WATER – THE NEW PRECIOUS RESOURCE

PLANNING, MANAGEMENT & ALLOCATION QUEENSLAND-STYLE

Paper for the

WATER IN MINING 2003 CONFERENCE

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ABSTRACT

This paper describes how water is being planned, managed and used in Queensland as both a precious natural resource, vital for healthy ecosystems, and as a valuable tradeable commodity, necessary to secure economic prosperity.

Queensland has been progressively implementing a planned package of water industry improvements agreed by the Council of Australia Governments in 1994.

The *Water Act 2000* provides the legislative basis for implementing the COAG water reform framework in Queensland and sets out statutory water planning processes.

A Water Resource Plan (WRP) is a strategic document that specifies water sharing and environmental flow outcomes across a whole catchment over a period of up to 10 years.

A Resource Operations Plan (ROP) sets out the details of implementing a WRP, including environmental flow rules, establishment of tradeable water allocations that are separate from land, rules for water trading, rules for operating water infrastructure, arrangements for the release of any unallocated water identified in the WRP, and requirements for monitoring and reporting.

Water Resource Planning and Resource Operations Planning are progressing in priority catchments and aquifers across the State. Ways to obtain a water entitlement now depend on whether a WRP and/or a ROP exist in a particular catchment.

Water trading provides for the buying and selling of water entitlements on a permanent basis where permitted under a ROP. Details of tradeable water allocations are securely registered on the Water Allocations Register, which is similar to a land titles register. Leasing and temporary transfers of water entitlements are also possible. Water brokers are emerging to facilitate water trading which aims to improve water use efficiency and move water to higher value uses.

Queensland is leading the way in the implementation of the COAG water reform framework and the pursuit of sustainable water resource management. The State's progress in this regard is increasing certainty for water users, while ensuring that considerations of equity amongst existing and future users and amongst various uses, as well as considerations of ecological sustainability and the wider community, are all taken into account.

The mining sector stands to benefit substantially from these new approaches to planning, managing and using this precious resource.

OVERVIEW OF WATER RESOURCES IN AUSTRALIA & QUEENSLAND

Australia – A Sunburnt Country

Water is a fundamental resource in Australia that underpins economic growth. It is not an unlimited resource. Australian Governments have had to respond to its limitations and the threats that can be imposed by unsustainable use.

Water in a Naturally Dry Land

Australia is a dry island continent typified by droughts and floods. Rainfall, and consequently river flow and groundwater recharge, is extremely variable. Australia is the second driest continent after Antarctica, and has less than 1% of the world's available freshwater resources. 75% of its land is semi-arid or arid, including 40% that is desert. A further 10% is extremely arid for much of the year and only 15% of the continent is well watered.

Rainfall varies from less than 150mm annually over parts of central Australia up to 2 000 mm in the monsoonal north. However, average rainfall across most of the continent is estimated to be only 450mm annually, with runoff only amounting to roughly 5% of rainfall for 75% of the land base. Almost 90% of all rainfall and snowfall in Australia evaporates, compared to a world average of approximately 65%. The rainfall variability in Australia is greater than any other continent, well above the world average and nearly twice that of Europe (see Figure 1).

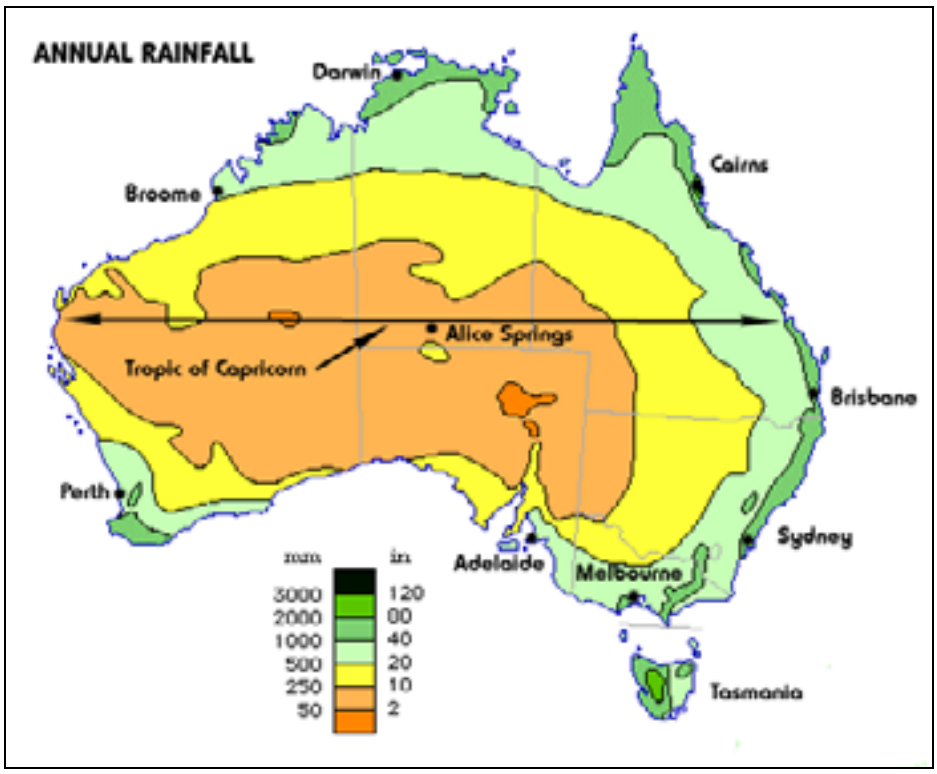
All of these features require Australians to have particularly innovative approaches to water resources planning and management.

Water Resources in Australia – the Physical Context

State and Territory boundaries largely ignore river basins, groundwater aquifers, and biophysical regions (see Figure 2).

Over the past few years, freshwater in Australia has declined in both quantity and quality, raising concerns about future sustainability. For example, 26% of Australia's surface water management areas – which account for 70% of total water use – are either close to or below estimated sustainable flow regimes required to keep the rivers in a healthy state (that is, water use is close to, or above, the sustainable yield limit). Further, 30% of Australia's groundwater management areas are either close to the sustainable yield, where the rate of recharge equals or exceeds the rate of use, or are already overused (see Table 1).

Figure 1 – Annual Rainfall in Australia



(Source: Australian Bureau of Meteorology)

Figure 2 – Surface water and ground water resources in Australia – state boundaries

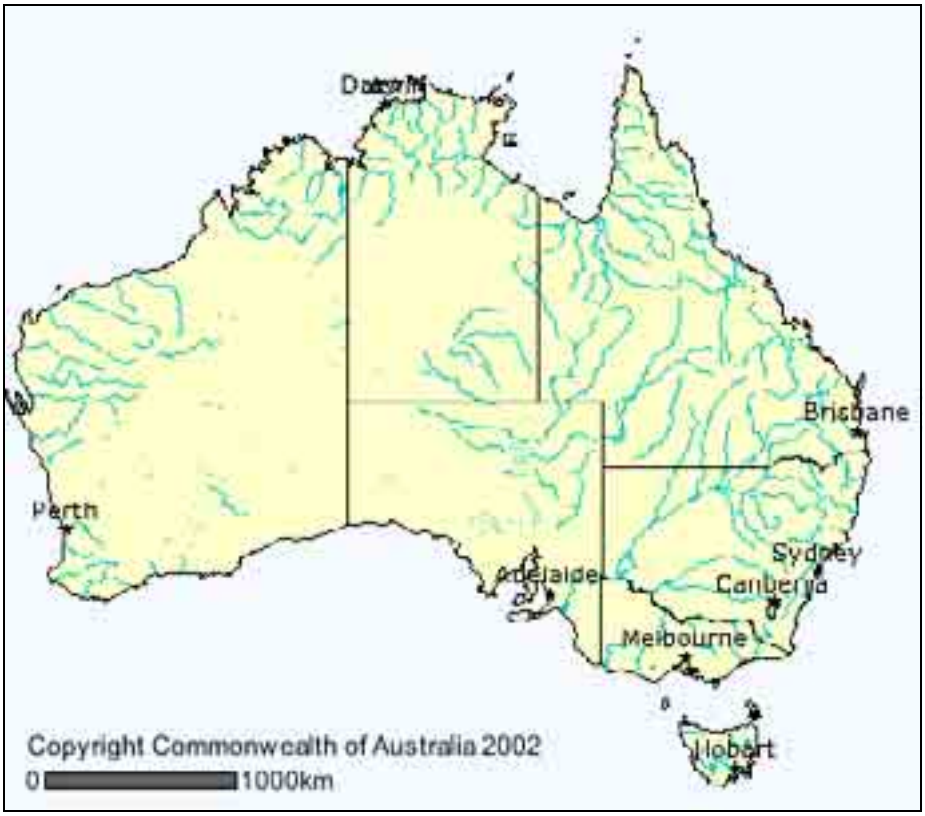


Table 1 – Number of surface and ground water management units approaching or exceeding sustainable levels of water use

	Number of surface water management areas	% of total number of surface water management areas	Number of ground water management areas	% of total number of groundwater management areas
Low water resource development: < 30 % of nominated sustainable yield	195	60	274	51
Moderate water resource development: 30 % – 70 % of nominated sustainable yield	46	14	81	15
High water resource development: 70 % - 100 % of nominated sustainable yield	50	15	104	19
Over developed: more than 100 % of nominated sustainable yield	34	11	57	11
Not recorded	-	-	22	4

(Source: Commonwealth Government 2000)

Water Resource Management in Australia

Until the last couple of decades, Australian governments, in common with other developed countries, focussed on developing water resources through large scale dam construction and establishing irrigation

systems. This was seen as the best way to develop and "drought proof" Australian industries and communities, and to support major urban centres. Because the annual variation in runoff from Australian rivers is estimated to be 60% greater than the world average, and 250% greater than in Europe, Australia has developed one of the highest per capita volumes of water storage to cope with prolonged dry periods.

Under Australia's system of federal government, responsibility for the management of water resources lies with the State and Territory Governments. Nevertheless, the Commonwealth Government has played a significant leadership role in promoting regional development through the provision of financial assistance to the States for infrastructure such as dams. Its first major involvement with the development of water resources was the commencement of the Snowy Mountains Scheme in 1949, in partnership with the Victorian, New South Wales and South Australian Governments.

Financial assistance to the States by the Commonwealth Government for the development and management of water resources continued into the 1990s. Financial assistance was directed towards other large infrastructure projects, such as the Ord River Scheme in the north-west of Australia, rural water supply development in the States, flood mitigation, and provision of sewerage services in cities and larger towns. The focus was on development with little consideration given in the early years to the environmental impacts of those developments.

Water Consumption in Australia

Due partly to our relatively low population (about 19 million people), the water supply-demand balance in Australia is not as acute as in other parts of the world. However, Australia has the highest per capita water consumption in the world. Each year Australians use a total of 24,000 gigalitres. Most (19,100 gigalitres) comes from surface water sources, the rest (5,000 gigalitres) from groundwater. Some 75% of water is used for irrigation in agriculture, a further 20% is used by the urban and industrial sectors, and 5% for other rural uses (domestic and stock) (see Table 2).

Table 2 – Australia's mean annual water use (GL) in 1996/97

State / Territory	Irrigation	Urban / Industry	Rural	Total use
NSW	8643	1060	305	10008
Vic	4451	987	339	5777
Qld	2976	1052	561	4591
WA	710	1027	59	1796
SA	819	292	53	1164
Tas	276	186	9	471
NT	53	87	39	179
ACT	5	63	4	72
Total	17935	4754	1369	24058

(Source: Commonwealth Government 2000)

Consumption varies considerably at different times of the year and in different regions due to different seasonal rainfall and demand patterns. High rainfall or drought affects the amount of water used, and many areas experience significant seasonal fluctuations in rainfall.

Across Australia, average water use has increased by 65% since the early 1980s, due primarily to increasing economic development and population growth. Between 1985 and 1997, water extracted for irrigation increased by more than 75% and drinking and industrial water consumption each rose by 55%.

Queensland – A State of Droughts and Flooding Rains

Water Resources

About 40-45% of Australia's average annual volume of freshwater that can be extracted from rivers or groundwater for use or storage is found in Queensland.

However, Queensland's rivers are characterised by alternating occurrences of severe droughts and major floods. Statistically, Queensland has one of the most variable climates in the world. Rainfall is also seasonal, with most falling during summer. Different parts of the State record the highest and lowest annual rainfall levels nationwide, and three-quarters of all our rainfall occurs in the less developed and sparsely populated northern catchments that drain to the Gulf of Carpentaria and the Coral Sea north of Townsville. Only about 6% of the water in our rivers drains to inland river systems.

The extreme variability and seasonality of Queensland's rainfall patterns present many unique management challenges, such as adapting modes of agricultural production to suit climate conditions and the need to rely heavily on surface water storages. Queensland has almost 200 major reservoirs, which provide approximately 64% of the State's total water consumption. These have a combined capacity of approximately 10 million megalitres (ML) or 10 000 gigalitres (GL).

The condition of Queensland's river systems compares favourably to the rest of Australia. While some impact on river systems is unavoidable, a significant proportion of the State's systems have minimal disturbance to their flows, water quality, riverbank vegetation, biota and fish passage. The relatively few areas of poor water quality conditions are generally due to high levels of turbidity or nutrients, caused, in the main, by diffuse, land-based pollution sources. Unlike some other parts of Australia, available scientific information suggests that the health of Queensland's river systems is not significantly impacted by altered flow regimes.

Queensland has vast underground water resources, which can be grouped into two main categories:

- Artesian water – underground water that flows naturally to the surface.
- Sub-artesian water – underground water that does not naturally flow to the surface, and which needs to be pumped. This is the case for most coastal systems.

The Great Artesian Basin (GAB) is the largest known artesian basin in the world, covering an area of more than 1.7 million square kilometres. It stores an estimated 8.7 billion ML of water and has a maximum depth of three kilometres. In Queensland, the Basin underlies more than 1.1 million square kilometres, or 65% of the State, and it is the sole source of water for stock and domestic use in many western areas (see Figure 3).

36% of all water used in the State – some 1.4 million megalitres each year - comes from underground water. This is significantly higher than the national average of approximately 20%. Underground water is being extracted faster than it is being replenished in some important

systems. Some coastal systems are also undergoing saltwater intrusion due to underground water withdrawal. Uncapped artesian bores, open bore drains, and increasing demand for irrigation and domestic uses have lowered the water table and reduced spring flows in some inland areas. Further, about three-quarters of the 240 spring groups recorded in the Great Artesian Basin are no longer flowing.

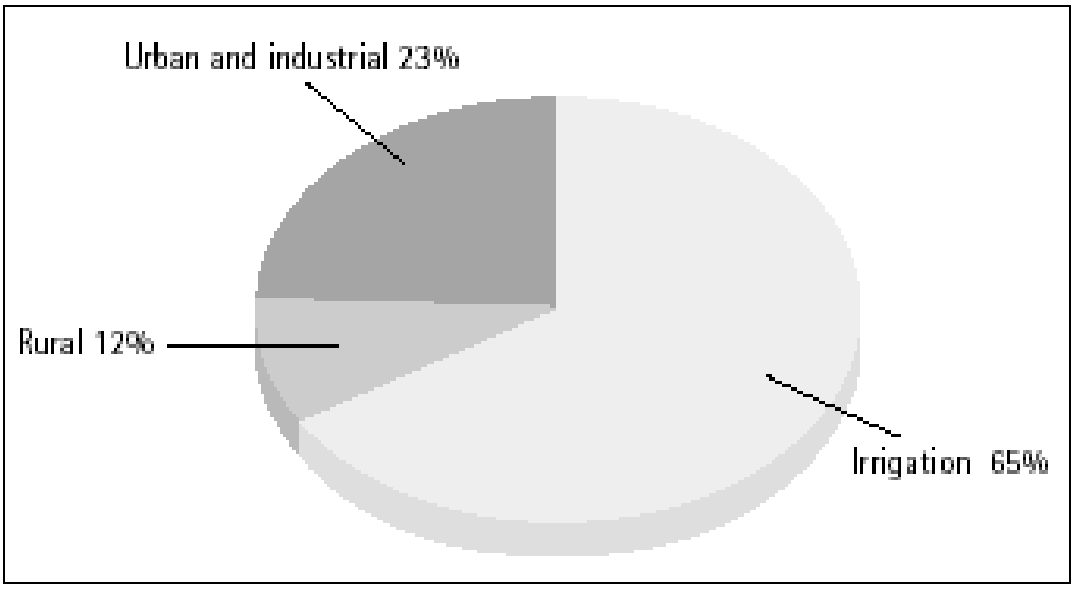
Figure 3 – Great Artesian Basin (GAB)

Water Use

Queensland's water consumption level is about 1.1 megalitres per person per year, and rising. The State is the nation's second highest per capita water user behind the Northern Territory, which uses about 30%

more water. Use of surface and subsurface freshwater in Queensland increased by 97% between 1983 and 1997, with a significant proportion related to increases in irrigated agriculture, an economically important sector (see Figure 4).

Figure 4 – Sectoral water use in Queensland 1997



(Source: Commonwealth Government 2002)

Water Resource Management Pressures and Directions

In Queensland, like elsewhere in Australia and overseas, there is mounting evidence that many of our water use practices may be unsustainable in the long run. An increasing population, forecasts of increasing climate variability related to global climate change, and increasing economic development, will put additional pressure on our water resources in the future.

Balancing present water consumptive needs with the needs of future generations, and the health of our river and underground water reserves, is one of the most significant long-term challenges facing governments, industrial, agricultural and domestic water users, and the community.

The Queensland Government is committed to a responsible long-term approach to water management, to maximise benefits to our society, sustain our economy and protect the environment. Water use decisions must be founded on the best possible science and information about

water condition, and we must increase the efficiency of our water use and maximise reuse opportunities.

Securing the State's water future requires striking a balance between multiple interests and goals, through open dialogue, and collaborative and integrated community planning and management.

ACHIEVING A SUSTAINABLE AUSTRALIAN WATER INDUSTRY

Australia has adopted a range of complementary approaches to address the balance between environmental and economic requirements necessary to achieve the sustainable management and use of our surface and groundwater resources. The main elements of Australia's strategy are the adoption and implementation of an integrated water reform framework, and a regional approach to deliver on-ground action.

Ecologically Sustainable Development

Since the 1980s, environmental health, sustainability, water availability, and water quality for consumptive uses have emerged as significant environmental and economic issues.

The concept of environmentally sustainable development gained prominence with the release of the Brundtland Report in 1987, which spelled out 27 principles for sustainable development, including the mutual goals of economic and environmental outcomes in policy development. Subsequently, the Rio Declaration and Agenda 21, which came out of the 1992 United Nations Conference on Environment and Development in Rio de Janeiro, set out a blueprint for sustainable activity across all areas of human endeavour. In addition, in 1992 Australia adopted a National Strategy for Ecologically Sustainable Development (ESD), which provides broad strategic directions and a framework for governments to direct policy and decision-making.

Throughout the evolution of ESD, there has been significant on-going international debate about the role and value of large-scale water resource developments.

COAG (Council of Australian Governments) Strategy

By the beginning of the 1990s, State and Territory Governments had begun to move their water resource policies to reflect an increasing emphasis on the need for ecological sustainability and economic viability. A combination of incidents and actions put water resource management high on the national agenda. Symptoms of resource degradation such as declining water quality, increasing salinity, toxic algae outbreaks, and loss of biodiversity were widely publicised. At the same time, irrigators were facing reduced security of supply in relation to their water allocations, and demand for water had increased.

In 1991, the Productivity Commission, which is Australia's principal review and advisory body on microeconomic policy and regulation, began an inquiry into water resources and waste disposal. This inquiry highlighted the need for wide ranging reform of the water industry to improve its efficiency.

This momentum resulted in the development of the Council of Australian Governments (COAG) water reform framework, signed in 1994 for implementation by all State and Territory Governments. COAG is a consultation and decision-making forum of the Commonwealth, State and Territory Governments and includes representation from Australian Local Governments. The water reform framework continues to be the driver for major change in water management in Australia today.

The water reform framework, which is still being implemented, encompasses urban, as well as rural water and wastewater industries, and includes economic, environmental, and social objectives. The reform program is aimed at improving the efficiency and effectiveness of the provision of water services, and instituting water management planning processes that take into account the effects of all water use by agriculture, industry, households, and the environment.

The water reform framework explicitly links economic and environmental issues within a coherent and integrated package of reform measures. Briefly these measures include:

- an integrated catchment management approach to water planning and management;

- pricing water for cost recovery and removing or making transparent cross subsidies;
- comprehensive systems of water allocations and entitlements, separated from land, and backed by secure access rights to water;
- providing for trading in water entitlements;
- specific provision of water for ecosystems;
- improved institutional arrangements, including separation of service provision from regulation and devolution of responsibility to the lowest possible level;
- water service providers to operate on a commercial basis;
- the development and implementation of a national water quality management strategy;
- water related research, and
- public consultation and education.

The COAG water reform framework does not preclude new water resource infrastructure developments but requires that all investment in new infrastructure be both environmentally sustainable and economically viable. This includes full cost recovery, including the construction and ongoing costs, from beneficiaries of the new infrastructure.

National Competition Policy

At the same time as the water reform framework was developing, Australia was entering a renewed period of microeconomic reform under the banner of the "National Competition Policy" (the NCP). In 1995, COAG agreed to an NCP package of reforms which addresses reform principles in relation to essential infrastructure facilities, pricing principles, fair competition between government and private sector business, and specific structural reforms to the gas, electricity, water and road transport industries, which often operated as natural monopolies.

The COAG water reform framework forms part of the NCP and other inter-governmental agreements. The NCP provides for specific annual payments to the States for progress under these reforms. The National Competition Council (NCC) assesses progress (including progress in implementation of the environmental provisions of the water reform framework) on an annual basis. The NCP payments have been a major

incentive for progress in implementing the water reform framework and the NCC has a schedule of assessments and payments until 2005/06.

All State and Territory Governments have been active in implementing the water reforms, particularly catchment planning, water entitlement specification, institutional reform, the identification of stressed rivers and provision of water for ecosystems, the progression towards full cost recovery for both urban and rural water use, and public consultation and education. Implementation since 1994 has placed Australia in a considerably better position to deal with ongoing challenges in balancing environmental needs and consumptive use.

SHARING WATER RESOURCES – QUEENSLAND STYLE

Water Act 2000

Queensland's *Water Act 2000* was the first comprehensive review of Queensland's water legislation since 1926. This Act has established a water resource planning framework which considers the total available water resources and represents a major achievement for Queensland in terms of implementing adaptive resource management systems.

One of the principal objectives of the *Water Act 2000* is to protect the biological diversity and natural health of riverine and aquatic ecosystems. Another important objective is to improve the confidence of water users now and in the future regarding the availability and security of water entitlements. This is achieved by providing for the fair, orderly and efficient allocation of water to meet community needs and by promoting an increased community understanding of the need to use water in a sustainable and cost efficient way. The principles of ecologically sustainable development underpin the decision-making processes.

The *Water Act 2000* provides a:

- management framework for the planning, allocation and sustainable use of water
- regulatory framework for service providers covering asset management, customer standards and dam safety, and
- governance regime for statutory authorities that provide water services.

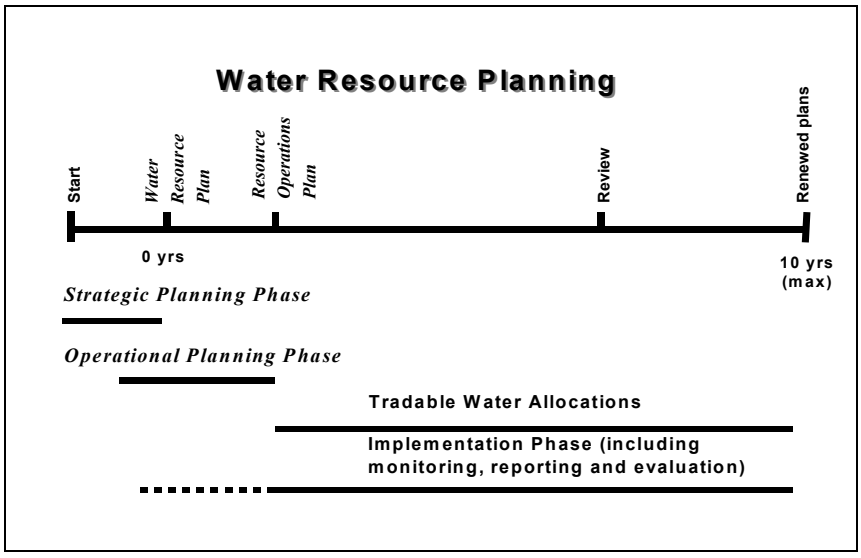
The *Water Act 2000* has two chapters that have a major impact on water resource and water infrastructure planning. These are outlined below.

Allocation and Management

The statutory water allocation and management framework covered in Chapter 2 of the *Water Act 2000* (see Figure 5) essentially comprises:

- a two-tiered planning framework including strategic catchment-level water resource plans and resource operations plans for their implementation,
- resource operations licences to ensure that operation of infrastructure complies with resource operations plans,
- a process for converting existing water entitlements to volumetrically – specified, tradeable water allocations,
- assessment criteria, including water allocation security and environmental flow objectives, for making decisions, such as trading,
- a process for establishing the trading rules and registration of tradable water allocations that are separate to land title; and
- a framework for granting new or additional water allocations to meet future water requirements.

Figure 5 – Water Resource Planning



Infrastructure and Service

Chapter 3 - Part 3 of the *Water Act 2000* covers water service provider obligations. It is aimed at ensuring continuity of water services to

customers. Part 3 requires that water service providers have an approved strategic asset management plan that ensures continuity of supply for each of the service provider's registered services (water, sewerage). The strategic asset management plan must be reviewed regularly in accordance with directions provided by the regulator (the Department of Natural Resources and Mines) to ensure relevance to the services provided.

The strategic asset management plan must:

- state the registered services to which the plan applies
- state the infrastructure providing the services
- state the levels of service, and performance indicators, for the service
- demonstrate how the levels of service will be achieved
- have regard to best practice industry standards, and
- identify the methodology used in deciding appropriate levels of service.

Water Resource Planning

The water resource planning process comprises three stages (see Figure 6):

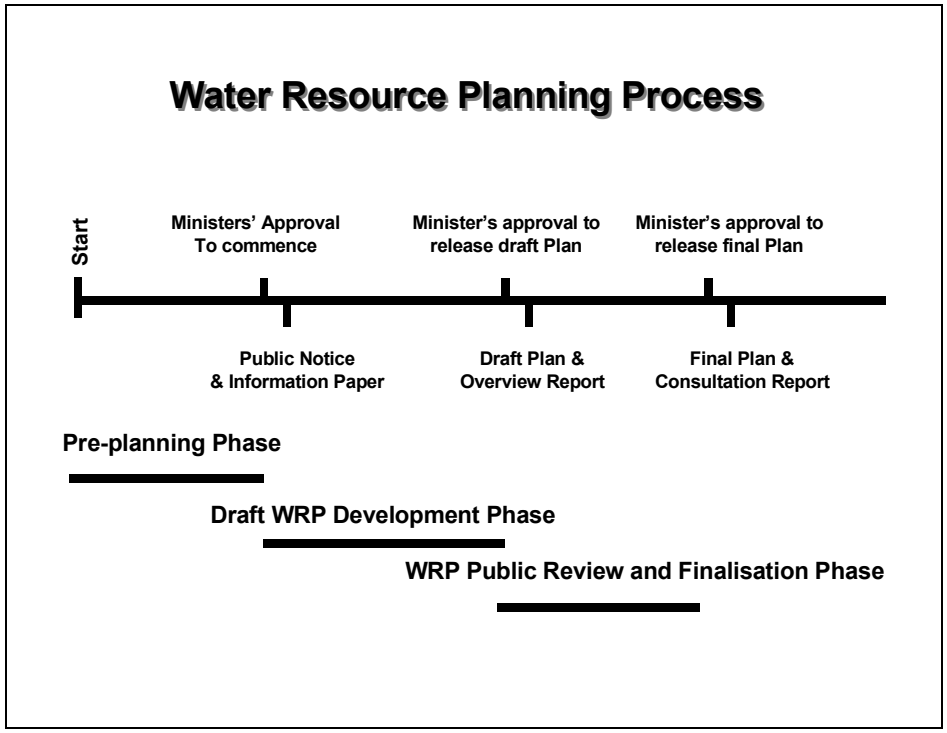
- the pre-planning stage, where experts prepare decision-support information including a basin-wide daily time-step hydrologic model, and environmental, economic and social assessments
- the draft water resource plan development stage, which involves the identification and assessment of the relative impacts of water allocation scenarios (options) in consultation with stakeholders such as local government, water users and cultural and environmental interests, and
- the water resource plan (WRP) public review and finalisation stage.

Central to the water resource planning process is the assessment of volumes of water available for allocation, and the assessment of the impacts of potential future allocations and stream-flow management regimes on water supplies and environmental flows. This involves:

- the use of basin-wide hydrologic models to simulate river flows and possible water diversions– given the current infrastructure, allocations and historical rainfall
- assessment of projected water needs and priorities for environmental, urban, industrial and rural water uses
- assessment of the condition of the catchment's water resources and ecosystems reliant on water, and
- assessment of economic and social impacts associated with the potential future allocation scenarios.

The water resource plan provides information to define water availability in terms of current allocations, including water allocation security objectives for various priority uses, environmental flow objectives to be achieved and any unallocated component.

Figure 6 – Water Resource Planning Process



Resource Operations Planning

To implement a water resource plan, a resource operations planning process (see Figure 7) is undertaken similarly to the water resource planning process. It is, however, far more detailed, being concerned with the nuts and bolts of day-to-day management at the reach level to

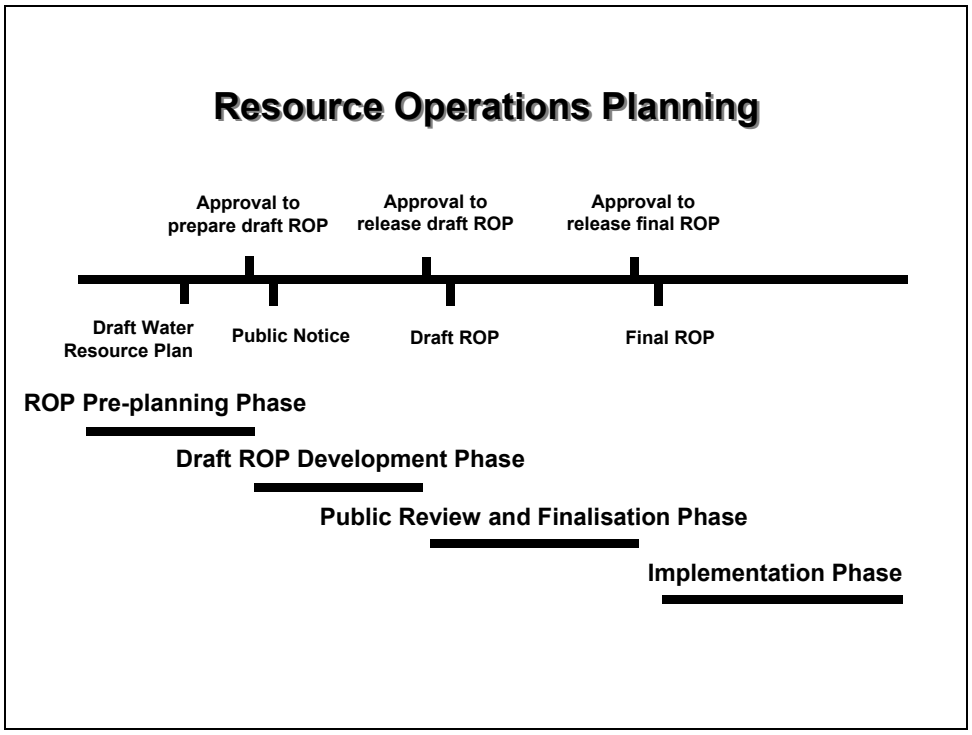
achieve objectives defined in the water resource plan. Resource operations plans (ROP) for a water resource plan area would cover only those river catchment areas where it is intended to establish tradable water allocations for market trading, or introduce other more detailed water allocation and management arrangements, which may include licences that are not tradable.

A resource operations plan will include requirements for the operation of infrastructure, the taking of water and performance monitoring. In addition, a resource operations plan will outline processes for managing and selling unallocated water identified in a water resource plan.

Development of a resource operations plan will take into account:

- strategies, including development proposals, for meeting projected water needs
- strategies for the future allocation of new water, taking into account the potential future effectiveness of water trading and water use efficiency to meet projected water needs.

Figure 7 – Resource Operations Planning



(Note: Process may be repeated for identified sections of the WRP area)

Resource operations plans are intended to provide water users with an improved level of certainty regarding the availability of water at specific locations in the river system, and strategies and priorities for making unallocated water available. They are intended to provide for the timely release of available water to the market. Wherever a market exists, it is expected that competitive arrangements will be used to sell unallocated water and to generate a market for existing allocations to be traded to different locations or uses.

The implementation phase of resource operations planning will include complementary planning for the conversion of existing entitlements into tradable water allocations and resource operations licences for the operation of water infrastructure.

Obtaining a Water Entitlement

In order to promote sustainable allocation and best use of water, a three-pronged planning hierarchy to meet water needs in a way that fulfils the intent of the national water reform agenda is used:

(a) facilitating the move to high value and best use of water through improved specification and security of existing water entitlements, and providing for water trading

(b) encouraging efficient use of water (reduce, reuse, recycle), and

(c) if supplies can't be met through (a) and (b) above, then the development of additional water supply sources.

This strategy seeks to improve overall productivity and efficiency before developing new water sources.

The options for obtaining a water entitlement are dependent on the status of the water plans. This status may be:

- where no water resource planning process has been initiated;
- where a water resource planning process has been initiated and a moratorium notice has been published but a water resource plan has not been finalised;
- where a water resource plan has been finalised but no resource operations plan exists; and
- where a resource operations plan has been finalised.

Where no water resource planning process has been initiated, applications for water licences may be made to the Department of Natural Resources and Mines. Entitlements can also be obtained by purchasing land with an existing entitlement.

Where a water resource planning process has been initiated and a moratorium notice has been published but the water resource plan has not been finalised, an application for a water licence will only be dealt with for water that is not the subject of the plan or as otherwise provided for in the moratorium notice. Entitlements can also be obtained by purchasing land with an existing entitlement but the moratorium may have an impact if a change in purpose is proposed or the works are not completely in place.

Where a water resource plan has been finalised, applications may be made to the Department of Natural Resources and Mines in accordance with the provisions of the plan. Entitlements may be obtained by purchase of land with an existing entitlement.

Where a resource operations plan has been finalised, applications for water licences may only be made for water that is not covered by the plan. If the ROP includes provisions for unallocated water, bids can be made in accordance with the release schedule for that unallocated water. Water allocations granted under the ROP are a new form of entitlement that represent a significant achievement for Queensland under the water reform framework. Water allocations are separate from land and may be traded. Other forms of entitlements may be obtained by the purchase of land with an existing water entitlement.

Finally, under all these scenarios, water may be purchased from a water service provider such as SunWater, and treated effluent can also be purchased from, say, a local government.

QUEENSLAND WATER MARKETS IN ACTION

Despite the limited nature of the resource, which was discussed earlier, demand for water is growing rapidly in Queensland. Within an effective resource planning framework, making water entitlements

tradeable is one way of improving water efficiency and making existing resources last longer. Water trading also increases diversification, innovation and development of high value crops.

In Queensland three types of water trading are possible:

1. permanent trades of water allocations and interim water allocations
2. leases of water allocations
3. seasonal water assignments (sometimes referred to as "temporary transfers").

Permanent Trades of Water Allocations

As mentioned previously, permanent trading of water allocations is only possible following the approval of a Resource Operations Plan (ROP). In implementing the water resource plan for an area, the ROP contains processes for converting existing entitlements to water allocations and for granting new water allocations to meet future water requirements. These processes have been carefully developed to meet the objectives of the WRP and the needs of the area, including the environmental flow objectives and water allocation security objectives.

Queensland's first ROP came into effect on 2nd of June this year. It covers the Burnett Basin, which is one of the largest in South-East Queensland, and initially involved the issue of about 1,700 tradable water allocations.

Once water allocations are granted, they must be registered on the Water Allocations Register (WAR). The Register operates within the Department of Natural Resources and Mines' Queensland Resource Registry as an adjunct to the service already provided by the land titles registrar. The Register is based on the land titles registry and the existing land titles registrar has been appointed as the registrar of water allocations.

Once recorded on the Register, water allocation holders and persons who have an interest are able to lodge dealings and conduct searches in the same manner as now exists for the land titles register. Common lodgement forms are used, with minor alterations having been made to

the existing land registry forms to accommodate dealings in water allocations. A similar fee structure is prescribed, and it is possible to lodge a single form to effect a combined land title and water allocation dealing.

The Water Allocations Register is a significant component of Queensland's successful facilitation and operation of water markets. In particular, users can be confident of the security offered by the Register because it uses a business process, namely the Queensland Resource Registry, and a computer system, the Automated Titles System. These processes are synchronous with the existing Land Register, which has been operational for 10 years and has proven to be secure and robust.

Permanent trades of water allocations can involve simply a transfer of ownership or they may also involve a change to the water allocation (e.g. change of location). Water allocations may also be subdivided or amalgamated to give effect to a trade.

Dealings involving a change to the water allocation require prior certification by the chief executive of the Department of Natural Resources and Mines. These dealings can only be lodged with the registrar if the transfer forms are accompanied by the relevant certificate.

The chief executive must determine if the application to change, subdivide or amalgamate a water allocation is in accordance with the rules set out within the relevant ROP. Certification will be given if the change is permitted under the water allocation change rules or if the chief executive is satisfied the amalgamation or subdivision is consistent with the ROP. The certificate may contain conditions and remains valid for 40 business days unless the certificate states otherwise.

Where an application to change a water allocation contemplates a change not mentioned in the ROP, then an investigation and public submissions process is undertaken to allow the chief executive to decide the application. If approved, a certificate is given as described above.

In this case, the applicant may be required to pay the cost of researching and investigating the application.

Other Trades

Interim water allocations (IWAs), which are entitlements to be supplied with water by the operators of a water supply scheme, can currently be traded in a number of areas. These are the Mareeba Dimbulah, Mary River and Nogoa Mackenzie water supply schemes. This form of trading is introduced only where there is a demand for trading and environmental impacts can be managed. IWAs are converted to tradeable water allocations upon approval of a ROP.

Seasonal water assignments (SWAs) are trades of water that may be taken under water entitlements to another person for a given water year. Ownership of the entitlement remains with the entitlement holder. While SWAs of supplemented supplies are approved by the water service provider, SWAs of unsupplemented supplies are approved by the Department of Natural Resources and Mines. The distinction between supplemented and unsupplemented water will be discussed in more detail shortly, in relation to water pricing.

Water Brokering

Water brokers may facilitate trades by bringing together buyers and sellers of tradeable water products. They may also assist in interpreting trading rules and other requirements, such as any resulting need for a land and water management plan. Water brokering services may be provided by real estate agents, stock and station agents, managers of supplemented water supply schemes, or individuals.

Access to Unallocated Water

Access to unallocated water not subject to a moratorium notice or restrictions under a water resource plan is possible by applying for a licence under the *Water Act 2000*. Alternatively, resource operations plans may specify a process for granting new water entitlements.

WATER PRICING

In discussing the pricing of water in Queensland it is useful to first describe the two different types of water supplies in the state – as each has a different pricing regime.

Water supply may come from a supplemented system, where dams, weirs, or barrages supplement and increase the reliability of receiving water along a pipe, channel or river. Unsupplemented water is all other water and, as a result of historical attitudes and approaches to water management, has typically not been charged for.

Recently, as part of Queensland's commitments under the COAG water reform framework, a review of the State's water management charges for unsupplemented water has been announced. While this review takes place, an interim charging regime has been introduced, which involves an annual $50 licence fee payable on renewal of a licence and a flat $3 per megalitre water harvesting charge, which currently only applies to those water harvesters previously charged.

The review of the costs and value of water is intended to assist with the development of a robust and long-term policy on water charges. It will identify all costs associated with the management of the State's water resources, and recommend those costs that should be met by taxpayers and those that should be met by water users and dam operators. It will also consider the environmental costs (including salinity and water quality degradation) to the community and other water users due to water extractions. The review will involve broad public consultation with the community and stakeholders.

Supplemented rural irrigation water has historically been priced below minimum cost recovery levels to ensure the financial viability of Water Supply Schemes. As part of agreements made under the COAG water reform framework, rural irrigation prices for most schemes in Queensland are to reach minimum financial viability by 2004.

The pricing of supplemented water in Queensland involves a tiered system of prices whereby two-part tariffs are used to meet the various water reform objectives. The variable usage-based component of the

charge promotes efficient water use, while the fixed entitlement-based component encourages water trading. For most schemes, the price path tariff structures are designed to provide 70% of required revenue from the fixed charge, with 30% being provided from the water use charge in an average water year. When the next round of price paths are developed, the possibility of 3-part tariffs will be investigated, with the third component of a charge being to set aside a reserve of funds for dry years, when revenue from water use may be so low as to affect the viability of the scheme.

In contrast to the irrigation sector, industry (including the mining industry) generally pays above this minimum financial viability for its water where it is supplied from a supplemented system. Typically industry requires much less water at a higher level of reliability and this reflects the need for a higher price for service and delivery.

INVESTING IN NEW INFRASTRUCTURE DEVELOPMENTS & SUSTAINING EXISTING INFRASTRUCTURE

In order to encourage investment in new water infrastructure or to encourage the maintenance and upgrading of existing infrastructure it is crucial that the price of water is fully cost-reflective. This means that prices must account for the costs of service and delivery, as well as ensure that water service providers receive a rate of return on their existing assets wherever practicable.

Where the water service provider earns a rate of return, its payment is warranted by the products derived from the use of the water providing sufficient returns to the water user. The requirement to pay a rate of return enures that water is only applied to those crops that provide a higher return. In turn, the water business and the grower will be better off, both investing in new infrastructure, ventures and innovation that expands a thriving agricultural industry.

Accordingly, investment will ensure more efficient service and delivery of water. A service provider will tend to only invest in new infrastructure where it can earn a return on its investment. New investment is necessary to ensure new technology and improved water supply systems are implemented. This new technology will either

provide increased service levels or reduced costs for customers paying a commercial rate of return. The rate of return is the incentive that drives the service provider to undertake such change. For this reason new infrastructure is required under the COAG water reform framework to be both economically and ecologically viable.

Another driver of innovation is competition in the water service delivery and water trading markets. Where competition exists, businesses (whether production or water businesses) attempt to innovate and produce new products and services in order to meet (or create) the changing demands of customers. This in turn can drive economic growth.

FUTURE TRENDS & OPPORTUNITIES FOR THE MINING INDUSTRY

The future for water as a precious resource is both exciting and challenging. Increased integration of water markets, both in the trade of allocations and the pricing of different sectors of water use, are expected to result in greater efficiency and reduced costs of inputs in production. The mining sector and other industries that use water in producing goods and services should in turn be able to produce goods at a lower cost of production and lower cost to the environment, with concurrent improvements in water use efficiency, and wastewater treatment and recycling.

In many ways, Queensland is leading the country in our implementation of the COAG water reform framework and in the pursuit of sustainable water resource management. An important component of this success comes with the finalisation of ROPs throughout the State and the separation of water from land, whereby permanent water trading will better facilitate the movement of water to higher values uses. In turn, this will allow for the development of greater varieties of water products and services both in terms of water quality and reliability, and water market related derivatives.

Furthermore, the implementation of water reforms in Queensland means that water trading will be able to take account of improved supply and demand signals, based on pricing regimes that better reflect the cost of supply. The operation of more efficient water markets allowing

water to move between different users and uses will allow for the better achievement of alternative sources of supply previously thought unviable or impracticable, such as desalinisation and water recycling plants.

These developments will ensure that water resources are treated preciously, with fewer adverse environmental consequences and improved industry outcomes. With these developments, the Queensland mining industry will be working smarter, with greater technological advancements enabling it to gain comparative advantages in an increasingly competitive global market place.

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