Exposure Draft

DRAFT GUIDELINES FOR MANAGING EXTERNALITIES

restoring the balance

High Level Steering Group on Water
Adelaide, June 2000

OBJECTIVE

The High Level Steering Group on Water endorsed the project *'Best Practice in Identifying, Costing and Charging for Externalities'* in October 1999.

The project's objective is to develop a pragmatic set of guidelines to assist jurisdictions in the efficient management of environmental externalities associated with Australia's water resources. Drawing on both national and international best practice, this document sets out those guidelines in the form of a management framework.

Developed in concert with jurisdictions to meet the current needs and future direction of the Australian water industry, the guidelines have been developed with practicality, flexibility, and durability in mind.

DRIVERS

Since its agreement in 1994, the COAG strategic water reform framework has driven significant reforms throughout the Australian water industry.

With a focus on the application of market disciplines, the goal of the COAG strategic water reform framework is to

> *'Arrest widespread natural resource degradation in all jurisdictions; and*
> *To achieve an efficient and sustainable water industry.'*

To date, this has been achieved by way of improved natural resource management legislation, the clarification of property rights, the establishment of local planning processes, and working towards the goal of full cost pricing for water provision.

It is this final aspect which has led to the development of these guidelines. The Expert Group on Asset Valuation Methods and Cost-Recovery Definitions defined full economic costs to include those costs associated with externalities.

These guidelines recommend ways in which those costs, or benefits, may be identified and internalized so that clear signals may be sent and incentives may be given to those individuals and institutions responsible for creating them.

SCOPE

The guidelines relate to all ground and surface water resources including regulated and unregulated streams.

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WHY MANAGE EXTERNALITIES ?

The objective of these guidelines, in line with the objective of the COAG water resource framework, is to assist jurisdictions to establish resource-condition objectives and signalling mechanisms that encourage individuals and corporations whose actions impact on the health and value of Australia's water resources to change their behaviour so as to at least meet agreed responsibilities so as to collectively achieve overall resource-condition objectives.

In Australia, water resources are frequently shared among individuals, corporations and the environment in order to meet both private and social needs. In some regions, competition for water resources is strong due to the scarcity of the resource and environmental needs. Externalities tend to arise:

- where property rights for the use of water and environments effected by water are inadequately defined;
- where an externality occurs, a non-market cost or benefit is imposed;
- when these benefits and costs can occur at a location that is temporarily or spatially distant from the action that caused them; and
- when resource users do not take the nature of these benefits and costs into account inefficient resource use can occur.

Pumping of groundwater at rates in excess of sustainable yield for example, can result in salt water intrusion into irrigation areas near the sea. When and where this occurs, yields decline and, in the worst cases, irrigation areas have to be relocated. An externality is created, those near the sea lose economic opportunity because they have no or little control of those further away who extract more than the maximum sustainable yield.

Externalities can increase the value of opportunities available to society. For instance, the creation of a dam can create new recreation opportunities. Similarly, environmentally sensitive storm-water management systems can enhance adjacent land values.

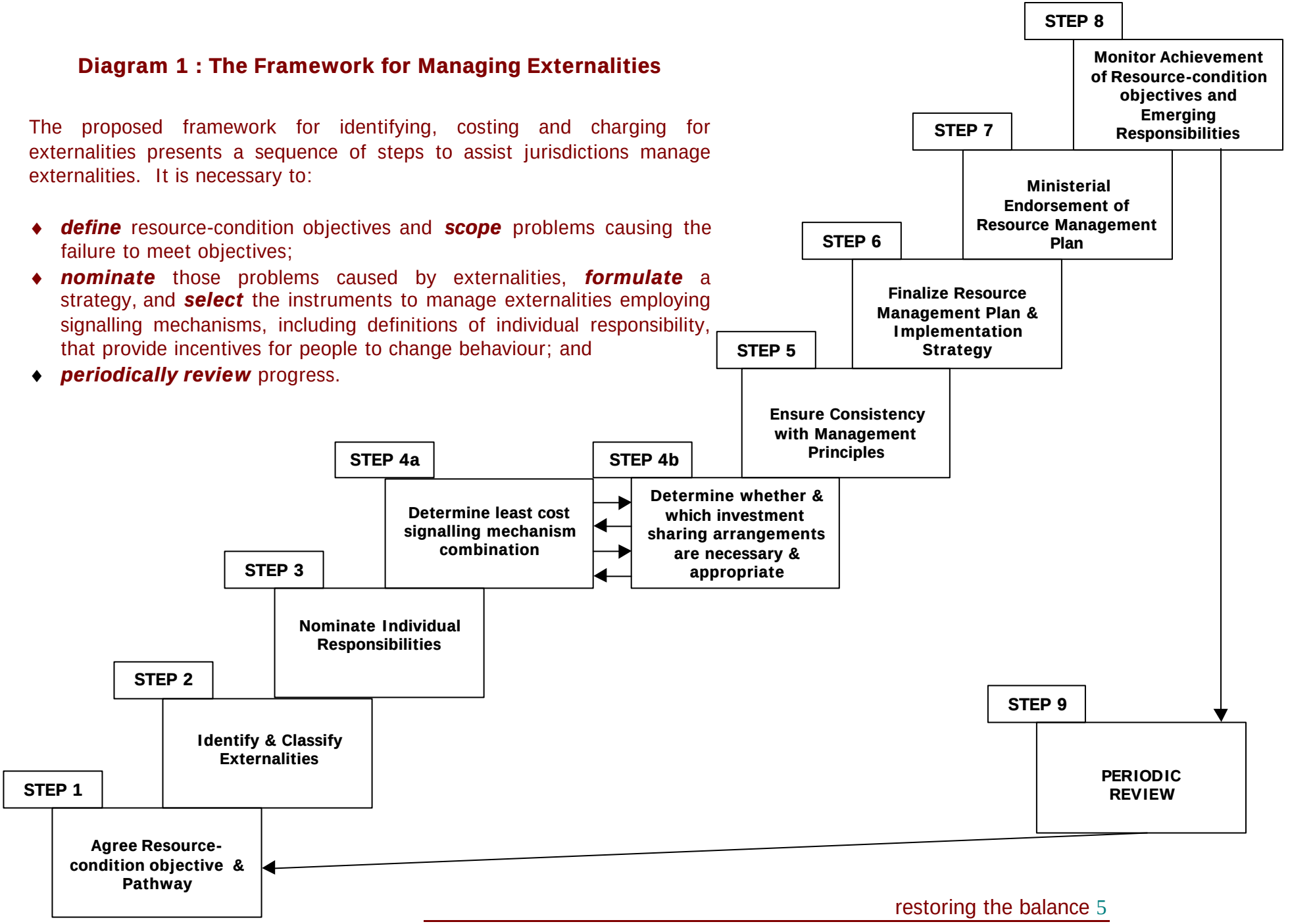
These guidelines for the management of externalities are designed to address such imbalances. By recommending ways in which incentives or signals may be used, the guidelines provide a framework to return responsibility for the condition of the environment to those impacting on resources. The focus of these *Guidelines* is on the use of signalling mechanisms to reveal cost, and on definitions of environmental responsibility as a means to influence instrument selection.

Several examples of both national and international best practice in the management of externalities are provided in the form of case studies throughout the guidelines. They serve to illustrate how the various components of the guidelines may be successfully enacted.

Diagram 1 : The Framework for Managing Externalities

The proposed framework for identifying, costing and charging for externalities presents a sequence of steps to assist jurisdictions manage externalities. It is necessary to:

- ***define*** resource-condition objectives and ***scope*** problems causing the failure to meet objectives;
- ***nominate*** those problems caused by externalities, ***formulate*** a strategy, and ***select*** the instruments to manage externalities employing signalling mechanisms, including definitions of individual responsibility, that provide incentives for people to change behaviour; and
- ***periodically review*** progress.



IDENTIFYING EXTERNALITIES

'the impact of changed environmental conditions on people who do not fully participate in the process that caused these conditions to change'

The term 'externality' is used by economists to describe the indirect or accidental consequences of actions associated with economic activity. When a factory pollutes a waterway or an irrigator accidentally contaminates a groundwater body, the condition of the water resource changes. When such outcomes are of concern or benefit to someone and they are not a full party to the process that caused them an externality is created.

To develop a set of guidelines for the management of externalities created by Australian water users, a more precise definition is needed. Formally, an environmental externality can be defined as,

> *'the impact of changed environmental conditions on people who do not fully participate in the process that caused these conditions to change.'*

Both passive and active water use can effect environmental condition thereby generating environmental externalities. These guidelines define 'water use' to include:

- extraction for consumptive purposes;
- contamination or pollution of a water resource as a result of water consumption or management;
- transmittal or transformation of waste; and
- appreciation of water environments for recreation and other similar purposes.

BOX 1 : 'Water Use'

Where the term 'water use' is used throughout the guidelines, it incorporates the many primary and end uses to which water may be put. Water users are the primary beneficiaries of these uses.

AGREEING THE RESOURCE-CONDITION OBJECTIVE

Nominating an overall set of resource-condition objectives for each water body or region and a pathway indicating how these can be expected to evolve through time is a first step toward the efficient and effective management of externalities.

The goal for all jurisdictions is to achieve an efficient and acceptable level of externalities in water resources rather than to eliminate such externalities altogether.

In order that externalities may be identified, it is necessary to first undertake an assessment of water resources and water environments and agree an overall set of 'resource-condition objectives' for resources or regions. Each resource-condition objective should be an expression of the minimum practical requirements for ecologically sustainable development and be agreed upon only after consideration of the costs and benefits of the objective. A salinity target at a point in a river is an example of a resource-condition objective.

Resource-condition objectives are likely to evolve over time. Accordingly, it may be necessary to plot a transitional pathway for each objective.

The best available scientific information should be employed to determine each resource-condition objective and the transitional pathway.

CLASSIFYING EXTERNALITIES

Classifying externalities, in accordance with the above classification system, and identifying the cause or source of them is a second step toward the efficient and effective management of externalities.

Water use externalities occur throughout the water cycle, and can be usefully categorised as:

CATEGORY 1 :

Extraction & Storage Externalities

- caused by the extraction, harvesting, diversion or storage of water such as irrigation or the generation of hydro-electric power;

CATEGORY 2 :

Return Externalities

- caused by the return of (usually) contaminated water and/or wastewater to water bodies, including groundwater, estuaries and oceans; and

CATEGORY 3 :

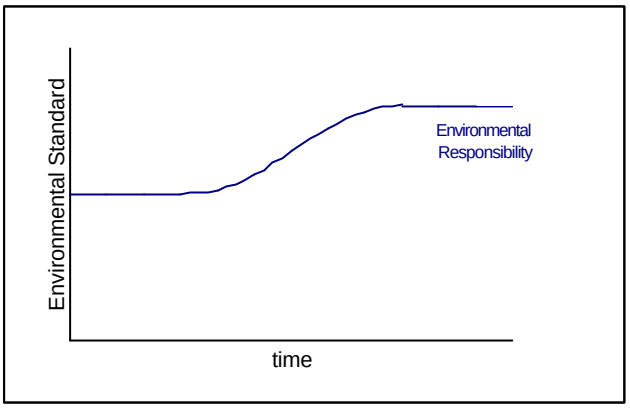
Stormwater & Overland Run-off Externalities

- caused by land-use practices that change the rate, quantity, quality and timing of flows.

When identifying and managing externalities, the distinction between the cause, or source, of the externality and the process that delivers it must be clearly established. Identifying the source of the externality is important so that the cause of the externality may be managed, rather than the symptom of the externality being treated.

The guidelines employ a standard economic definition of externalities. It is recognised, however, that some of the costs incurred in natural resource management can be costs associated with the management of externalities, for example, riverbank regeneration.

DEFINING AND ASSIGNING 'ENVIRONMENTAL RESPONSIBILITY'



Agreeing individual responsibilities in each time period and, where appropriate, providing an indication as to how these responsibilities or standards can be expected to evolve, is a third step in achieving the efficient and effective management of externalities.

All people have a responsibility to help maintain and, where appropriate, improve environmental conditions as part of the costs of doing business, including using water.

Many administrative arrangements are used to define this responsibility. The most common approach is to define minimum levels of acceptable practice. Often, this is expressed as a minimum standard. Thus, for example, irrigated rice growing is restricted to clay soils because on light soils the expected environmental impact of rice growing on groundwater table depth and water quality is judged to be unacceptable.

Under the framework for managing externalities, resource users are considered 'stewards' and therefore should take all reasonable and practicable steps to use resources responsibly.

Usually, Governments have a responsibility to take all 'reasonable and practical' steps to prevent their actions causing foreseeable harm to the environment both now and in the future. This includes an obligation to clearly define individual responsibilities.

It is likely that the standards that express this responsibility will evolve over time as more scientific information becomes available, demands on the resource increase and as social and economic circumstances change. As technology improves and the cost of achieving these standards decreases, resource managers can be expected to set new and more progressive condition objectives for the resource.

Standards need to take into account the degree to which individual responsibility can be assigned with confidence. Where sources of contamination, for example, are extremely diffuse, it may not be possible to assign responsibility at less than an industry or district level. In these cases, it may be more appropriate to set up a process that seeks to manage the externality in an iterative manner.

BOX 2 : 'Resource-condition objectives' & Individual Responsibility

It should be noted that some standards have statutory backing, alignment of these standards with overarching resource-condition objectives, as they change through time, gives the concept of individual responsibility greater clarity and definition.

Such standards can be used to define the nature and magnitude of an externality.

The magnitude of an externality should neither be measured against the resource as it was in its pristine state, nor necessarily the status quo condition of the resource.

Instead, the magnitude of an externality should be measured against definitions of environmental responsibility, set out as a behavioural or operational 'standards' in water resource management plans or legislation. Where externalities arise from the collective actions of individuals, measurements should be partitioned in proportion to distance from the standard and estimated contribution to the externality observed. As with resource-condition objectives, it should be expected that these standards will evolve through time.

In this way defining and assigning individual responsibility becomes a tool to assist the management of externalities and, ultimately, the achievement of resource-condition objectives over time.

Case Study 1 - Setting Objectives and Responsibilities

Externality Classification: Category 1 - Extraction & Category 2 - Return

Externality Description: Rising salinity levels in the River Murray and increasing land salinisation and water logging have been caused by the widespread development of irrigation and land clearing across the Basin.

Mechanism **:** Agreeing a target and setting the minimum requirement

The Murray Darling Basin Salinity and Drainage Strategy establishes specific responsibility for member Governments to manage the salinity impacts of new development.

A combination of engineering options (salt interception schemes) and non-engineering solutions (land and water management plans) have been established by South Australia, Victoria, New South Wales and Commonwealth Governments in order to reduce the flow of highly saline groundwater into the River Murray.

The Victorian and New South Wales Governments have agreed to manage water resources within agreed limits. They have agreed not to construct or approve any proposal that would increase salinity by 0.1 EC or more in the River Murray at Morgan unless they have access to salinity credits.

Under the salinity credit scheme, the New South Wales and Victorian governments received salinity credits of 15 EC each for their contributions to the costs of the interception schemes. States can earn more credits by financing schemes that reduce the expected salinity load at Morgan. The Murray Darling Basin Commission (MDBC) maintains a register of works undertaken and the salinity credit and debit impacts of approved proposals and construction projects. The salinity impact of any proposed irrigation scheme must offset by acquitting credits in the register.

The share of these annual costs borne by individual land-holders is based upon a formula that takes into account an assessment of the size of the drainage benefits enjoyed by the landholder.

According to MDBC (1999), in the Murray-Darling Basin, and in particular the Murray Valley, the Salinity and Drainage Strategy has:

- Increased awareness of the downstream salinity impacts of activities in upstream catchments;
- Established the ground rules for cost effective management of new development;
- Initiated community debate on salinity and drainage issues;
- Reduced salinity in South Australia; and
- Protected the River from inappropriate development.[1]

[1] The Commission also recognises that the salinity problems of the MDB are now known to be greater than anticipated when the Salinity and Drainage Strategy was developed. The Strategy is under review.

SIGNALLING MECHANISMS

Nominating the least cost combination of signalling mechanisms to be applied to encourage individuals to meet their responsibilities and thereby to achieve overall resource-condition objectives is a fourth step in the efficient and effective management of externalities.

Once individual responsibilities have been agreed, a variety of signalling mechanisms need to be chosen in order to achieve resource-condition objectives efficiently.

BOX 4 : Getting the Price Right

These guidelines have been born out of the aspect of the COAG strategic framework for water reform requiring the application of full cost pricing. However, pricing will not always be sufficiently robust an instrument, when employed exclusively, to carry all the information necessary to manage externalities cost effectively. In many cases, it will be more efficient and more cost-effective to use other mechanisms to reveal the full cost and value of externalities.

Normally, no one tool or signalling device will be sufficient to encourage individuals to meet their responsibilities, and thereby contribute to the achievement of any nominated resource-condition objectives, agreed in water resource management plans. Rather, a portfolio of signalling tools is required. When employed collectively, the tools provide the incentives or signals to resource users so that the aggregate result of their actions is attainment of the suite of resource-condition objectives held for a resource or region.

The primary goal, when adopting a portfolio of signalling tools, should be to change the behaviour of water users at least cost.

Time lags between cause and impact can be lengthy, especially in cases involving transmittal via slow-moving groundwater bodies. When signalling the extent of costs imposed on others, care must be made to distinguish between sunk costs, resulting from historical action, and costs associated with environmental damage expected to occur as a result of current activity. It is not possible to use signalling mechanisms to change history.

The signalling tools identified below represent a series of options, frequently complementary, for achieving resource-condition objectives. The options presented should not be considered an exhaustive set. Other complementary mechanisms, which may influence land and water use, such as biodiversity and or carbon credits should be explored.

When choosing and applying any instrument or combination of instruments, the total cost of implementation must be considered, including enforcement and monitoring costs. This is necessary to ensure efficient resource allocation.

SIGNALLING MECHANISM 1 - *PROPERTY RIGHTS*

Without exception, the establishment of explicit and transparent property-right arrangements for the use of water resources underlies the successful implementation of all the signalling options identified below. Property rights confirm economic opportunities associated with a specific resource. In doing so, they can be used to nominate responsibility for maintenance of the condition of that resource. Further, property rights represent an 'enabling mechanism' by which a market may be 'created' and facilitated.

As a result, property rights are particularly applicable to the management and control of both extraction and return externalities. Property-right clarification is currently being implemented by way of legislative arrangements in many Australian jurisdictions in order to control the quantity of water used.

The establishment of property rights for stormwater and overland flows would assist in managing externalities associated with these water resources by establishing who has responsibility for them and who has a right to benefit from them. This is a significant strength of the property-right approach.

Tradeable Water Rights

Tradeable property rights for access to and use of water resources establish markets for the of resource, where once there was none. In many cases, it may be appropriate to condition these rights and attach obligations to them. These conditions and obligations specify individual responsibilities as they relate to the holder of a property right. In this way, property rights complement the introduction of restrictions on their use in the form of operational standards, which are discussed in detail below.

In practice... Property rights for water, wastewater or use of a resource's assimilative capacity create a tradeable asset of potentially significant value to the holder. Property rights in water that can be separated from land title and traded have been, or are being defined in legislation in a number of jurisdictions. The South Australian Water Resources Act 1997, which established tradeable water rights and nested planning processes, offers an example of best practice. The tradeable nature of water rights encourages water use to trend to its highest and best use. That is, those who can profit the most from water can be expected to pay a premium for it. If "profit" includes full consideration of externalities more efficient resource allocation will result.

Case Study 2 - Water Allocation and Licensing

Externality Classification:	Category 1 - Extraction
Externality Description:	Hydro-geological surveys and monitoring of the McLaren Vale Prescribed Wells Area in South Australia indicate that groundwater levels in the Basin are declining, the average rate of extraction currently exceeds the safe yield.
Mechanism:	Clear Property-rights Specification

In McLaren Value, it has been estimated that extraction of groundwater at or below 6 000ML/yr will minimize detrimental effects on groundwater users and dependent surface ecosystems. In order to achieve this, individual allocations have been capped in a manner that allows use rights to be reduced to sustainable limits. This goal has been set down in a draft water allocation plan (WAP) currently undergoing public consultation.

The mechanism that allows for this clearer specification of water use rights was established under the *Water Resources Act 1997 (SA)*. This Act allows separation of water rights from land-title, creates a tradeable asset, and establishes a hierarchy of plans to control use throughout the State.

The McLaren Vale Prescribed Wells Area is 'prescribed' under the Act. Formal prescription establishes a requirement that any individual taking water from a groundwater aquifer within the Area, except for stock and domestic purposes, must have a water licence.

Tradeable Emission Rights

Tradeable emission permits can be introduced to encourage producers to collectively deliver resource-condition objectives at least cost. The result can be much more efficient resource use and more rapid attainment of the long run objective. In the United States of America, air pollution has been controlled effectively by first setting air quality targets and then allocating tradeable emission permits.

In practice... Tradeable emission permits offer an effective way to manage return externalities. Used in conjunction with standard setting and applied with legislative backing, permit trading schemes assign maximum responsibility and autonomy to market participants. Trading schemes have already demonstrated their effectiveness in controlling nutrient loads in water bodies and river systems both in Australia and overseas.

Case Study 3 - Salinity Trading Scheme

Externality Classification: Category 2 - Return

Externality Description: The release of salty water from coal mines and power generating plants had contributed to an increase in salinity in the Hunter River throughout the 1970s and 1980s. The elevated salt levels were having a detrimental impact on the primary producers who drew irrigation water from the river.

Mechanism: Resource-condition objective & Tradeable-Permit Schemes

In order to address the increase is salinity, a system of tradeable salinity permits has been developed in the Hunter Region by first defining maximum salinity levels. Discharge of saline water into the River is only permitted when there is a significant positive gap between the ambient salt levels and the environmental goal - that is, during times of either high flows or flood.

A specified number of salt credits were created and allocated to the main point sources of salt (mines and a power generator). Credit holders may either discharge into the system, thereby using their credits or sell or lease the credits, on the local market to others in the region who want to use them. Credit selling and leasing allows new mines and other industries to be established without compromising resource-condition objectives.

Case Study 4 - Nutrient Trading in the United States

Externality Classification: Category 2 - Return & Category 3 - Stormwater

Externality Description: Diffuse groundwater pollution presents a unique challenge. Examples of schemes established in the United States indicate, however, that well constructed trading schemes can assist in its control.

Mechanism: Emission-Offsets Arrangements

Emission-offset arrangements were established to control the amount of phosphorus entering Lake Dillon in Colorado. The main diffuse sources of contamination are urban run-off from towns, ski areas and septic systems. Point sources were primarily wastewater treatment plants.

Total emissions to the Lake are capped at a maximum daily load of 4 610kg/yr of phosphorus and any treatment plant wishing to increase emissions must either:

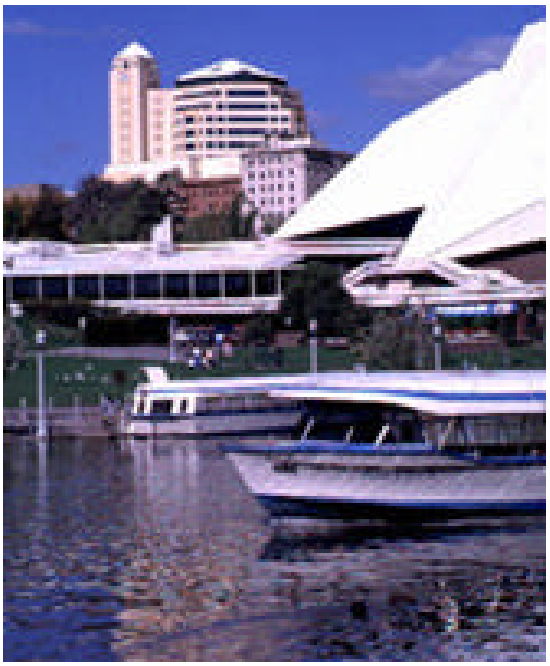
a) buy phosphorus emission-rights from another plant; or
b) reduce diffuse sources of phosphorous emission.

Assessments are made on the basis of models that predict the flow of phosphorous given different types of land-use practice. For trades from diffuse to point-sources, a precautionary trading ratio is used in recognition that the nature of nutrient flows from diffuse sources to the Lake is uncertain. Two kilograms of diffuse source pollutants must be reduced to gain the right to emit one kilogram from a point-source.

The program has been responsible for achieving among the highest rate of phosphorus removal capacity in the country. Between 1981 and 1991 point sources reduced their loads from 3 748 kg/yr to 529kg/yr.

Similar schemes have been established for Nitrogen in the Tar-Pamlico River Basin and biological oxygen demand from pulp and paper mills in the Fox River, Wisconsin. Emission-offset systems have been established to protect wetlands in both Arkansas and Maryland.

SIGNALLING MECHANISM 2 - *CHARGING*



Charging can be used as a demand-side tool to change the quantity of water used. By increasing the price of water or wastewater, water-supply authorities can encourage water users to change their pattern of water use. For instance, in responding to increases in the price of water, users may reduce the quantity of water used by investing in water-saving technologies or simply change their water use practices.

However, as indicated above, water-supply or sewerage charges often can not be relied on exclusively to deliver resource-condition objectives. The reason for this is that charging is a 'blunt' instrument that is not highly effective in changing behaviour. This is especially the case where demand for the good or service is not responsive to changes in price.

Charging can, however, be effective in better reflecting the magnitude of the externalities created by those users who cannot be so readily influenced by standards, conditional property rights or market-based trading structures.

This is particularly true in the urban context where users are often spatially distant from the resource they use or dispose waste into. Where no direct or significant personal impact on resource is perceived, charges can be used to signal that all users share responsibility for resource degradation and resource protection.

In the context of the management framework and principles advocated above, water-supply businesses may be included in the resource planning process, and be held accountable for the water use impacts of their customers on the environment.

Investments in water use environmental management measures required of a water-supply authority represent costs that can be passed on to customers. In this way, customers contribute to the achievement of the long-run resource-condition objective for a particular resource or catchment.

In practice... Urban water and waste-water service providers are working toward cost-reflective pricing in accordance with the COAG strategic water reform framework. An 'externality' component could be incorporated into current pricing structures. Resource users would then share in the investment required by a corporation to meet long-run resource-condition objectives and have the extent of this commitment communicated to them.

Similarly, rural bulk-water suppliers could raise a levy that seeks to offset the costs to government of mitigating the effects of water extraction on rivers after extraction has taken place.

While charges can be used to raise revenue to undertake ameliorative activities after damage has been caused, or to fund management or structural change, a charge can also be applied to specific activities, such as pollution. Problem-specification charges tend to discourage the polluting activity. Such charges are particularly useful in addressing return externalities and are referred to by economists as Pigovian[2] charges.

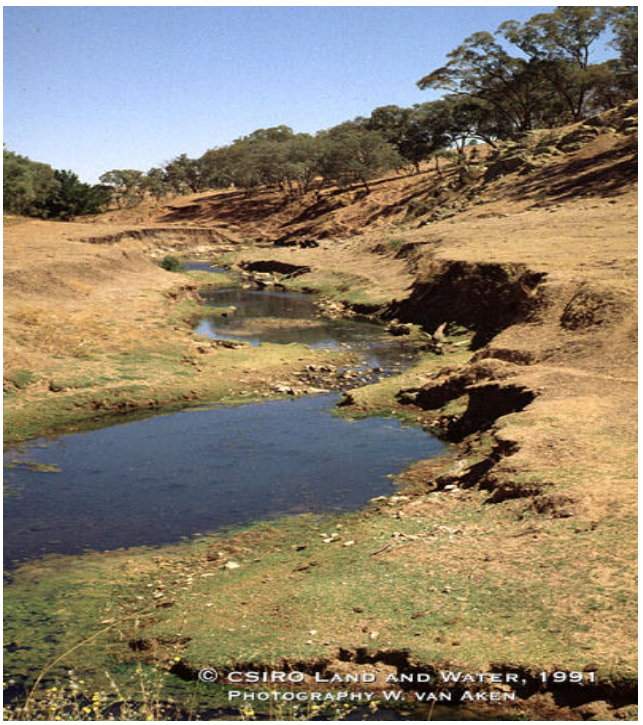
Such a charge effectively penalises a polluter for any polluting activity. The charge may be applied to either the final product, to production inputs or to the load placed on the environment. Such a charge is most efficiently applied to polluters according to the load placed on the environment - in this case, on water resources or water environments be they surface water, groundwater or ocean resources. Where substantial monitoring costs are involved, however, it may be more cost-effective to place the charge on a product or input. When this approach is taken, the strength of the signal given and, hence, the incentive to change behaviour, is less.

Catchment levies are sometimes considered incorrectly in the same light as Pigovian charges. When well directed, a levy can be used to great effect in raising a community's awareness of the impacts of their water use. By using a levy raised within a catchment to undertake ameliorative works, however, there remains no direct incentive to alter behaviour, at least in the short term, and as such the levy is often interpreted by the community to be a tax.

In practice...A charge will effectively raise the cost of producing a product. For instance, a charge applied to water withdrawn from groundwater aquifers may encourage investment in more efficient use of water that is drawn from the aquifer. The more specific the 'charge', the more likely it is to be acceptable to the community and the more likely it is to change the behaviour causing the externality.

Jurisdictions will need to carefully consider how best to manage any extra revenue that is generated when charging mechanisms are used to reduce demand. In many cases, communities have a preference for hypothecated arrangements that guarantee quarantining of revenue to activities that improve the resource condition. Hypothecated arrangements make the intent of charging mechanism transparent and auditable.

[2] A Pigovian charge is the name given by economists to a charge that seeks to internalise the cost of externalities. This was first proposed in 1920 by a famous economist – Arthur Cecil Pigou.



Case Study 5 - Charging

Externality Classification :	Category 1 - Extraction
Externality Description:	By 1979, water consumption was approaching the safe yield of the three Hunter Valley supply sources and there was a need to evaluate the benefits of developing a new supply source to meet increasing demands.
Mechanism:	Charging to Manage Demand

For more than a decade Hunter Water Corporation ('the Corporation') has been moving towards the application of consumption-based pricing principles, full cost recovery, and the removal of cross subsidies. For example, in 1982, the Corporation changed the emphasis of water pricing from charges based on property value to charges based on water use. Other pricing reforms have included:

- 1982 - introduction of a two part-tariff;
- 1990-1991 - elimination of property value-based charges for residential properties;
- 1994-1995 - elimination of property value-based charges for non-residential properties;
- 1995-1996 - removal of charges for vacant land; and
- 1995-1996 - removal of charges for fire services.

The Corporation's operating licence specifies targets for demand management. For the period from 1990-1991 to 2000-2001, the quantity of water used from all storages on a per capita basis must be reduced by at least 25 per cent. By 2010-2011, the per capita reduction must be at least 35 per cent. The Corporation is confident that significant further reductions in consumption will result from the reuse of effluent.

The results indicate the Corporation's pricing policy has resulted in a significant reduction in demand, water consumption in the region is 30 per cent below the Australian urban average and the planned augmentation of the supply system had been delayed until 2030. In 1998, IPART 1998 concluded that the Corporation was on track to achieving the targets set in its operating licence.

SIGNALLING MECHANISM 3 - *GRANT & FEE REBATES*

Grants and fee rebates may be appropriate incentives to encourage the internalisation of externalities. Rebates, for example, may be appropriate for a resource user who is accredited as an organisation whose actions impose fewer costs on the community.

The case for grants is strongest when a resource user's actions *exceed* individual responsibilities and produce substantial benefits that can not be recovered through normal market processes. In such cases, the incentive is not a subsidy. Rather, it is reimbursement for work done on behalf of society. Usually, the service provided is access to or benefit from a public good. Examples include amenity values resulting from enhancing wetlands, and investment in research and development leading to new water re-use technologies.

In practice... Grants and fee rebates can be usefully employed when an individual is charged with, or undertakes voluntarily, work on behalf of the community.

Grant and reward systems can be made more cost-effective by allocating the available money via a competitive bid or auction process where people tender for the opportunity to supply access to public goods.

SIGNALLING MECHANISM 3 - *STANDARDS*

Standards can be used to define individual responsibilities. For example, producers may be required to invest in specific infrastructure or adopt management practices that result in less extraction, reduced or re-directed overland flow or greater dilution of returns of contaminated water to groundwater systems. A financial incentive, such as a fine for non-compliance, can be associated with such an approach. The threat of a fine, coupled with as assessment of the probability of being caught, can be used to internalise externalities.

Standards are particularly useful in addressing storage, return and stormwater externalities.

A weakness of the standards approach is that there can be significant monitoring costs associated with its implementation. Further, legislative backing is often required to give standards an appropriate weight and allow enforcement.

In practice...The National Water Quality Management Strategy and the 'National Framework for Drinking Water Quality Management' provide a basis from which acceptable water quality objectives can be set. Where water quality falls below the standards set in these documents, water treatment costs can rise significantly. Enforcement of standards reduces treatment costs.

Case Study 6 - Fitzroy Basin Water Allocation and Management Plan

Externality Classification:	Category 1 - Extraction
Externality Description:	In recent years, the demand for water in the Fitzroy Basin has increased and the water needs of the environment are beginning to be better understood. Several shortcomings with the management of the Basin were revealed including gradual diminishments in the security of access to water supplies and inadequate assessment of environmental flow requirements or impacts of development on downstream environmental needs.
Mechanism:	Standard Setting

The Fitzroy Basin WAMP is a statement of objectives, performance indicators and criteria to assist the making of decisions relating to the allocation and management of water resources in the Fitzroy Basin. The objective of the Plan is to establish an appropriate balance between water than can be withdrawn for stock, domestic, industrial and irrigation purposes and water that should be left to maintain the health of the river in accordance with the principles of ecologically sustainable development.

One of the key features of the WAMP is the way it sets down standards for environmental flows and development. Specifically, the plan nominates:

- Environmental Flow Limits, which represent the levels of impact beyond which there is considered to be an increased risk of unacceptable environmental degradation; and
- Planned Development Limits, which represent the maximum levels of deviation from the Environmental Flow Limits that the Government considers are within the bounds of acceptable environmental risk in order to accommodate existing and future water development and water usage in the Fitzroy Basin.

While the WAMP currently has no statutory basis, it is proposed that the Plan be given legal effect under the proposed Water (Allocation and Management) Act being developed as part of Queensland's reform of its water management legislation.

MANAGEMENT PRINCIPLES

Application of these principles to the use and management of Australia's water resources and associated environments is a fifth step required to ensure the efficient and effective management of externalities.

The purpose of the COAG strategic water reform framework has been to change the behaviour of water users. To this end, externality management should focus on the signals given to resource users to ensure they recognise emerging responsibilities and, in turn, contribute to achieving resource-condition objectives at catchment, basin and regional scales.

The following principles should apply to the management of externalities in the pursuit of resource-condition objectives.

1. In setting objectives and assigning individual responsibilities and also selecting signalling tools, the net benefits of changing behaviour and achieving the objective should be assessed.

2. As a general rule, resource users should be required to meet the full costs of achieving individual responsibilities.

3. Voluntary or mandatory actions significantly in excess of individual responsibility may be rewarded where or when non-recoverable costs associated with the provision of access to public goods or services are incurred.[3]

4. When agreeing individual responsibility, and where there is scientific uncertainty, the 'precautionary principle' should be observed. The following definition of the 'precautionary principle', as agreed by Australian Governments in the Inter-Governmental Agreement on the Environment, is reaffirmed by these guidelines:

   Precautionary principle - Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:

   (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
   (ii) an assessment of the risk-weighted consequences of various options.

5. Where deemed appropriate and when implementing policy, 'backsliding' from the current level of resource condition should be avoided. 'No backsliding' represents an ideal.[4]

[3] It is noted that actions beyond individual responsibility can create externalities of positive value to individuals but not the general public. It is suggested that reimbursement of costs by governments should be limited generally to situations where public benefits are created.

[4] 'Backsliding' occurs where or when a new policy arrangement causes environmental degradation to increase. Introduction of a tradeable emission permit system, for example, could allow the dirtiest factory in an area to increase emissions. The no backsliding guideline requires that no new policy arrangement increase degradation in areas where this change would not be acceptable. In some cases, this stringent requirement may untenable or inappropriate.

SHARING INVESTMENT TO RESTORE THE BALANCE

Investment, or cost, sharing is a legitimate transitional approach to encourage individuals to achieve their individual responsibilities more speedily and thereby ensure the efficient and effective management of externalities.

The principles outlined above are sufficiently flexible for application to most occasions where an externality arises. However, in special circumstances resource users, communities or Governments may need to share the investment or costs required to manage an externality. Such arrangements may be justified where:

- restoration or reclamation of a resource can be justified but the action that caused the externality is historical;[5]
- investment sharing would enable a more speedy transition to the attainment of long-term resource-condition objectives and thereby avoid significant or irreversible losses;
- investment or cost sharing would significantly reduce enforcement and monitoring costs;
- where the level of investment required to comply with expected future standards is judged by the community as being extremely inequitable if met by resource users alone;
- where the interaction of the activities of a number of resource users creates an externality and it is not possible or not cost effective to adequately identify who is responsible for causing the externality;
- where it is not possible to quantify in physical terms, the contribution from a particular source or the impact on a particular resource; or
- where the activity involves provision of a public good or service and the cost of providing access to that good or service would give competitors an unfair advantage because the costs of providing access cannot be recovered from users in a cost-effective manner.

In determining how investment, should be shared, transparent Community Service Obligations are recognised as a legitimate mechanism to enable the distribution of the investment burden.

While taking into account both the management objective and the management principles outlined above, jurisdictions should retain the discretion to determine how the cost of meeting resource-condition objectives should be shared in relation to a particular water resource.

[5] The definition of historical cost will vary by catchment and resource. However, historical costs will generally be those associated with activities undertaken by resource users that are no longer traceable or where those activities were encouraged or permitted by Governments at the time of their undertaking.

Where costs are harmful, sharing costs or investment removes or lessens the extent of the signal given to resource users. As a general rule, and in such circumstances, local solutions should be sought in the first instance and cost-sharing arrangements should be phased out.

Investment, or cost, sharing should not be seen as advocating ongoing Government subsidisation for ameliorative works necessary to sustain otherwise non-viable businesses or activities.

Government should, in general, contribute to works only up to a level sufficient to trigger the necessary investment towards effective self-correcting, self-perpetuating natural resource management systems. Public funds should be applied in such a way that they neither substitute for the responsibility of others nor weaken others' perception about their own resource management responsibilities.

IMPLEMENTATION FRAMEWORK

The sixth step in ensuring the efficient and effective management of externalities is to set down in a plan, the transitional pathway for emerging responsibilities so that, in association with other instruments, they deliver water resource objectives in an effective and equitable manner for each resource or region.

In order to implement the guidelines outlined above, a pragmatic framework for activating the management of externalities is required.

By nominating resource-condition objectives in a plan, the value that communities or catchments place on achieving a certain condition for their water resources is revealed. This includes consideration of expected future values as resource-condition objectives evolve.

Goals for the improvement of the condition of Australia's water resources are already being expressed, to some extent, in water resource management plans, water allocation arrangements, and legislation in all jurisdictions. These need to be extended to allow standards and obligations to be defined and the emergence of clear policy signals about responsibilities associated with the creation and maintenance of externalities

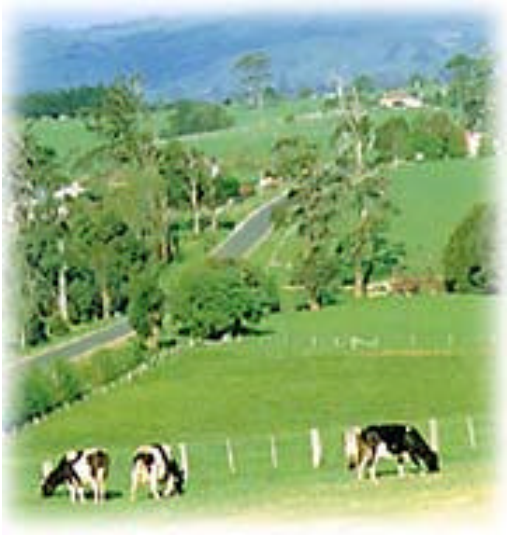
Accordingly, jurisdictions should build on arrangements that are currently in place. In many cases, however, current planning arrangements will need to be modified to set out a transitional pathway necessary to achieve resource-condition objectives. This pathway will need to be costed, agreed, monitored and enforced for each water resource or region if plans are to be effective. In many cases, implementation will be assisted by the specification of interim milestones. When preparing or adjusting plans, full consideration should be given to the costs of implementing them including monitoring and enforcement costs.

BOX 3 : 'Valuing' Externalities

There is an argument that, in order to manage externalities, the externality should be valued using non-market valuation tools, such as hedonic pricing and contingent valuation, and then these values simply incorporated into water charges. A distinction should be made at this point between the development of water resource management plans and their implementation.

It is acknowledged that there may be a role for non-market valuation techniques in the development of plans and the assessment of benefits and costs associated with setting of long-run resource-condition objectives. These guidelines, however, refer to the implementation of plans where targets and objectives have already been agreed.

By employing water resource management plans and nominating resource-condition objectives and individual responsibilities, the dollar value or cost of the externality is revealed by the total investment required to meet standards, and/or delivery in excess of that requirement.



The seventh step in the efficient and effective management of externalities is that plans be agreed at the highest level in each jurisdiction.

While draft plans have been prepared for many regions, very few have received the final approval necessary to ensure implementation. For these *Guidelines* to be effective it is necessary that each plan have statutory status. This means that it will be necessary to have the plans endorsed at the highest level in each jurisdiction. In most cases, this will require Ministerial endorsement.

The eighth step is to monitor the implementation of the plans and the achievement of resource-condition objectives and thereby ensure the efficient and effective management of externalities.

In order to ensure that individual responsibilities are being met, and resource-condition objectives pursued, monitoring procedures will need to be developed. These procedures, and the cost associated with them, should be considered in the construction of the water resource management plan as excessive monitoring costs can impact on both the nominated resource-condition objectives and the suite of signalling mechanisms chosen to achieve them.

Periodic revision of all aspects of the plans will be required to ensure their ongoing effectiveness and efficiency in the management of externalities.

It is anticipated that the life of resource management plans would be approximately five to ten years, depending on factors such as the initial condition of the resource, the availability of information about the resource, demands on the resource and the region, and the rate of adjustment. Periodic review of all aspects of the plan, from resource-condition objectives to cost or investment sharing approaches will ensure the plans remain relevant. It is important that reviews are staged and implemented in a manner that minimises uncertainty.

Case Study 7 - Local Catchment Planning

Externality Classification: Category 2 - Return

Externality Description: Increasing pollution of groundwater resources resulting from increased development and a lack of community awareness of the impacts of their activities.

Management Tool: Community Based Planning Mechanism

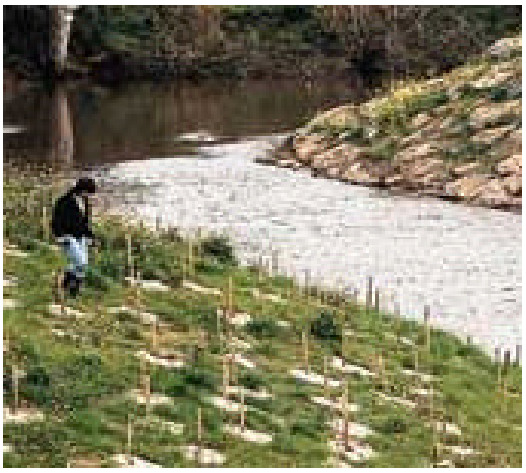
Approximately 50 per cent of Perth's potable water is extracted from groundwater mounds underlying the city. The high permeability of the sandy soils means that urban expansion and development are likely to contaminate the city's groundwater in the future. Contributing to the problem was a general lack of community awareness of the importance of the issue and a lack of clarity of whether state or local government was responsible for the development conditions and controls.

Employing the Planning Act to restrict land uses, the key aspects of the planning initiative were:

- formal government recognition of the need to protect the drinking water supply;
- the use of rigorous scientific advice to review priority Underground Water Pollution Control Area (UPWCA) boundaries;
- the development of a coordinated approach by regulatory agencies to ensure integration across the state's existing regulatory framework; and
- consultation with stakeholders and the broader community.

Two key lessons emerged from the approach. Firstly, the need to have a good understanding of the water resource condition and the impacts of alternative land uses on these conditions. Secondly, the importance of initiating effective consultation with the community, as early as possible, to address concerns impacts on individuals.

Improved integration was the most important aspect of the process because it provided for consistent decision making, raised the profile of groundwater protection and eliminated confusion and uncertainty for both rural and urban landowners.



The management framework outlined above relies upon the existence of planning provisions. However, there will be circumstances where no planning provisions are in place, or where inadequate, or inappropriate, planning is being undertaken. Where this is the case, jurisdictions should establish alternative management mechanisms which accord with the management objective and principles identified in these guidelines.

NECESSARY CONDITIONS

Within the context of the management framework outlined above, a series of necessary conditions emerge that must be met in order to meet resource-condition objectives and to ensure the efficient and effective management of externalities generated by the Australian Water Industry.

The ***first necessary condition*** for full account to be taken of externalities is that water-resource management plans be agreed and approved. These plans should identify externalities, the causes of them, set the individual standards and propose the suite of instruments to ensure the objectives expressed in them can be achieved in a timely manner.

The ***second necessary condition*** for full account to be taken of externalities is that there be a reasonable expectation[6] that the objectives expressed in water management plans can be delivered.

The ***third necessary condition*** is that the suite of signalling mechanisms chosen to achieve the objectives expressed in the water management plans can deliver these objectives in a cost-effective manner.

The ***fourth necessary condition*** is that incentives used to encourage efficient resource use make the direction of expected changes in community definitions of individual responsibilities and social expectations abundantly clear. Plans must be approved at the highest level.

The ***fifth necessary condition*** is that resource-condition objectives, individual responsibilities and signalling mechanisms be consistently monitored and periodically reviewed.

TRANSITIONAL ARRANGEMENTS

To implement the above management framework in a manner consistent with COAG policies and to meet the necessary conditions for the efficient and effective management of externalities, jurisdictions will need to:

- retain sufficient flexibility and implementation autonomy to ensure that the management framework described above complements jurisdictional pressures and system structures;
- allow regions to define and enforce agreed standards through water resource management plans in accordance with the principles outlined above;
- implement nested planning processes so that no body can compromise the interests of another in the absence of due process;
- fully cost catchment plans and allow regional[7] resource management authorities to raise the investment funds necessary to implement them;
- allow regional resource management authorities full access to the range of instruments necessary to give efficient signals to water users; and
- allow for the ongoing monitoring and periodic review of progress.

[6] Consistent with the definition of the Precautionary Principles set out in the Intergovernmental Agreement on the Environment, by 'reasonable expectation' it is meant a high probability of attainment.

[7] Local catchment management is to be preferred where legislative and administrative arrangements make this possible. Conceptually, local managers should be empowered to manage resources in the most cost-effective manner possible.

IMPLEMENTATION MILESTONES

The efficient and effective management of externalities as they occur in the Australian water industry will be achieved via the successive implementation of reforms leading to the following milestones.

MILESTONE	IMPLEMENTATION BY
1. **Identify** the cause and extent of externalities in catchments.	2002
2. **Agree and Adopt** water resource management plans that recognise resource-condition objectives and individua responsibilities necessary to manage externalities effectively.	2005
3. **Adopt** transparent signalling mechanisms, in regions where externalities are significant.	2007
4. **Achieve** full management of externalities for water resource use.	2010
5. **Establish and Enact** monitoring and periodic review processes for water resource management plans and transparent signalling arrangements	2010