The Secretary
House of Representatives Standing Committee on Environment and Heritage
Parliament House
CANBERRA ACT 2600

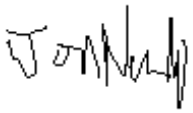
14 July 1999

Dear Standing Committee Members,

This letter carries our submission to your recently advertised review of catchment management in Australia. We are based in Tasmania, so many of our observations of catchment management are based on local conditions but we believe that much of our submission is relevant Australia wide.

The submission is attached below.

Yours sincerely,



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SUBMISSION to

the House of Representatives Standing Committee on Environment and Heritage

Inquiry into Catchment Management

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30 July 1999.

RECOMMENDATIONS

Recognising:

- the degradation of the nation's natural resources over the last two centuries;
- the serious consequences of continued unsustainable use of the nation's natural resources;
- the importance of a harmonious national approach to resource management amongst all Australian States;
- the administrative efficiencies to be gained by the national sharing of information and resource management arrangements;
- the success of national approaches to resource management achieved over the last decade by national forums such as ANZECC and ARMCANZ;
- the difficult and intractable nature of some of the problems faced by resource managers; and
- the growing awareness of the need for increased respect, care and stewardship of the living creatures and communities which inhabit the water environment.

We recommend

that the committee urgently seek ways to:

- enhance national programs aimed at providing leadership, coordination, research, and information dissemination;
- increase resources to specific programs currently running under the NWQMS framework, and those of key national institutions such as LWRRDC, NLWRA, and CSIRO;
- maintain and enhance implementation of the COAG water reform agenda, with particular emphasis on its environmental components (notably its support for environmental flows and its support for the NWQMS);
- facilitate, through all available avenues, the application of the CAR principles to the identification and reservation of important freshwater ecosystems and communities;
- in particular, seek avenues for expanding the COAG water reform agenda into the area of the protection of aquatic ecosystems and communities;

- maintain and enhance the flow of information, particularly using key national and State web sites, electronic newsletters, and meta-databases;
- maintain and enhance the use of catchment-based approaches to the management of the nation's natural resources.

Further

we draw the committee's attention to a number of particularly important and intractable issues which need increased resourcing and focus:

- the development of approaches allowing the effective assessment of the long term sustainability of irrigation proposals, including major agricultural dams whose viability rests on irrigation proposals;
- education programs encouraging increased respect, care and stewardship of the living creatures and communities which inhabit the water environment;
- increased understanding of sub-soil drainage, particularly with regard to the development of models for use in sustainability assessments, and the data needed to support reliable use of such models;
- the management of cumulative effects of small decisions, such as water allocation licences or dam permits – including consideration of the "tyranny of small decisions" effect, and the precautionary principle;
- the continued need to refine and extend programs aimed at establishing and monitoring river health, including the use of real-time sampling of physical and chemical parameters, and the use of macro-invertebrate sampling and characterisation techniques;
- the need to identify, assess and map aquatic ecosystems and communities;
- the need for continuing support through the NWQMS for the management of particular general problems: sewage treatment, wastewater re-use, stormwater management, and water conservation;
- the need to progress the update of the NWQMS water quality guideline document in a way which does not loose important technical detail;
- the need for research into the "passage" needs of native fish and crayfish, and the concurrent development of detailed working guidelines for the construction, operation and maintenance of fish passage structures;
- the need to encourage the various States to develop statutory links between the community-based catchment planning process and the wider State decision-making framework. The model provided by the Queensland Environment Protection Policy on Water bears close examination; however each State is likely to favour different approaches depending on the way the local catchment management planning process has developed;
- the need to encourage and support community-based catchment planning groups in considering a wider range of issues, including, for example, questions of the cumulative impact of water allocations and dam permits, and the questions of fish passage provisions and freshwater ecosystem reserves. This encouragement must take into account the statutory frameworks operating in the different States, as well as the availability of baseline information. The development of GIS information available over the Internet should presumably play an important role; and
- the need for research and development, and the ready availability of information, relating to the cost-effective control of water pests (such as carp, willows and water hyacinth).

These lists are not in priority order. We believe all these issues are extremely important, and deserve the committee's energy, imagination and wisdom in seeking ways in which to facilitate national leadership and coordination in finding solutions or mechanisms for better management.

OVERVIEW

The development of catchment management

The development of catchment management programs and processes over the last 50 years has been fundamental to the management of what is, arguably, Australia's most pressing environmental problem: broad scale land degradation.

Australian States have, by virtue of the Australian Constitution, responsibility for the management of natural resources. We are, however, all Australians first and foremost, rather than Tasmanians. In this context, leadership by the Commonwealth Government, and by ministerial forums such as COAG, ANZECC and ARMCANZ are *essential* to achieve harmonious State approaches to the management of natural resources, and to minimise inefficiencies in the development of resource management policies and programs.

To the extent that catchment management approaches across Australia have been able to achieve outcomes of resource protection and sustainable use, much is owed to these national and Commonwealth initiatives. We believe that, far from the need diminishing, the need for this kind of national leadership is now greater than ever.

Catchment management is an evolving philosophy. Initially, the movement grew out of the most basic and pragmatic issues. To illustrate with a simple (real) example: Municipality A's water supply dam is choked with sediment. The sediment has to be removed, and where better to put it than just *downstream* of the dam? Out of sight, out of mind. However, two years later, and twenty kilometers downstream, Municipality B's water supply dam is choked with sediment – the same sediment, in fact, that was moved by Municipality A out of their dam.

The first phase of catchment management was largely "river based". The second, more sophisticated approach, which we are now in, generally speaking, was to management not only the catchment's streams and rivers, but to also manage land uses within the catchment, and their impact (for example from diffuse source pollution) on the water environment. Key issues today are salinity, nutrients, sediment and acid drainage, and of course the sustainability of soil and vegetation resources. Pathogens and toxics are important local issues.

The third phase, which we are moving into, takes increasing account of living resources within the water environment. The water environment, which we wish to use to water our crops and our cities and industry, is in fact the home of millions of plants and animals. While some of these living things are valued for their beauty, or for their food value, we are also recognising that, quite apart from their usefulness to humans, these creatures need our care, respect, and protection. We are moving into the third phase of catchment management; the stewardship phase.

Value of a catchment management approach

The management of land, water and biotic resources must be managed using a system which depends on geographic boundaries, as the resources themselves exist in space and time, and decisions apply similarly in space and time. There are two logical boundary systems: biogeomorphological, and administrative. Unfortunately these boundary systems are almost never coincident, and this is the core of the problem. Water catchments are the most useful of the first category, while the borders of States and municipalities are the most useful of the second category.

Because landforms, soils, the water environment, and the land's biota are all interlinked by fluvial and ecological processes, from a strictly resource-based perspective, catchment boundaries are the most sensible boundaries to use in management programs dealing with natural resources. However, where such boundaries cross administrative boundaries, problems of coordination between different administrative regimes arise.

There are advocates both for catchment management, and for resource-based management on purely administrative boundaries.

On balance, however, we are strongly of the view that, in the long term, it will be more efficient to try to solve the problems of administrative coordination which arise in catchment management, rather than use a resource management regime which is based on administrative boundaries, attempting to address the problems created, for example, by the fact that water flows across such boundaries, and that important biological resources, such as forests or nature reserves, also cross administrative boundaries.

Methods of achieving sustainability

All life depends upon water. As Jacques Cousteau once said: "Our planet is a water planet; a jewel in the universe". Civilisations have arisen, and collapsed, within the cradle of the land's water resources. Most of us are aware of the rise and fall of the ancient civilisations of the Mesopotamian region. A similar pattern has unfolded in other parts of the world.

The natural resources of Australia, and of the world, are (in general) not being used sustainably. Over the last century, the resources of the forests, the rivers, and the ocean have been mined rather than harvested. Australian soils have been washed away, blown away, and degraded through waterlogging and salinisation. Many of our plants and animals have become extinct.

Catchment planning can, in full-blown form, become a vehicle addressing all these sustainability issues.

There are many methods of achieving sustainability. Among the most important are:

- control of soil erosion by wind and water
- control of soil degradation (especially salinity and waterlogging)
- protection of the lands waterways (surface and ground waters), through maintenance of natural processes, such as floods, and natural nutrient exchange cycles
- protection of the quality of water in the waterways through programs which maintain natural areas like wetlands, riparian vegetation, and aquifer recharge and discharge zones

- protection of the quality of water in the waterways through programs which control point source discharges through statutory approaches, and which control diffuse sources through a combination of statutory and community awareness programs
- fair allocation of water resources, taking the needs of aquatic ecosystems into account
- the development of comprehensive, adequate and representative aquatic reserves to protect all major aquatic ecosystems and communities

This list is *not* set out in order of importance. Indeed, the last point is probably the most poorly developed, and the need to address this issue is arguably the most important issue facing catchment management today.

Commonwealth programs, under ANZECC and ARMCANZ, have been fundamental in progressing work to date in these areas. The COAG Water Reform Agenda, in supporting many of the methods listed above (note explicit support by COAG for environmental water allocations, and for the NWQMS) has played a key role in enhancing sustainable use of Australia's water (and land) resources. The use of COAG financial incentives, linked to the achievement of key outcomes, has been crucial to the program's success.

As catchment management evolves as a process in Australia, there is continuing, and increasing, need for national and Commonwealth leadership in these areas.

Stakeholder roles

Key roles can be summarised:

Commonwealth

support for national programs providing leadership in three main areas: policy, technical, and data gathering

enhancing the availability of information used in the national context

State

development of State statutory and policy frameworks to support national initiatives (essential within the context of the Australian Constitution)

enhancing the availability of information used in the State context

providing support for municipalities and community-based catchment programs through the development of funding programs and decision-making frameworks

Municipal

coordination between statutory land use zoning schemes and catchment management programs

enhancing the availability of information used in the municipal context

providing support for community-based catchment programs through the development of funding programs and decision-making frameworks

Catchment management community groups

the development of community-based catchment management plans within the frameworks provided by National and State programs, taking into account local community values within the broad Australian approach.

Planning, resourcing, implementation, coordination and cooperation Mechanisms for monitoring, evaluating and reporting

These two headings summarise the quality control process, as illustrated, for example, in the ISO 14001 Environmental Management System standards.

The principle of quality control can be simply stated: "quality is not an accident".

To achieve desired outcomes from a complex system, careful planning is necessary. It is now widely agreed that this planning takes several fundamental steps:

Decide on the desired outcome
Plan for the outcome
Implement the plan
Monitor and audit the results (against the desired outcomes and plan)
Report the findings
Review the report: has the right outcome been achieved? Then finally:
Identify necessary changes to the plan for the next reporting year (ie the management cycle)

A variety of institutions, committees, working groups and ad-hoc arrangements have been set up at to meet the needs of stakeholders (within the roles and functions listed above) to carry out the tasks involved in these various steps. These include:

- National forums such as ANZECC and ARMCANZ, and COAG
- National institutions such as the Land and Water Resources Research and Development Corporation, the National Land And Water Resources Audit, and CSIRO's Division of Land and Water Management;
- Educational institutions
- State government agencies
- Municipalities
- Community groups, such as Landcare, Catchment Coordination Committees, Riverworks, and Waterwatch

The existence of a wide variety of committees and working groups, with membership crossing the boundaries of these more permanent groups, is fundamental to the wider process, as is the management of the huge amount of information generated in this area.

Here web sites, specialist libraries, publication programs, newsletters and structured on-going research and publication programs (such as the NWQMS) are vital in meeting information needs. Stakeholders are involved in various programs at various levels. The system certainly works, but how can it be improved, and what, if any, new initiatives need to be taken?

THE DEVELOPMENT OF CATCHMENT MANAGEMENT IN AUSTRALIA

Catchment Management seems to be focused around water quality issues, while land degradation and ensuing soil loss is one of the most consistent problems in catchments across Australia. Catchment Management therefore, should take into account the activities that have created land degradation and land management practices, rather than just focusing on water quality issues.

The activities that contribute to land degradation and water quality in Tasmania are (in order of severity):

Activity	**Major impacts**	***Relative Contribution***
Agriculture (broad acre cropping)	Nutrient leaching, over use of fertiliser, salination, poor cropping practices, no protection given to streams or drainage lines, erosion of soil due to removal of vegetation.	60-80% (N,P)
Agriculture (grazing)	Above issues and stream side erosion from hard hoofs, manure pollution, pathogens	60-80% (N,P)
Forestry (clear felling old native forest)	Siltation (and soil nutrient leaching) of streams and rivers, removal of vegetative soil cover, destruction of local aquatic ecosystems, loss of biodiversity, erosion of soil layer, water table increase, long term salination	20-50% (SS)
Forestry (clear felling)	As above	20-50%(SS)
Forestry (road drainage)	As above	20-50%(SS)
Forestry (road building)	As above	20-50%(SS)
Large scale hydro power dams	Stagnation deoxygenation of water, blocking fish migration, changes in flow volume, reduction to natural environmental flow, restriction of water supply to lower catchment areas due to evaporation effects	50-100%(DO)
Mining tailings dams	As above plus potential acid mine drainage pH issues	10-100%(pH)
Stormwater Flows	Suspended Solids, Pathogens, Nutrients	50-80% (N,P, bacto)
Sewage Disposal to waterways	Pathogens, nutrient load, seasonal (summer) algal blooms.	20-50%(N,P) 1-90%(bacto)
Farm dams	Habitat loss, restriction of water supply,	?

	Siltation, removal of swamplands, marshlands, erosion	
Municipal Roading	Soil erosion, Siltation.	20-100%(SS)

Notes: N,P -nitrogen, phosphorus; SS -suspended solids; DO -dissolved oxygen; pH -acid/alkalinity, bacto -bacterial loading.

These activities and their relative impacts are different depending on the level of development that has taken place in the catchment. Catchments in Tasmania's world heritage area tend to be more affected by forestry and hydro dam activities. Catchments in rural areas tend to be affected mainly by agricultural practices, and catchments in urban areas more affected by Sewage Disposal, and diffuse source pollution.

Environmental Impact and Regulation

The diverse range of activities reflected above are regulated in Tasmania to different levels. The impacts reflected above tend to correlate directly and inversely to the level of regulation currently binding the type of activity. Agriculture has minimal regulation and has the greatest impact on land degradation and associated water quality issues in rural catchment, while forestry (which has more regulation than agriculture) then mining (most regulated) creates the largest impacts in more pristine catchments.

Catchment Management in Tasmania

Tasmania has two key pieces of legislation in the water management area: the *Water Act 1957*, and the *State Policy on Water Quality Management 1997* (SPWQM). The SPWQM statutory policy provides both for ICM (in very general terms), and for the establishment of "Protected Environmental Values" (PEVs) on which both water quality objectives and environment flow determinations can be based. The approach outlined in the Policy, and subsequently developed by the Department of Primary Industry, Water and Environment, is generally, but not fully, in line with the National Water Quality Management Strategy (NWQMS) agreed national approach. [For a description of the national approach linking water quality and catchment management, refer to *Implementation Guidelines* published by the NWQMS in 1998] Under the provisions of the Tasmanian Policy, the State government determines the PEVs, and later the water (environmental) quality objectives and environmental flow requirements. The State government is committed to community consultation during this process.

A *Water Management Bill 1999* has been developed to replace the *Water Act 1957*; the Bill has passed the lower house and is currently before the Senate. The *Water Management Bill*, once enacted, will implement, to a greater or lesser extent, the principles of the COAG water reform agenda. However, its scope is limited principally to water **flow** management. The Bill provides for the State government (or water agencies) to develop water management plans (more accurately titled "water flow management plans") in consultation with the water users and the public generally.

The current State government came into power on a pre-election promise of publishing a draft ICM Policy for public comment within one year of taking office. While this seems unlikely to happen, there remains an expectation that such a draft will be published in the not too distant future.

The important point to note about the Tasmanian statutory framework is that, unlike the situation in, say, Queensland, there is currently no strong link between the catchment planning process, and the process of establishing the statutory framework of water

quality regulation provided for through the establishment of PEVs and subsequent water quality objectives and targets. It can be argued that an opportunity has been lost in this regard.

As an aside, it should be noted that, in Queensland, catchment management plans are developed by community-based catchment management planning groups under the auspices of Queensland's *Environment Protection Policy for Water* (which is subordinate legislation under the *State's Environment Protection Act 1994*). These catchment plans, amongst other matters, recommend sets of water (environmental) values on which water quality objectives and environmental flows can be based. The Queensland policy provides for the formal listing of approved catchment management plans under the Policy, through a parliamentary process. The Pumistone Passage catchment plan was the first to achieve statutory listing.

Once listed, the values contained in the plans effectively achieve statutory weight. This link provides a major incentive for the development of these community-based plans, as the catchment planning committees can be reasonably certain that their work will, in fact, be directly incorporated into the State's statutory decision-making system, which includes, for example, requirements placed on point source discharges in emission licences. Such licences are issues with conditions aimed at the achievement of ambient standards (objectives or targets) in waters receiving effluent discharges.

The Tasmanian system does not, at this stage, provide such a link (although, there could be a similar mechanism put forward in the as-yet-unpublished Draft Tasmanian State Policy on ICM). Without such a link between the catchment planning process and the process of establishing PEVs, and without the publication of the draft State ICM Policy, the development of catchment management plans in Tasmania, to date, has tended to be sporadic, to some extent ad-hoc, and generally unstructured.

For example, of the twelve catchment plans published to date, only one directly addresses the question of water values within the NWQMS structure. This in turn means that the community has lost this vehicle as a means to voice its view on this issue. And the issue *is* important, as the State government will use the PEV-based objectives in regulating point source emission, and in developing diffuse source control strategies.

Catchment management in Tasmania is not fully "integrated" as required by the motherhood statement in the relatively new SPWQM. Both local and state government are evolving an interest in catchment management plans, and offer varying support to different catchment planning groups. Some community groups have also developed catchment management plans, sometimes through working groups, and at other times using local consultants. Local government has also begun to develop catchment management plans, and municipalities have endorsed a small number of those plans which have been prepared. These plans have been more community based, and focused on determining the contributions made to water flow management by different activities in the catchment. The level of detail and cost (to local government) required to develop these plans has meant that there are few across the state, and the focus has primarily been on substantially modified urban or urban/rural catchments.

There is also a push to make ICM a "bottom up" process, where community interest generates the momentum to produce the CM plan. For small catchments in Tasmania, this would seem to be an approach which will remain heavily dependent on volunteers. It is difficult to say how many of these plans have been guided in their establishment by suitably qualified natural resource managers (NRM), or to what extent quality assurance principles or processes have been considered.

Each of these approaches has associated benefits and costs:

- Community based benefits –ownership of problem, taps into volunteered resources, facilitates direct communication between catchment keyplayers.
- Community based problems –poor quality control, difficult for state government players to observe, if given powers, institutes a "fourth level" of government, sporadic.
- Local Government benefits –main land manager/planning authority, better quality control, more ownership of council based activities –such as sewage treatment.
- Local government problems –lack of ability to pick up state based directives (such as demonstrated by State Policy on Water Quality Management), poor state-wide co-ordination possibilities, poor national integration possibilities, less community ownership of problems and solutions.
- State Government benefits –best quality control, best state-wide management, best national integration, perhaps best information flow and dissemination.
- State Government problems, minimal community ownership of CM plan, no existing authority for management, not exactly a bottom up approach.

Cumulative effect of dams

Of the twelve catchment management plans published in Tasmania to date, most mention the matter of farm dams, and some contain inventories of the number of dams and their location within the catchment. However, of the twelve, none quantify the capacity of catchment dams, nor do they develop recommendations regarding any kind of assessment or decision structure around the issue.

The fact is that, in some catchments, we are already, arguably, at the point where we have too many dams. For example, the twenty kilometer long catchment of Claytons Rivulet contains around 160 dams. These dams are capable of harvesting at least 20% of the (one-in-five) dry year annual flow in the catchment. Overall, the capacity of the dams is large enough, in total, to impact in a significant way on flood flows, and thus on stream geomorphology – and stream habitat value.

In some of our larger catchments, while the situation is not so serious, there is still reason for major concern. The Meander Catchment contains around 350 farm dams, capable of harvesting 5% of the 20th percentile annual flow (a one in 5 dry year). In a nearby Midlands catchment, the Macquarie, the equivalent figure appears to be close to 20%. While these figures initially appear to suggest a minor, rather than a serious problem, it should be borne in mind that both catchments are currently subject to major dam building proposals. In the case of the Meander, if all the proposals where to go ahead, the total capacity of dams in the catchment would increase by over 200%, while in the Macquarie, the largest of the current dam proposals is for an 80 GL dam, contrasting starkly with the current total capacity of all dams in this catchment of only 16 GL.

Our most heavily used catchments are reaching the point where they are clearly "over-built" with dams, yet there is no policy framework in Tasmania to guide government regulators in their assessment of the cumulative effects of dams. Without such a policy, our catchments will progress incrementally to the very serious situations in which the mainland Murray-Darling catchment now finds itself. Catchment planning groups, without this policy framework, can do little except raise the issue and then ignore it – and this is, in fact, what is happening in Tasmania.

Fish passage

Fish passage is a serious issue in Tasmania. The *Inland Fisheries Act* provides the government with a powerful tool for ensuring fish passage "rights" in Tasmanian streams. However, the fact is that the powerful provisions of the Act are not used to any significant effect.

The situation is that, in this State, no adequate guidelines exist in regard to ensuring the passage of native fish past on-stream farm dams. And the construction of on-stream farm dams has been, and remains, current practice.

Tasmania's Farm Dam Working Group, in its 1997 recommendations, identified dam cumulative effects, and fish passage, as two important unresolved policy issues. The report suggested that NHT funding be sought for a project to develop fish passage policy and guidelines. Due to pressures on staff time, however, this recommendation was not acted upon.

The current situation is that, when a farm dam is permitted on a stream where fish passage is an issue, the farmer is required: "to construct a spillway of 1:15 gradient or less, with sufficient resting pools for fish". The farmer normally receives no further written guidelines on the spacing or depth or shape of the pools, nor are there guidelines on the width, depth or shape of the connecting passages between the resting pools. The farmer is given a contact name and phone number for the provision of further advice, however in practice he has no incentive to seek this advice, and seldom does. There are no guidelines on the maintenance of these "fish passage spillways".

Consequently, there are good reasons to believe these spillways, even when constructed, are either inadequate for fish passage, or are so poorly maintained as to rapidly loose effectiveness over a period of a few years – as erosion, stock access, or the growth of vegetation in and around the resting pools take their toll. And, of course, the use of spillways to provide fish passage assumes that water does actually flow over the spillway during those months of each year that fish move upstream in their breeding cycle. However, many dams are too big for this to occur. In many cases the size of the dams in relation to their catchments are such that significant spillway flow is likely to occur only once in 5 or 10 years: quite inadequate in regard to fish passage needs.

Sustainability assessment of large agricultural dams

Tasmania's Resource Management and Planning System RMPS (a suite of legislation - including legislation for landuse planning, water management and environmental assessment) requires government agencies to act "so as to achieve the objectives of the RMPS". One of the key statutory objectives of the RMPS is ecological sustainability. This provision is, of course, in line with national commitments set out in the National Strategy on Ecologically Sustainable Development, the National Water Quality

Management Strategy (NWQMS), and the COAG Water Reform Agenda. The Tasmanian *Policy for the Protection of Agricultural Land* is also focused on sustainability as one of its key principles.

However, there are difficulties in applying this requirement to the assessment of proposed agricultural dams, and their related irrigation projects. These difficulties reflect both the lack of accepted assessment techniques, and the lack of supporting data.

Tasmania, at present, has no agreed protocols for assessing the sustainability of large dams, which, logically, would include an assessment of the sustainability of likely long term irrigation programs on which the dam depends for its economic viability.

In assessment of sustainability, the most important (and readily assessed) issues relate to salinity and waterlogging. Issues related to sodicity, soil biota, and soil structure are less amenable to general assessment techniques.

In the case of salinity, long term sustainability depends on preventing the build-up of salt levels in the soil. There are four key factors:

- The amount of salt applied to the land: ie: the amount of salt in the water used for irrigation, and the amount of water applied to the land during the irrigation season
- the drainage characteristics of the soil
- the amount of winter (flushing) rainfall, and
- the ability of the sub-soil aquifer to convey the salts to the river system

Mapping of these four layers has not, at this stage, been undertaken (to our knowledge) over anything but extremely small areas of the State. Such mapping is not currently available to the routine dam assessment process in Tasmania.

Tasmania's soil mapping is well developed (at 1:25,000 scale) over a relatively restricted portion of the country; however, work is on-going at present, and is producing useful public data on soils and land capability. The land capability data is available on the 1:100,000 scale, which is not generally suitable for use in developing detailed farm plans or irrigation management plans. The data is, nevertheless, valuable in terms of broadscale planning.

The saline characteristics of surface waters are, as you might expect, well understood, as are rainfall patterns. However, sub-soil drainage is much less well understood, and there does not appears to be adequate data except over only a very limited part of Tasmania.

Assessment of the ecological values of water environments

Conservationists and biologists have been concerned about the protection of different ecological environments (sometimes referred to as communities) for hundreds of years. Many Australian ecologists (like HJ Frith, for example) have pointed out, decades ago, that conservation of key ecological communities must take place both inside, and outside, dedicated reserves.

Rivers and lakes are no exceptions: adequate conservation of aquatic communities can only be adequately achieved though a system which

- sets aside special purpose ecological reserves, and
- seeks to protect ecological values in the remaining (multiple use) water environments.

In Australia, comparatively little work has been done in regard to the first aspect, while the second aspect is more highly developed. In this regard there is an urgent need to apply the CAR principles, the cornerstone of the Regional Forests Agreements (RFA) process, to the aquatic environment. The CAR principles relate to the identification of reserves which are *comprehensive, adequate* and *representative*.

The RFA process would not have occurred without the Commonwealth Forests Policy 1992, and the subsequent Commonwealth endorsement and funding of the RFA process. Commonwealth assistance is urgently needed in respect to a the development of CAR freshwater reserves in all Australian States.

Cumulative impact and the precautionary principle

Tasmania's SPWQM formally endorses the precautionary principle. However, the principle is, at present, not used in any specific sense within the government decision-making process.

This is partly due to the process that the ecologist William Odum referred to as "The Tyranny of Small Decisions" – otherwise known as "cumulative effects of small developments", or "death by a thousand cuts". Cumulative effects, for example from rights to extract water from natural water systems, are an extremely serious issue in Australian water management, and any policy developed relating to the management of cumulative effects needs to specifically acknowledge, and encourage the use of, the precautionary principle.

In such policies, it is essential to acknowledge the basic difficulty: that the application of the precautionary principle, in the management of cumulative effects, *will produce results which appear unfair on individual farmers.* Without this explicit acknowledgment, policies dealing with cumulative effects *will never be effective*.

Information Flow -the Key

Information flow is the key to effective catchment management. Some degree of centralisation of information is required to ensure continuity of state and local government response, and to ensure quality control over issues such as field based measurements and achievement of required objectives. The vast increase in the amount of community involvement in environmental monitoring programs has created a more information but at variable quality and usefulness.

Local government, as the primary catchment landuse regulator/manager, has historically the least involvement with catchment management. Some (approx 10%) local Councils have implemented ICM

The state agencies that have been involved in catchment management in Tasmania to date have historically been involved in resource allocation rights rather than environmental management. These agencies have been possessive in maintaining their involvement in the resource allocation issues and with data collection from catchments. However, funding cuts across the board may have resulted in increased sharing of

information, as “core business” drives field data collection and agencies such as the former Rivers and Water Supply Commission that used to collect a lot of information collect substantially less.

New technologies such as the internet have revolutionised the possibilities for information provision by Catchment Management Plans and committees. This has been observed in the Mainland states, Tasmania has yet to contribute to ICM website development.

Information Flow Problems

The information chasm between environment oriented state agencies and resource based state agencies continues to exist, and when combined with 30 different local government responses, creates a complex web to navigate. This is without involving community groups of which there may be up to 20 to 30 in any small-medium sized catchment in Tasmania.

The primary goal of ICM in Tasmania will therefore be the development of quality assured information flow to all key players. You must walk before you can run.

Once the structure of the reporting and feedback system has been designed, this centralised system will help to assure quality in catchment management plans as they develop throughout the state.

At the moment there does not appear to be any centralised structure around which CM can develop.

Federal direction in these areas should be provided essentially for the local reasons above, ie quality assurance Australia wide.

Environmental Management Review Processes and ICM

It is clear that many new groups will be affected by ICM. Groups that have traditionally received little direct attention from environmental managers will now be centrally involved as EM review catchment management plans, process, and achievements. New lines of communication are required to involve Agriculturists and Forestry, who have traditionally defended themselves from “over regulation” and bureaucratic red tape.

New developments in economics have indicated EM adds to economic growth rather than being a cost to bear. Environmentally based efficiency gains to protect the environment have a direct economic benefit by boosting productive capacities through lowering unit production inputs and hence cost.

These older environmentally based industries, traditional adversaries of EM, now need to begin the process of reconciliation with EM to achieve the growth required for success in the future. More environmental regulation equals more growth, is the message which will have to be carried to these key players, along with new information on how to achieve the new objectives.

This process of achieving the new information flow with agriculture in particular, has been consistently identified as being the area for primary focus. How do we re-educate a

sector practising European style agriculture or forestry to adapt to Australian conditions?

Gradual change is a possibility, but leading observers have noted environmental damage in Australia is increasing faster than the awareness of it. Environmental damage is also increasing faster than government response to it. This is a function of our gradual understanding of Australian ecosystems and subsequent development of the required management practices –a slow process at present.

To quote AWWA:

> *There is an urgent need for these issues to be addressed for ICM to take the next step forward to combat the burgeoning problems in river catchments throughout Australia salinisation of land and waterways and erosion of agricultural and other land. Each of these problems is major on its own; when taken in combination they have the potential to cause enormous degradation of land throughout Australia. Recovery from the current situation requires decades of remedial actions. Delaying positive action will result in the time for recovery growing exponentially.*

Legislation would seem to be the key to creating a co-ordinated and quality-controlled response to Australia's needs for commitment to ecologically sustainable development. ICM is a primary tool from our Ecologically Sustainable Development tool box, and as such federal leadership, co-ordination, funding, policy development, and legislation must be supported and enhanced in this area.

It will be an important achievement of this process to recognise the need to maintain the present highly successful "bottom up" philosophy behind ICM. Community ownership of ICM seems to be the key to its success.

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