ensuring that the various debates about water resource development are undertaken within a more analytical and consistent framework, thereby ensuring decision-makers are better able to determine the most appropriate level of development.

*Audit Contributions:* Draft Australia-wide guidelines for assessing infrastructure development are being developed as part of the Audit, and will be available before June 1999 for review and, if appropriate, implementation.

*Suggested Actions:* Draft Guidelines are reviewed, possibly through their application to several current proposals, as a basis for their adoption Australia wide.

10. Recognition of the differing status across Australia of our surface and groundwater resources -

*Problem Statement.* Much debate in the water resource community focuses on heavily used areas such as the Murray-Darling Basin. There remain many development opportunities in tropical Australia, which need to be recognized and accurately assessed as part of Australia's development.

*Audit Contributions:* The Audit's categorization of Australia's water resources will provide a framework for further analysis.

*Suggested Actions:* A deliberate emphasis needs to be placed on those areas where development has yet to occur to ensure balance and recognition of development opportunities by decision-makers, politicians and the community generally.

11. Integrated natural resource management

*Problem Statement.\** Water resource management and development has traditionally been undertaken in agencies quite separate from those that manage the waterways, their biota and their estuaries downstream. A more integrated approach to catchment and water resource management and development is essential.

Underpinning this is a recognition that the majority of Australia's population, and indeed the next 5 million people as our population increases, will all live within the coastal zone and will make particular impacts and demands and have expectations for the condition of our estuaries. Freshwater supply to estuaries is essential, as is water of particular quality. Estuary, waterway and catchment condition as an integrated system provide an excellent framework upon which to develop benchmarks for catchment and water use performance and need to be incorporated within management planning.

While it remains challenging for us to link land, water and vegetation issues across catchment, creek, waterway and estuary, simultaneously we also need to meet the challenge of integrating natural resource issues with the social and economic requirements of the Australian community. In addressing this challenge, the Audit has found there is a lack of analytical systems and frameworks within which to report on the status of Australia's resources and their development opportunities.

*Audit Contributions:* The Audit, in partnership with natural resource agencies across Australia, will be compiling data and attempting to provide an integrated assessment of catchment - waterway - estuary health. Superimposed upon this will be a resource

accounting system that allows for the incorporation of socio - economic data.  
Reporting at a catchment scale in an integrated fashion will be a key Audit product.

*Suggested Actions:* Further R&D is required in this area. Review of Audit findings and analytical methods might provide a useful framework for progressing these issues.

*Further Information on Audit Activities:*

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