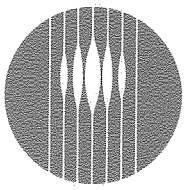


CSIRO
AUSTRALIA

Division of Water Resources

Seeking Solutions

WATER ALLOCATION IN AUSTRALIA

FIVE CASE STUDIES

INTRODUCTION

This document consists of a series of five case studies which outline the processes for water allocation in the South Esk Catchment in Tasmania; the Murray River from Lake Hume to Echuca and the Gnangara Groundwater Mound in Perth, Western Australia.

The case studies were written primarily to provide background information for a questionnaire survey of interested community and relevant government officials as part of a study on "Distributive Justice and the Allocation of Water between Irrigation, Industry, the Community and the Environment". The study is being funded by the Land and Water Resources Research Development Corporation and conducted by the Social Science Unit of the CSIRO, Division of Water Resources.

The case studies attempt to describe quite complex social and political processes with minimal misrepresentation of the actual circumstances. They are, by necessity, concisely written, but they do represent quite accurate summaries of the situation in each area.

The researchers would like to thank the many community members and State and Federal Government personnel who helped in the development of these studies.

Geoffrey J Syme
Blair E Nancarrow

February, 1992.

CONTENTS

The Murray-Darling River System

The Murray Darling River System is the most important inland river system in Australia. The total Murray System, including the Darling and Murrumbidgee Rivers and their tributaries, drains over one million square kilometres or one seventh of the total area of Australia. It accounts for approximately 46% of Australia's agricultural production and contains three-quarters of the nation's irrigated area. The resources of the area support 2 million people, either directly or indirectly. The total value of primary and secondary production is estimated to be in excess of $10,000 million per year (see Map 1).

The total area irrigated by the River Murray in New South Wales, Victoria and South Australia is about 730,000 hectares (1.8 million acres) with production valued about $350 million per annum.

Because of the needs of people, 75% of the river's flows have become regulated over time, and distributed from two large dams (Hume and Dartmouth) situated near Albury Wodonga. These dams collect water from the Upper Murray catchment (see Map 2) and are supplemented by some water from the Snowy River Mountain Scheme. Water is also drawn from the Menindee Lakes and Lake Victoria.

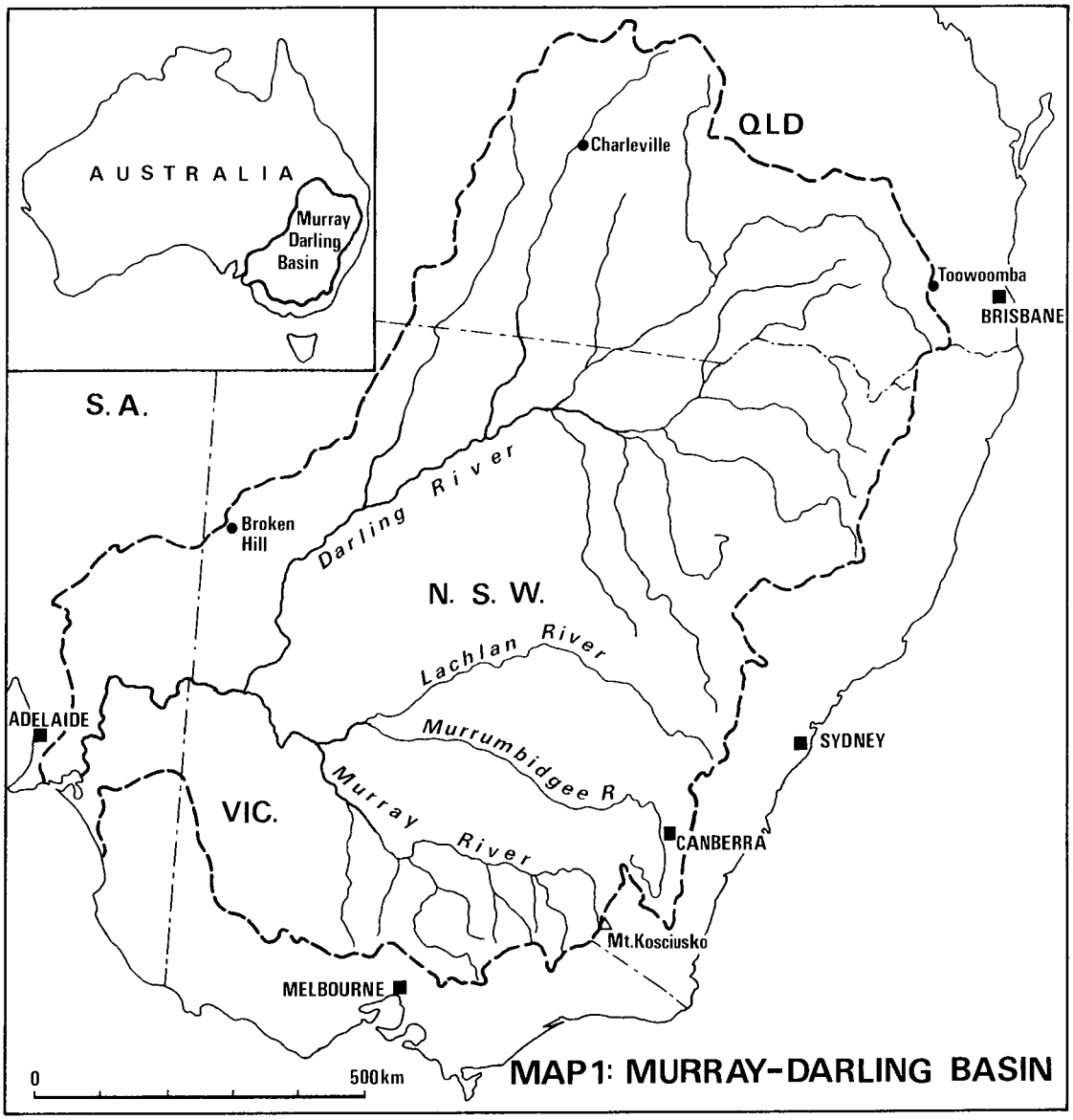
The water from the Murray Darling System and its tributaries is divided between New South Wales, Victoria and South Australia under a sharing arrangement outlined in the Murray-Darling Basin Agreement. Not all water is divided. A set reserve is kept in case of drought. Some water is recognised as being "lost" from the river system itself (eg. evaporation; seepage etc.). It is also agreed that some water has to be kept to dilute salinity.

NSW and Victoria are entitled to half each of the available water upstream of Albury and each state retains their full entitlement to the water from their tributaries downstream of Albury. This results in NSW having access to 42% and Victoria 58% of the water. These two states then equally provide an agreed allocation for South Australia. If there is a drought, South Australia gets one third of the water.

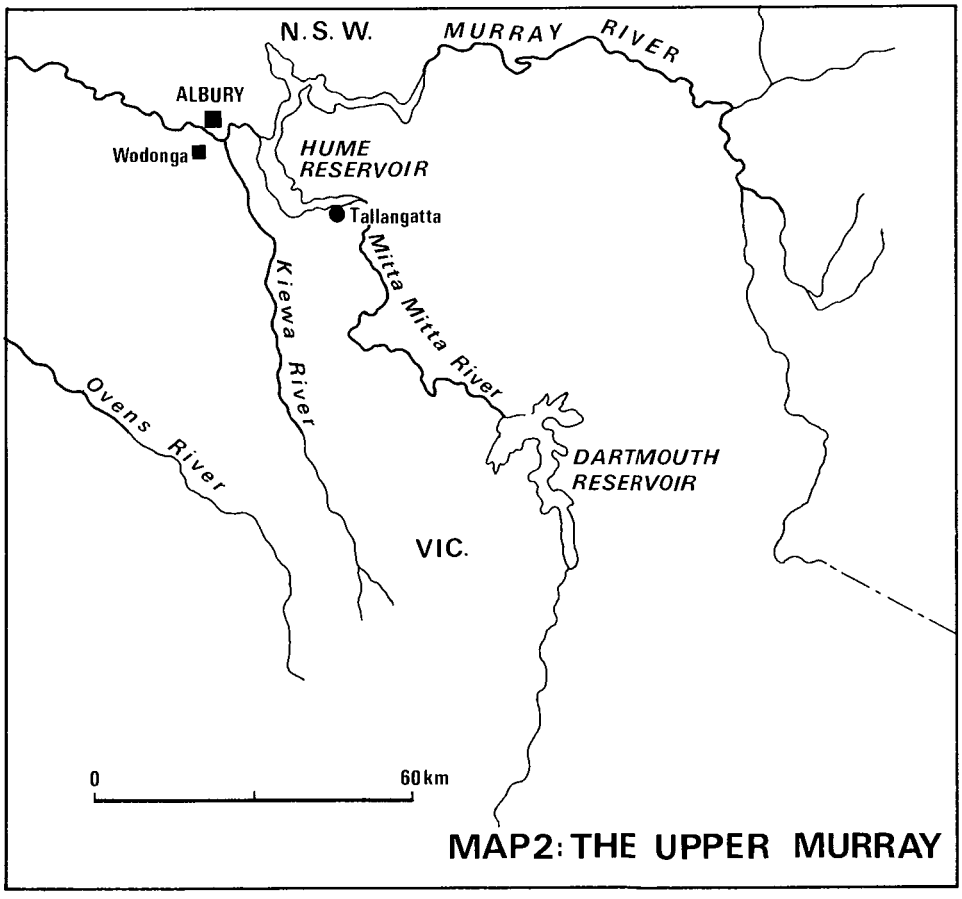
On average, 34% of the Murray is diverted into irrigation channels. In dry years it can be as much as 66%.

The storage of water by the dams and the diversion through irrigation channels for summer growth has meant that the natural cycle of the river has been reversed from its traditional patterns. (That is, the natural cycle before 'white man' was little or no flow in the Murray River during summer with whole sections drying up. Winter brought natural floods.) This reversal has created problems for environmental ecosystems, such as the Barmah-Millewa Forest (a native red gum forest).

The dams were primarily created for irrigation. Therefore, 94% of the water is still used for this purpose and the remaining 6% is used for town supply, industry and stock water.



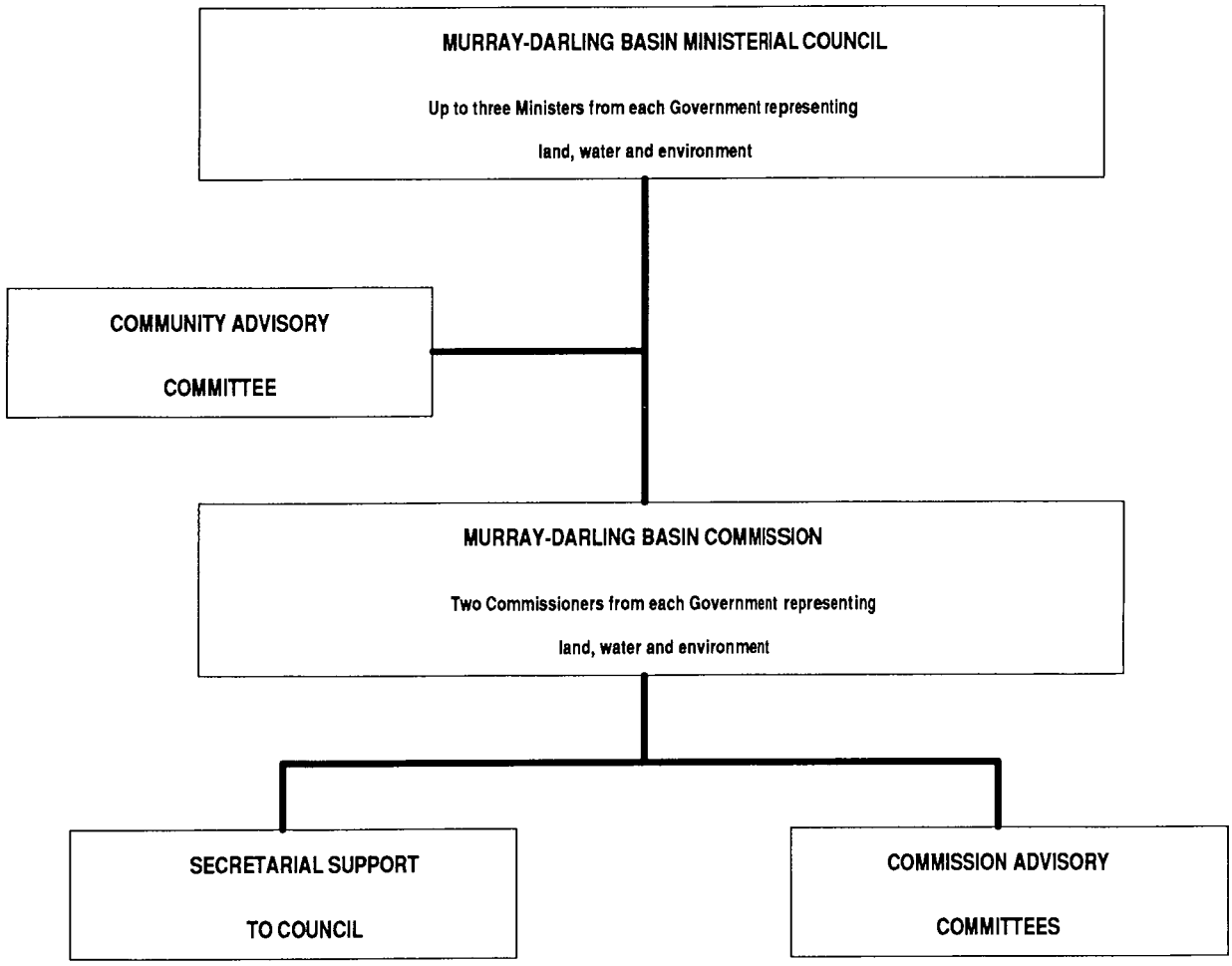
MAP1: MURRAY-DARLING BASIN



MAP2: THE UPPER MURRAY

The Murray-Darling Basin Commission (MDBC) supervises the operation of the dams and decides how much water each of the states is entitled to each year. Once the water has been assessed, the States are in charge of its use and disposal.

The overall planning and management of the Murray-Darling Basin is conducted by the Murray-Darling Basin Ministerial Council. This Council consists of up to three political ministers for land, water and the environment from each of the Commonwealth and relevant State Governments. The MDBC provides advice to the Council. There is also a Murray-Darling Community Advisory Committee with members drawn from all states and a variety of backgrounds and interests.



The MDBC is also charged with maintaining water quality, environmental quality and considering recreational needs. It sponsors a wide ranging public involvement program which consists of input from communities of common concern who in turn gain input from local catchment management groups. The charter of the MDBC is to "promote and coordinate effective planning and management for the equitable and efficient and sustainable use of land, water and environmental resources of the Murray-Darling Basin".

The role of the MDBC and the participating State Governments is, however, becoming more complex as the demand for a wider ranging use of the water for a variety of purposes is becoming evident. For example, water in the Murray Darling is used for all the following purposes and perhaps more:

- irrigation;
- salinity control;
- town supply;
- stock supply;
- industry;
- recreation, both passive (eg. picnicking; enjoying the view etc.) and active;
- conservation of flora, fauna and migratory birds;
- dilution of drainage water from human uses;
- generation of hydro-electricity;
- flood mitigation;
- tourism;
- educational and research purposes.

There are problems already evident for water allocation, both in terms of quantity and quality and how they relate to water management generally. For example;

. methods need to be found to ensure that water is available at appropriate times to meet the needs of the Barmah-Millewa Forest;

. the water salinity problem has become a major national issue

. desnagging of the river has led, on some occasions, to an inappropriate environment for the maintenance of the native fish populations.

The problems facing the MDBC and the associated state government agencies are therefore formidable when decision makers try to take people's interests into account fairly. In what follows, we have presented three major issues and processes as case studies which have and are currently being considered by decision makers.

We would like you to read the case studies and answer the questions at the end of each to see if, and why, you believe some decisions have been fairly made and how you would make improvements. They do not, by any means, reflect all the complexities of the Murray-Darling System but do provide some good examples of the problems facing decision makers and users of water.

CASE STUDY 1: ALLOCATION OF WATER AT LAKE HUME

The Hume Dam with a capacity of 3,038 gigalitres (3,980 million cubic yards) was constructed in 1936 and upgraded in 1961 as, originally, the major storage for irrigation in the Murray Darling System.

To enlarge this dam, the town of Tallangatta was physically moved in 1956 to a site on the edge of Lake Hume. The shift was comparatively amicable as residents were promised a lakeside town with ample tourism opportunities.

Lake Hume is also of great significance to the area for recreational and tourism purposes. Being inland towns (Albury Wodonga and Tallangatta), the local population makes great use of recreation on the lake. The main tourism season is late summer to autumn and there are a number of businesses geared to this tourism trade. Recreational fishing is a highly popular activity and has the third highest participation rate among outdoor recreation activities, for both the local population and tourists. There are a number of recreational fishing clubs in the area.

The Hume Dam was supplemented in 1979 with the construction upstream of the Dartmouth Dam which added a further 4,000 gigalitres (5,240 million cubic yards). This additional water was to provide much needed security to the irrigation supply for downstream farmers in case of dry years or drought. In addition, a 150 megawatt hydro-electric power station was built at Dartmouth (see Map 2).

As things have subsequently turned out, to the chagrin of many of the local businesses and residents of Tallangatta and Albury Wodonga, Lake Hume's levels have been extremely low in the latter part of summer each year. The policy is to use Lake Hume water and maintain storage in the Dartmouth Dam and so protect supply for irrigation. Albury Wodonga residents are extremely annoyed about these lower levels and the local governments and businesses have a reported a big drop in tourist trade. Tallangatta experiences large areas of mud flats annually and the town's water supply quality is also affected as the lake level lowers. (Tests are presently being carried out on the feasibility of using groundwater for Tallangatta's water supply, but a number of problems have been encountered in attempts to sink the test bores.)

In 1980, a study published by consultants suggested that there could be a possibility of some earlier releases of water from Dartmouth Dam to maintain adequate water levels in Lake Hume for recreational purposes. This study suggested that a compromise could be made by agreeing not to release water early from Dartmouth in times of drought (approximately every 8 to 10 years) and so lessen any possible costs to irrigators. However, such a policy would also reduce the electricity production from the power station at Dartmouth.

This study was refuted in a later more detailed economic analysis of the costs and benefits of different strategies for releasing water. This later analysis supported the existing policy of no early releases. It concluded that there was greater economic benefit from irrigation and electricity than from recreation and tourism.

There was some support for further investigation into the construction of a weir near Tallangatta to maintain water levels near the town, thus enhancing recreational and tourism benefits there. This, though, would not solve the problem for Albury Wodonga.

Opponents of the second study suggest that recreational benefits of Lake Hume had been grossly underestimated because much of the tourism in the area had already disappeared because of the lack of water in the Lake for several years. They also argue that the benefits of greater security of water for irrigators could just as easily be attained by the farmers' more efficient use of water. This would also have the added advantage of helping salinity and other environmental problems associated with irrigated agriculture. There is currently an investigation into the economic value of allocation of water for hydro-electric purposes.

Water was released early last summer when Dartmouth filled for the first time and the hydro-electric station had suffered severe damage and would not be working for some time. However, this has not become policy and residents and businesses cannot count on its happening each year.

Advocates for irrigators say that the main reason for the construction of the dam was irrigation and so this should have priority.

Advocates for recreation and tourism say that the needs of all parties can be easily met and that they would agree that Lake Hume should be emptied in times of water shortage or drought.

The Murray River

Dartmouth Dam, Spillway and Power Station

An Irrigation Channel

Barmah-Millewa Forest

CASE STUDY 2: ALLOCATION OF WATER IN NORTHERN VICTORIA FOR AGRICULTURAL IRRIGATION

HISTORY

In the late 1950s and early 1960s, water allocations were free to agricultural irrigators. About this time it was realised that full allocations could not be provided to those farms furthest from the river in some irrigation systems. So, only partial allocations were made or, on occasions, none at all to these distant irrigators.

With the completion of the Dartmouth Dam and the increased volume in storage and greater security of supply, it was expected that allocations could be increased for the region. But in 1984, a review into water allocations suggested that there might be a requirement for more water to be allocated for environmental protection purposes (eg. allocations for salinity dilution, protection of the Barmah-Millewa Forest and so on). Therefore, allocations for irrigation within the Goulburn-Murray Irrigation District (see Map 3) were not increased.

It was thought that there would be no great effect on the farming community as farms would be more sustainable with better environmental protection. It was also considered that there was room for improvement in policies to promote efficiency in water use, at both the individual farm level and for the region as a whole.

The original principles of allocation for *those obtaining a full entitlement* were to provide for a "basic" water right and an "extra" water right. The basic water right was provided on a per hectare basis. It was thought that smaller farms would have more intensive development so the amount of water allocated per hectare was greatest for small farms (up to 16 hectares) at 5.33 megalitres per hectare. The largest farms (220 hectares and over) received only 1.02 megalitres per hectare.

The *extra* water right came about because, in the early days, it appeared that there was still some water available after basic allocations in most seasons. This water was made available to lands under intensive cultivation. Consequently, a formula which allocated this "extra" water was devised and revised on several occasions. This formula was based on the size of the farm, its suitability for irrigation and its existing level of development. This system was used to develop the so-called 1964 formula which is shown in Figure 1.

Problems were subsequently encountered with this formula because of subdivision of land and the associated changes in entitlements. Issues, such as the appropriate allocation of water for hobby farm use, became more problematic. The formula was abandoned in 1989, although the allocations have remained unchanged.

THE CURRENT SYSTEM

The Rural Water Commission (RWC) is responsible for the administration of the irrigation districts throughout Victoria and allocates water to irrigators.

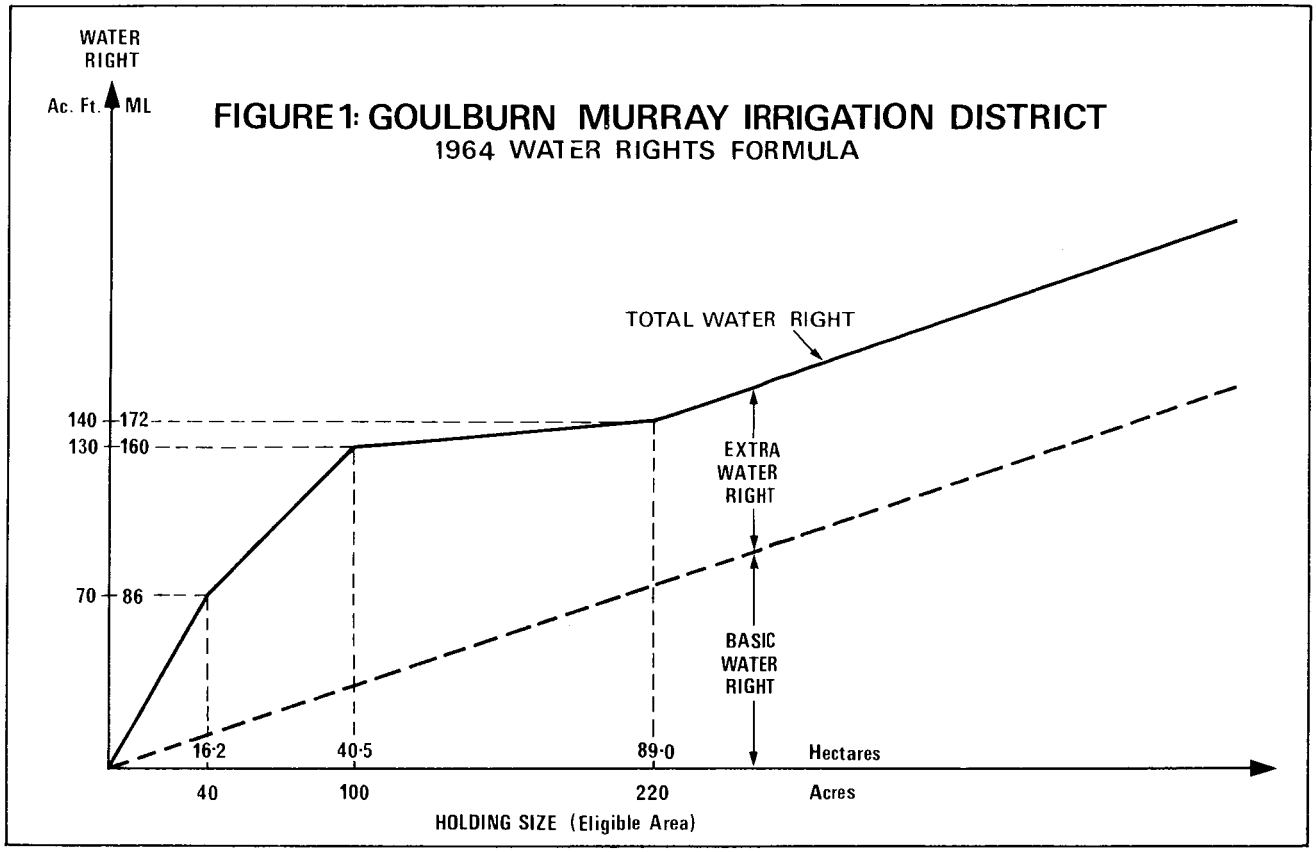
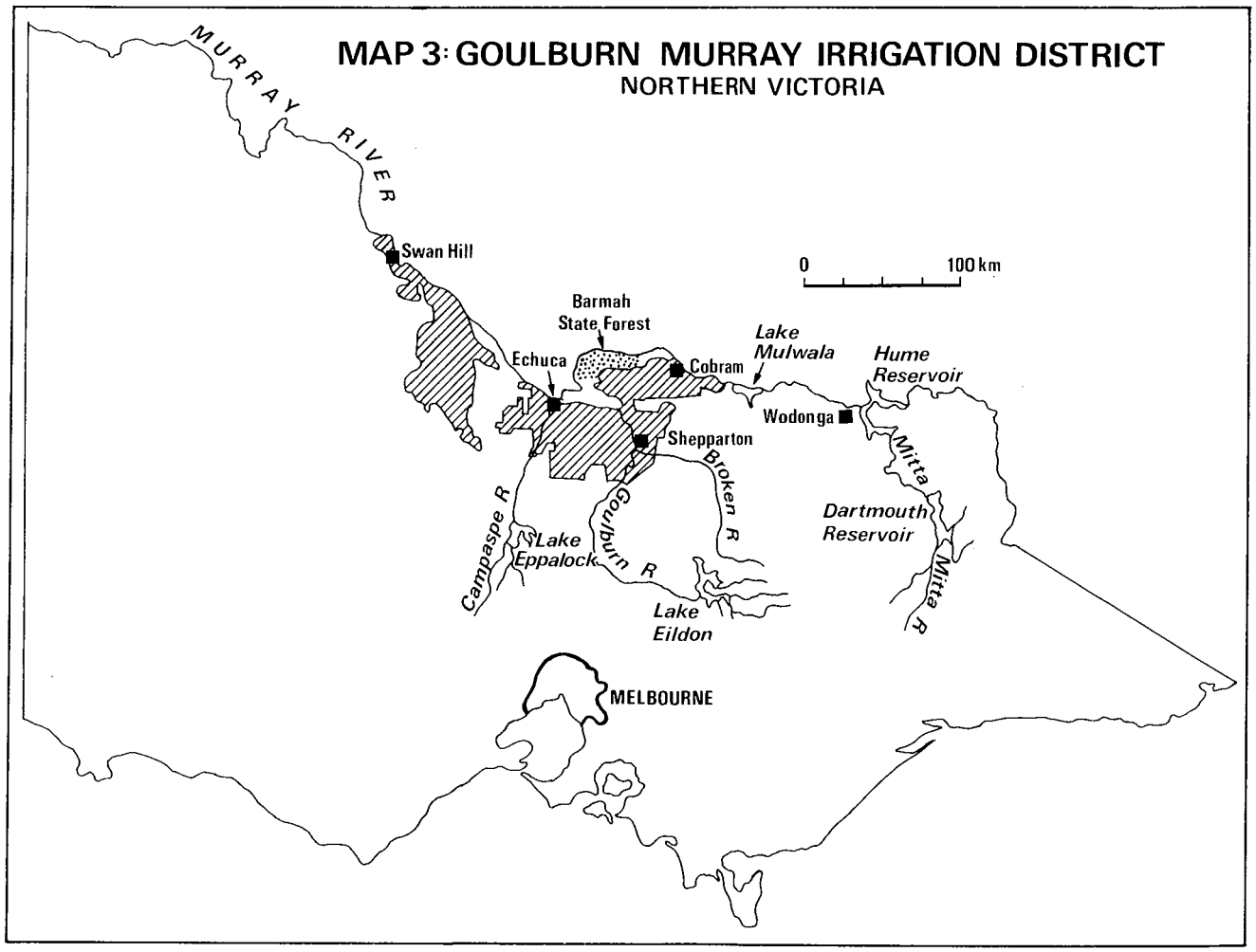


FIGURE 1: GOULBURN MURRAY IRRIGATION DISTRICT
1964 WATER RIGHTS FORMULA



MAP 3: GOULBURN MURRAY IRRIGATION DISTRICT
NORTHERN VICTORIA

Irrigators now pay for water (their original allocations which were free) at a flat rate. For example, in the Goulburn-Murray Irrigation District the 1990/91 price was $14.50 per megalitre.

In recent years, to promote efficiency in water use, the 1989 Victorian Water Act has introduced Transferable Water Entitlements (TWEs). This allows the landholders to buy or sell their entitlements on either a temporary or permanent basis, but under a guiding set of rules. That is, irrigators are now allowed to trade their current water right which was originally given to them free. Any new water entitlements can be tendered for after public notification of its availability.

Some of the rules for buying or selling water include:

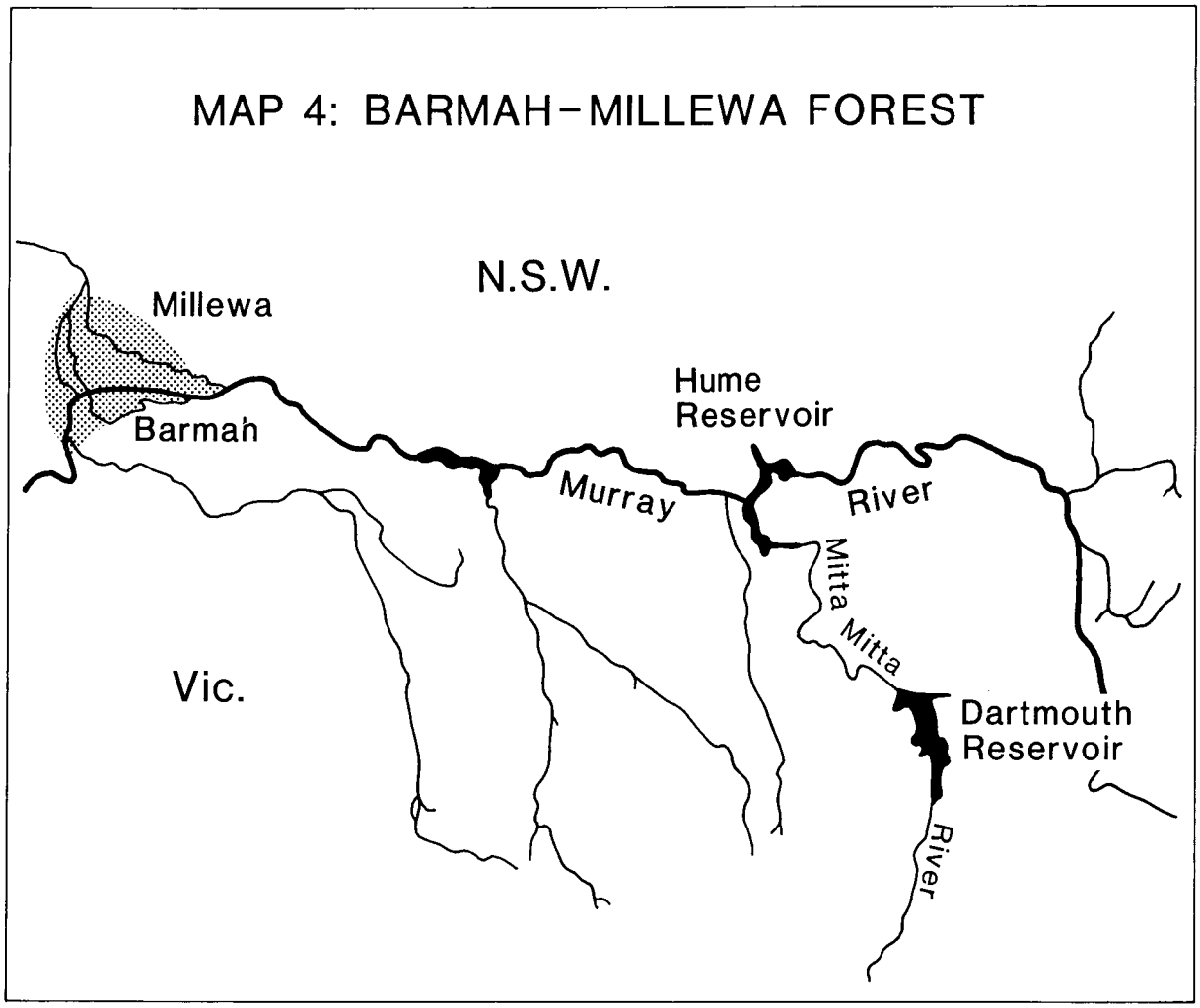
- a minimum water right must be retained for any land area;
- the level of service (ie. a set amount of water) in a district channel system must be maintained;
- the need for salinity control within a particular area must be considered

and - requirements for drainage needs must be kept.

A register of all transfers (or sales) is kept. Currently, transfers between user classes (eg. transfers of water from irrigation use to urban use) are not allowed. However, it is thought that these transfers may occur in the future.

A recent consultant's report estimated that about 30% of irrigators would benefit financially from the introduction of TWEs.

To date there have been no appeals against water allocation decisions. Although there is no set process laid down for these types of appeals, it is expected that it will be a similar process as for planning appeals (eg. appealing against a road planned to be built through your property).


MAP 4: BARMAH-MILLEWA FOREST
N.S.W.
Millewa
Barmah
Hume
Reservoir
Murray
River
Mitta Mitta
River
Dartmouth
Reservoir
Vic.

CASE STUDY 3: WATER FOR THE BARMAH-MILLEWA FOREST

The Barmah-Millewa Forest, situated on the Murray, is of international significance. It provides the most extensive landscape of river red gums in the world. This diverse landscape consists of lakes, billabongs, rushlands, grasslands and box forest.

Part of the area is in New South Wales and part is in Victoria. (See Map 4).

The area is also of international significance as a habitat for waterbirds. Australia is a signatory to an international agreement guaranteeing the protection of migratory birds which occur in this area.

Because of the needs of irrigators, the normal pattern of the forest being flooded during winter and drying out in summer has been disrupted. The reverse actually occurs.

This has created problems for planners who have attempted to allocate some of the states' total water allowance for the conservation of the forest, bird life and other fauna.

Commercial forestry, as well as conservation, is of importance in the area. Red gum is a dense, strong and durable timber which has been used for a range of purposes such as sawn timber, railway sleepers, street paving blocks, fuel, fencing, bridge construction and so on since the beginning of settlement. Currently, sawlogs are harvested to supply local mills. The wood is also suitable for the manufacture of high quality furniture.

Because of its unique nature, the Barmah-Millewa Forest has considerable recreational value at both the local and states' levels.

One possible means of allocating water between the four competing interests: irrigation, conservation, forestry and recreation; which has been discussed in New South Wales, is to develop the concept of transferable water entitlements (TWEs). By this method, all users would be required to compete to buy allocations, with the assumption being that each group would acquire only those quantities of water which are really required.

One would assume that such a system would operate with private interests representing the forestry and agricultural uses. The relevant government departments would purchase (with taxpayers' money) the environmental allocation and charge recreators for access to the area.

Alternatively, conservation groups could be responsible for the purchase of water for the ecology.

PLEASE NOTE

Tasmania recently had a state election which resulted in a new government.

As a result, *since going to print*, organisational changes have occurred.

The Department of Resources and Energy no longer exists and in its place is the Department of Primary Industries, Fisheries and Energy. The Rivers and Water Supply Commission, Hydro-Electric Commission, Department of Primary Industries and Inland Fisheries Commission all fall under this portfolio; the Division of Mines and Mineral Resources does not.

However, to this point, the organisational restructuring does not change the essence of Case Study 4 and the management of Tasmania's water resources except, perhaps, in bringing Primary Industries and "water" closer together.

CASE STUDY 4: WHO OWNS THE WATER IN THE SOUTH ESK CATCHMENT, TASMANIA?

Tasmania is generally thought to have an abundance of water. This, in fact, is not the case. The state is 'over-watered' in winter and 'under-watered' in summer. Ways have had to be found to harvest and store the winter waters for summer usage and to manage limited summer supplies in the best interests of the community.

The South Esk Catchment covers about 9 000 square kilometres, approximately 12% of the state of Tasmania. The area is shown in Map 5. The South Esk River has a number of direct or indirect tributaries:

Meander River
Lake River
Macquarie River
Elizabeth River
Nile River
Liffey River.

There are two major hydro-electric power stations in the catchment:

Poatina using waters from the Great Lake
and Trevallyn using waters from the Trevallyn Dam outside Launceston.

The Great Lake naturally flowed south. However, it has now been diverted north through the Poatina Power Station and on into the South Esk River and so to the Trevallyn Dam for further power generation. Arthur's Lake was also created from two smaller bodies of water to increase the amount of water available for Poatina. This affected the natural flow of the Lake River.

The Cressy-Longford Irrigation Scheme is presently the only formal irrigation scheme in the catchment but there have been plans for the development of another scheme in the Meander Valley.

Because of the diversity of the area, as well as historical factors, almost all imaginable problems associated with water allocation occur. There are increasing demands for water from a variety of sources, and it is expected that water allocation may become a major focus of community concern in the future.

We have identified the main areas of concern at present and some specific issues and problems associated with particular rivers to give an idea of the complexity of problems facing Tasmanian planners. This is by no means the complete list of issues.

(A) Organisational Processes

The Rivers and Water Supply Commission (RWSC), under the Government's Resources and Energy portfolio, is charged with the management of catchment areas to ensure the best use of the State's water resources. This means they must provide

efficient water services and water sources for a range of uses and purposes including domestic, industrial and rural water supplies, irrigation, waste disposal, recreation, flood mitigation and drainage and the freshwater ecology. With a few exceptions, it has control over all surface water in catchments. The main exceptions are mining water rights and in Hydro-electric Water Districts. The South Esk Catchment falls in a Hydro-Electric Water District.

The Hydro-Electric Commission (HEC), also incorporated in the Government's Resources and Energy portfolio, must, in its Water Districts, protect levels of water and quantities taken by authorities or people and ensure the lakes and rivers are free from pollution, except if this goes against the rights of anyone under the Mining Act.

Therefore, the HEC virtually 'owns' all the water in the South Esk Catchment and allocates an agreed amount to the RWSC. The RWSC in turn allocates this to urban and agricultural uses through the issuing of Commissional Water Rights (CWR). The HEC may agree to sell water, or water it no longer needs, to a variety of uses at mutually agreed prices.

The Mining Industry is exempt from RWSC control and is entitled to take water on their mining leases. If there is no water on the lease, then water rights are applied for from the Division of Mines and Mineral Resources. This Division is also within the Department of Resources and Energy.

The Inland Fisheries Commission is answerable to the Department of Primary Industry and is responsible for the management of all freshwater fauna. However, there is no formal allocation of water in the rivers for the maintenance of fish and their habitats - other than through the 'goodwill of the RWSC' and what they can be allocated by agreement with the HEC to maintain minimum flow levels.

The relatively new Department of Environment and Planning is responsible for:

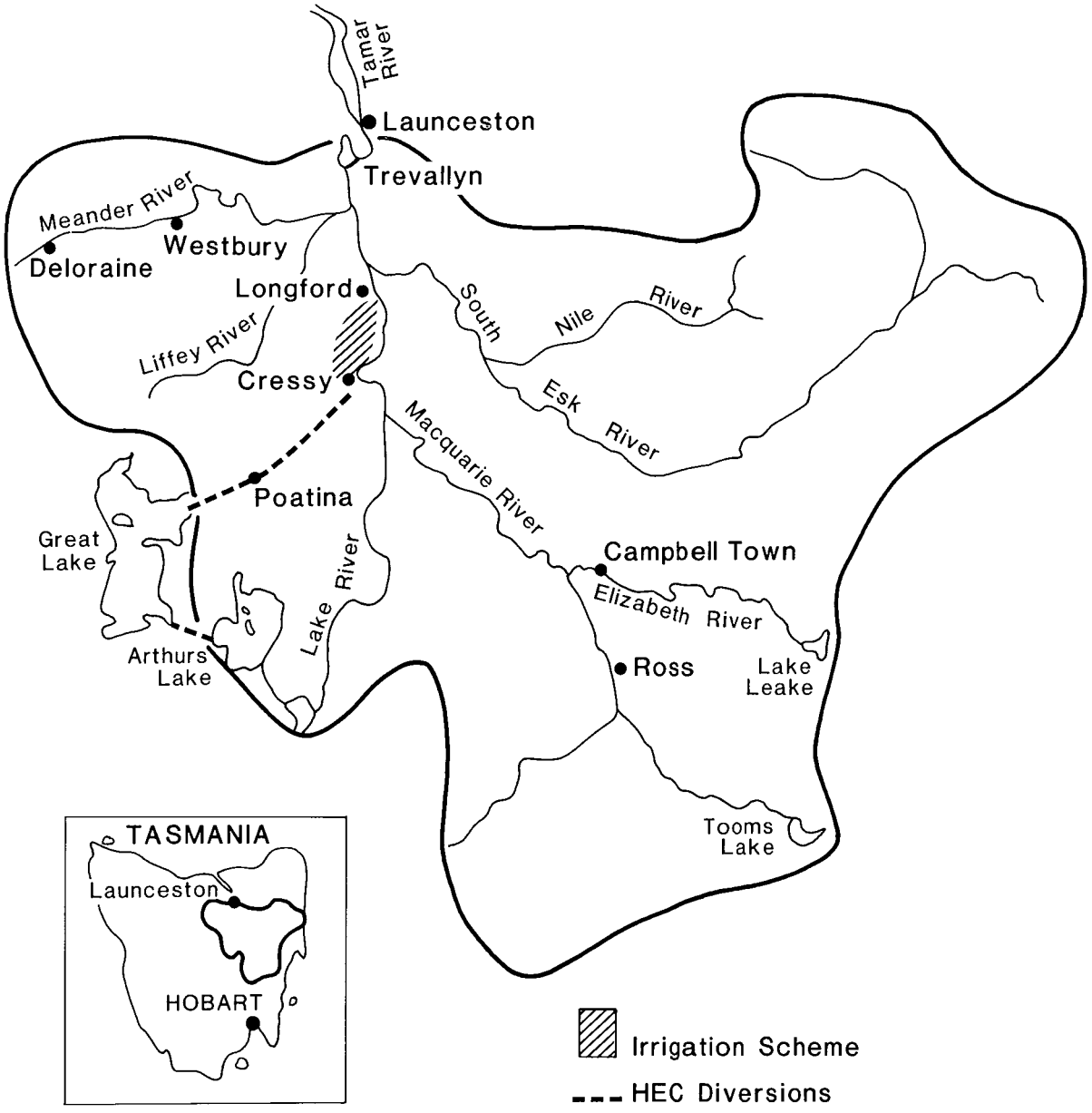
- the protection and improvement of the environment to ensure a balanced, fair and sustainable use of Tasmania's land, aquatic and atmospheric resources;
- planning and monitoring the use and development of the natural and built environment.

The department is attempting to develop 'whole of river management plans'.

The Division of Mines and Mineral Resources control groundwater. There are presently no licenses required for groundwater with only a general monitoring of the number of private bores.

The Macquarie Water Trust, run by the Ross Municipality, controls the waters in the Upper Macquarie River.

There are ten Municipalities (local government authorities) in the South Esk Catchment which are responsible for 22 urban water supply schemes (allocations from the RWSC) and services. Presently there is a proposal, which if adopted, will reduce the number of Municipalities in the catchment to seven.



MAP 5: SOUTH ESK CATCHMENT, TASMANIA

Water intensive agriculture (eg. potatoes) is becoming more widespread in recent times. There is only an informal relationship between the RWSC and the Department of Primary Industry in overseeing farmer irrigation practices.

River Water Advisory Committees are being established by the RWSC with local farmer membership which mainly advise on water allocations and/or restrictions.

The Department of Primary Industry is also forming local Landcare Groups with farmer membership to help promote 'responsible' farming practices.

Legislation is currently being developed to integrate land and water management in Tasmania.

(B) Allocation Systems and Issues

(i) Run-of-River Irrigation Demand

The HEC must, by legislation, ensure a set minimum flow in the South Esk River. The RWSC use a share of this reliable river yield when calculating allocations for different uses. Commissional Water Rights (CWR) allocations are issued for summer irrigation needs. CWR allocations for irrigation are based on crop types and are issued on the basis of what the river can reliably yield. Until recently, CWR fees (for management) were a set price, no matter how much water was allocated. However, they are now charged for on a sliding scale according to the size of the allocation (eg. $120 for 2 years for an allocation of 300 cu.m/day; $411 for 2 years for an allocation of 3 000 cu.m/day).

There is a general check on how much water is being taken by irrigators but the actual takings could be as much as twice that of their allocations in some areas. There is some concern among farmers that licenses are still being issued on some of the rivers when there is insufficient water *now* and that irrigators downstream will eventually miss out. Although the RWSC continually monitors flows in the major rivers, official policing of takings and curtailing of usage only occurs when the flows are low. The farmers on the River Water Advisory Committees are attempting to regulate themselves in this area.

(ii) Cressy-Longford Irrigation Scheme

Water for the Cressy-Longford Irrigation Scheme is provided from Poatina and Trevallyn by the HEC and is managed by the RWSC. Presently, approximately 7 200 megalitres (ML) per year of water has been allocated through water rights. On average 6 000 ML are used each year (ie. approx 3 000ML in a wet year & 10 000ML in a dry year). Irrigators pay for their water rights - an amount which is governed by their allocations ($15.25 per ML of allocation even if the water is not used). All allocations in the scheme are metered. Therefore, irrigators further pay a set rate for water used up to and in excess of their allocations ($13.15 per ML).

There is a belief among some farmers in the catchment that a number of properties are holding water rights in the scheme without any use for their allocations. There is a perception of inequity in this when there are some elsewhere who need water and can't get it.

(iii) The Lake River

Because of the diversion of water away from the Lake River and into Arthur's Lake, The HEC is required by legislation to provide "all reasonable requirements" for farmer irrigation in this river. The term "reasonable requirements" has not been specifically defined. There is a potential for conflict in this area if the irrigators consider they 'require' more water while the HEC is concerned about its low water levels in its storages.

The HEC does not charge for this water but the RWSC does charge its standard management fee for CWRs.

(iv) The Nile River

Prescriptive Water Rights operate in some areas on this river. The Tasmanian government has issued these rights to properties which could *prove* that river waters had been used for irrigation, stock watering etc. prior to 1930. These rights allow a certain percentage of the flow of the river at no cost.

Properties on the river which do not have prescriptive rights therefore ensure their water supply by building off-stream storages to collect the winter flows and summer freshes. They still pay for CWRs.

(v) The Meander River

The town of Westbury has prior legal rights to water in the Meander River for urban use. The river has dried up twice in the past because of up-stream use and has left the town temporarily without a source of water supply. Westbury Municipality has had to build large off-stream storages to protect their supply. The town of Deloraine has substantial water quality problems with their urban supply because of pollution from industries (eg. logging; farming etc.) upstream. The Municipality has to purify its water and also top it up with groundwater. There are considerations on the need to install advanced filtration systems to overcome this problem. It is expected that sufficient water for all uses will become a major problem in the future as demand continues to increase.

(vi) The Macquarie / Elizabeth Rivers

Dry fly trout fishing is a substantial industry for recreational fishing on these rivers. The Macquarie is the most highly regarded fly fishing river in the State and anglers catch some 20 000 trout a year on this river. There is a large fishery at Lake Leake on the Elizabeth River. The water in the Lake is owned by the Campbell Town Municipality although the RWSC now deal with allocations due to recent conflict

between various uses. The Macquarie Water Trust allocates the waters in the upper Macquarie. Coordination of the different authorities is difficult.

Conflict is developing between irrigation and sustaining the fish industry. River flows which are sufficient for irrigation are not sufficient for fish and the Macquarie has dried up in the past. In fact, it is releases from Lake Leake and Lake Tooms which ensure that it continues to flow and there is no formal allocation for fish. Preferences by irrigators to build weirs and storages on the river are not favoured by Inland Fisheries Commission as this would affect the trout migration. The Commission prefers off-stream storages.

Irrigators suggest that anglers and environmentalists should have to pay for water to sustain their interests just like the farmers. Other schools of thought suggest that the conflict can be avoided by restocking fish rather than attempting to sustain them.

(vii) The Gorge

The Gorge is a tourist attraction in Launceston. However, much of the water which used to flow through it to the Tamar has now been diverted into the Trevallyn Dam by the HEC. The HEC does allow extra flows for traditional boating events, but, in general, local residents are dissatisfied with normal flows and consider it to be detrimental to the tourism industry. However, others consider that the HEC storages have created tourist and recreational attractions which wouldn't otherwise have been there.

(viii) Water Quality

As already indicated by the issues on the Meander River, water quality is an important aspect of water allocation. Users expect their allocations to be of sufficient quality for their requirements, particularly where urban drinking water is concerned.

On the eastern side of the catchment, some wastes from present and abandoned mine sites are leaching into the South Esk River.

Other industries in the catchment (forestry; agriculture; abattoirs) as well as urban sewage wastes all affect the water quality in the catchment.

It has been suggested that upstream users have a moral obligation not to pollute the water which is required by downstream users.

The South Esk River

Cressy-Longford Irrigation Area

The Macquarie River

HEC Power, Poatina

CASE STUDY 5: ALLOCATING GROUNDWATER FROM THE GNANGARA MOUND, PERTH, WESTERN AUSTRALIA

The Gnangara Groundwater Mound is situated in the northern suburbs of Perth (See Map 6). It is a major source of water supply for the expanding northern suburbs (mostly outside the immediate study area shown in the map). In fact, the Water Authority of Western Australia (WAWA) draws about half of the available water in the aquifer for these urban supplies.

Within the study area, water from the Gnangara aquifer is also used for irrigation by a large scale market gardening industry. Other horticultural industries such as flower growers, plant nurseries and turf growers also use the groundwater.

The groundwater is visible in the lakes and wetlands which are common on the mound. Many of these wetlands have high conservation value. Some, like Lake Joondalup, provide an attractive area for urban development. The groundwater is also used for recreational facilities, such as parks, sporting ovals and golf courses.

Finally, major users of the Gnangara groundwater are the pine forests (shown as State Forest on the map) which are maintained by the Department of Conservation and Land Management (CALM).

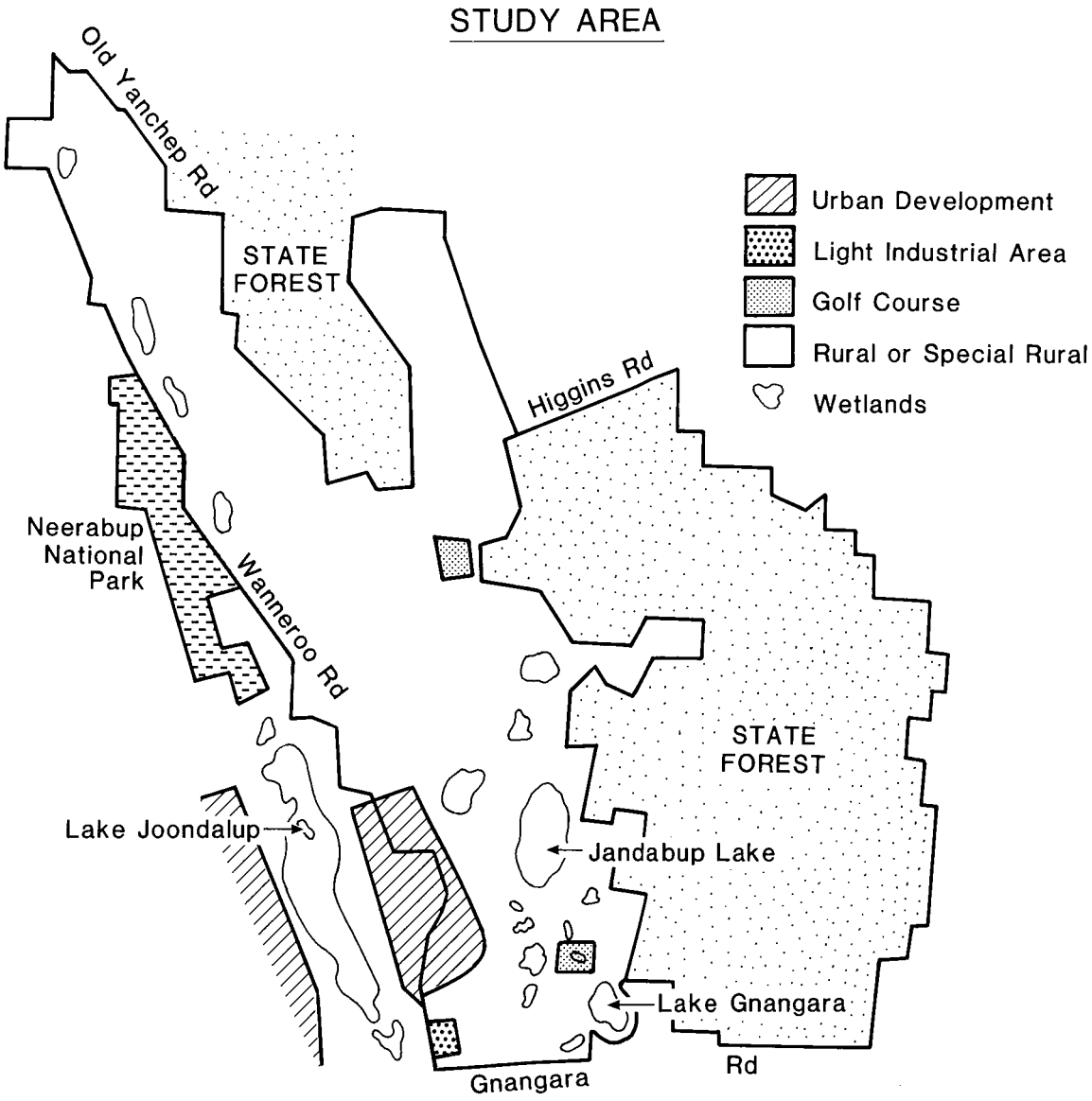
In recent years there has been increasing concern about water allocation and the conflict between human and environmental uses.

WAWA manages the groundwater resource and determines how much it requires for urban domestic use. It is also responsible for the allocation of the remaining available groundwater from the aquifer. WAWA is assisted by a Local Advisory Committee which comprises members from other government departments, the Wanneroo City Council, market gardeners and other local industry representatives.

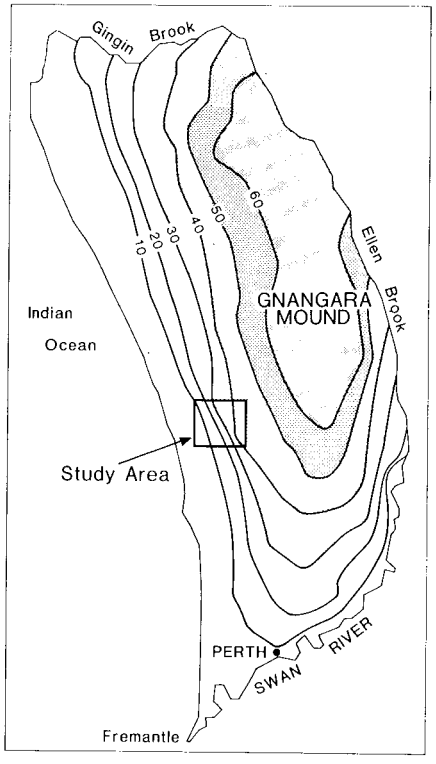
Apart from urban areas on WAWA scheme water supply, all users (eg. local industry, local government, schools, golf courses etc.) are assigned water allocations which are either set by WAWA or decided through applications for various uses.

In general, water is allocated in the following proportions to the various uses:

- market gardening 60%
- pasture & lucerne 16%
- nursery / flower growers 11%
- domestic & recreation 8%
  (includes ovals, golf courses etc.)
- animal husbandry 1.5%
  (poultry, piggeries)
- other 3.5%
  (includes turf farms)



MAP 6: GNANGARA GROUNDWATER MOUND, PERTH W.A.



For commercial irrigators, allocations are made for up to five years and are then reviewed. Allocations are made in accordance with the type and quantity of crop to be grown. Priorities for various irrigation uses are made by WAWA in conjunction with the Local Advisory Committee.

Because the water is limited, over the past few years applications for water for irrigation in some areas have been refused if the property owner has not been able to demonstrate that the land would be developed within two years. This has left some land which is zoned rural with no water.

This lack of allocation or only part allocation has a significant effect on land values as the land is not suitable for rural uses without water.

Virtually all of the available groundwater in the major rural areas has now been allocated and few licenses for new horticultural projects are now issued.

All users not on scheme water supply sink their own bores and pump the groundwater to the surface. Their *actual* water usage is not metered but is estimated from crop type, area and the type of irrigation system.

Special rural dwellers, who own lots between 1 and 2 ha. in size, are allowed access to 1500kls per year only, which is considered sufficient for household use and the irrigation of up to 0.2ha.

Urban home users, where no scheme supply exists, are limited to 650 kls each year.

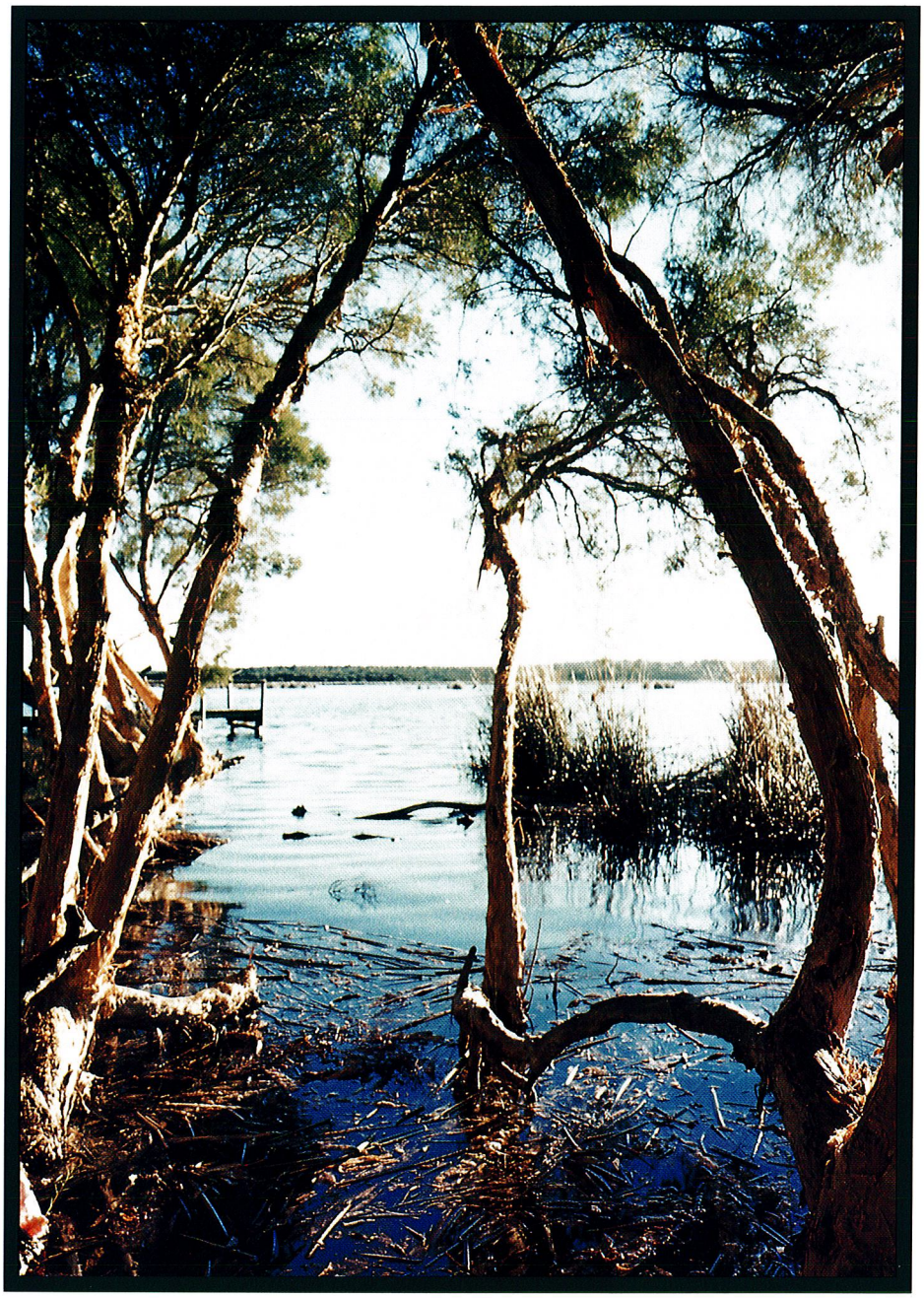
Urban homes in areas of scheme supply have no restrictions on groundwater use. Anyone who wishes, may install a bore for garden irrigation. It is estimated that up to 30% of households on the mound have private bores for garden irrigation.

Nobody pays anything for groundwater. There is some consideration of imposing a management fee to cover WAWA's costs sometime in the future. This, however, is not likely to include domestic users or stock watering uses.

The lakes and wetlands in the area are protected through the Environmental Protection Act. The Environmental Protection Authority (EPA) has set specific *minimum* water levels for a number of the lakes below which they must not fall. WAWA is responsible for seeing these criteria are met and monitor the levels regularly. Occasionally, they have had to pump water into the lakes to artificially maintain the levels.

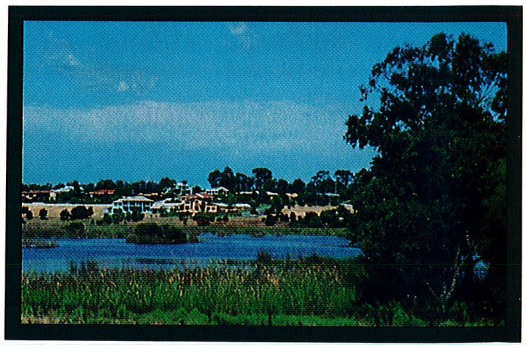
In some cases, to protect the wetlands and their water quality, water allocations for nearby properties have been reduced or the modification of farming practices enforced.

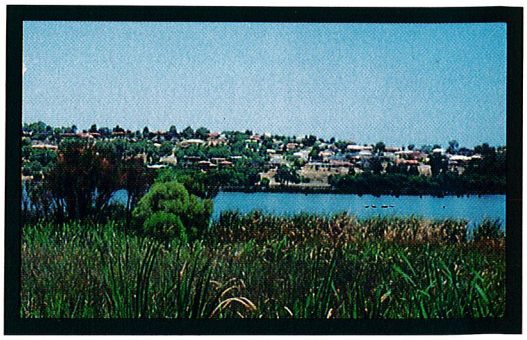
The encroachment of urban development is also having an effect on wetlands through the clearing of natural vegetation and the run-off of fertilizer and other chemicals from properties which is causing damage to the ecology.



Lake Joondalup

Urban Development on Wetlands





Dept of Conservation & Land Management's Pine Forest

Market Garden

Turf Farm

There is considerable public concern about the future of the wetlands. The local City Council has formed a Lakes Management Committee with membership from the council, state government departments and local landowners. This Committee monitors the condition of the lakes and make recommendations to the Council to promote their preservation. If necessary, Council will then lobby State Government departments for any required actions.

A significant amount of water is used by CALM's pine forests. These forests are the subject of considerable debate. Many say that, as they are not native to the area and use so much water, they should not be allowed or at least should be thinned to reduce water consumption. Others say that if they were removed, it would result in considerable raising of the water table which would also cause problems (eg. salinity).

Compensation is not available for those who have had their water allocation lowered or who miss out on water completely. Appeals can be made against the refusal of allocations through a tribunal chaired by a neutral person (generally a retired magistrate) who makes a recommendation to the Minister for Water Resources.

About 110 applications were processed in 1990/91 with approximately 90 licenses granted and 20 refused. In 1990/91 there was one appeal processed. Where practical, appeals are avoided by direct negotiations with licence applicants on possible allocations. There were five such occasions.

Finally, because of the use of the groundwater for Perth's drinking water supplies, urban and other development on the mound have been restricted to protect the quality of the water.

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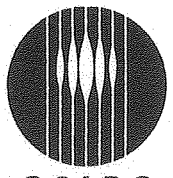


Division of Water Resources
Perth Laboratory

JUSTICE IN

WATER ALLOCATION

SURVEY QUESTIONNAIRE

PLEASE PRINT

Name: .....

Organisation: .....
(if applicable)

City / Town or Nearest Town: .....

Telephone: .....

CONTENTS

WAYS PEOPLE THINK ABOUT WATER ALLOCATION

Following are a number of statements which describe a variety of ways people think about allocating water. Please show how much you agree or disagree with each statement. ***(Use the scale below and write the number from the scale next to each statement which best describes how much you agree or disagree with it.)***

Scale:
1 = **strongly agree**
2 = **agree**
3 = **neither agree nor disagree**
4 = **disagree**
5 = **strongly disagree**

People who have been allocated water should only retain this right if they show that they do not waste it. .....

All water users should pay the full costs of providing water. .....

Water is a community resource that can't be owned by individuals. .....

The natural environment has the same rights to water as people have. .....

Landholders have a right to use stream water passing their property only if it does not have a negative effect on those downstream. .....

There are no general rules about how to allocate water: it depends on the situation. .....

All sections of the community have a right to have a say on water allocation. .....

Those who have received water allocations in the past have a greater right to water than those who are relative newcomers. .....

If the government has to go into debt to provide water for everyone, it should. .....

Water should be allocated to those who work hardest to use it most effectively. .....

While some parts of the natural environment are valuable and should be preserved through water allocation, some are not so valuable and can be "let go". .....

Water is a community resource which is only "lent" to users. .....

Water quality is an important issue in many water allocation decisions. .....

Scale: 1 = strongly agree
2 = agree
3 = neither agree nor disagree
4 = disagree
5 = strongly disagree

All water should be put on the market and allocated to those who will pay most, regardless of what it is used for. .....

It is impossible to get a decision making process which is fair to all interests. .....

Water allocations should be made to maximise the overall economic income of a community. .....

Recreational uses of water are of important economic value. .....

Public involvement should not be used very often in water allocation as most people are self interested. .....

If you bought and sold water on the open market, the environment would miss out on water unfairly. .....

It is more important that water is used for the benefit of our way of life than to maximise our income. .....

It is important to set rules now for how water should be allocated for the next generation. .....

Local people are best left to organise water allocation on rivers in rural areas. .....

Analysing the monetary costs and benefits can't really solve allocation problems. .....

If the decision making process is fair, people should accept the final allocation decision. .....

Farmers should only be allocated water if they can demonstrate that it is being used efficiently on their property. .....

Since the environment can't defend itself, allocations should specifically be made to support it. .....

Those upstream have a moral responsibility to look after the interests of those downstream. .....

In water allocation, everyone should be treated equally. .....

Any negative effects of irrigation on the land tend to be exaggerated. .....

Recreators, such as fishermen, boat users and water skiers, should pay for costs of river and reservoir management. .....

CASE STUDY 1: ALLOCATION OF WATER AT LAKE HUME

QUESTIONS:

1. How much do you agree with the following statements? *(Use the scale below and write the number which shows how much you agree or disagree with the statements in the space next to each statement.)*

Scale:

1 = strongly agree
2 = agree
3 = neither agree nor disagree
4 = disagree
5 = strongly disagree

Statements:

Because the dams were built to ensure water for the irrigators, this should be the first priority for the water. .....

Promises of water for the town of Tallangatta and its tourism should be kept. .....

The benefits of recreation can be measured by economics. .....

If the tourism businesses will compromise and have no water in drought years, it's only fair that the irrigators compromise in other years. .....

It's more important to maintain our food production than our tourism industry. .....

Water-based recreation is important for quality of life in inland communities. .....

The Murray-Darling Basin Commission should decide the issue. .....

The local councils should decide the issue as they are closer to the problem. .....

A committee with representatives from all interests should draw up a plan for the MDBC to action. .....

2. How fairly do you think each of the following groups are being treated? **(Circle the number you think is appropriate on the fairness scale for each group and then say why you think this.)**

irrigators:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

resident recreators:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

tourism businesses:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

Tallangatta:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

visiting recreators:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

3 Even if you may think some groups are being treated unfairly, *overall with all things considered,* do you think the present system of allocating priority of water to irrigation is fair? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

If you answered YES, go to question 5.
If you answered NO or NOT SURE, continue with question 4.

4 Have you any suggestions on how the issue should be decided which would be fair to everyone? **(Circle the number next to your answer.)**

YES .... 1 NO 2

If YES, what?

.....

.....

.....

5 Should there be provision for people to appeal against decisions?

YES .... 1 NO .... 2 NOT SURE 3

If YES, what sort of body should be set up to hear appeals?

.....

.....

.....

6 How important is it to provide water for the following uses? **(Use the scale below to show how important you think each use is.)**

Scale:
1 = essential
2 = very important
3 = quite important
4 = slightly important
5 = not important

water for:

irrigators .....
residents'* recreation ..... * ie. Albury Wodonga, Tallangatta etc.
Tallangatta town supply .....
tourism industry .....
recreational fishing .....
hydro-electric power .....
Tallangatta's tourism .....

7 Now please rank in order of importance. That is, who should get first priority for the water, who should have next priority. **(Put a 1 next to the most important use; then a 2 next to the second most important use; and so on until you put a 7 next to the least important use.)**

water for:

irrigators .....
residents'* recreation ..... * ie. Albury Wodonga, Tallangatta etc.
Tallangatta town supply .....
tourism businesses .....
recreational fishing .....
hydro-electric power .....
Tallangatta's tourism .....

8 When you were thinking about this case study and answering the questions, how important were the following thoughts about water & allocation to you in making your decisions. ***(Use the scale below and write the number from the scale which shows how important each thought was to you in the space next to them.)***

Scale:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

The equal treatment of all groups .....

The chance for everyone to have a say .....

Water is owned by everyone and therefore it should be managed for the overall public good .....

The rights of the environment .....

Management for future generations .....

That no matter what's done, someone will be favoured .....

How efficiently water was being used .....

How hard the user worked and therefore deserved the water .....

Whether the user had water rights previously or not .....

Whether it was important that all user groups were doing the "right thing" by others .....

Whether it was good for the state's (nation's) overall economy .....

The needs of the particular situation rather than general rules .....

Thinking of the users as individuals .....

Whether individual users paid for what they got .....

The benefit to community lifestyle .....

The role of local people in making decisions .....

Any other **important** thoughts in making your decisions? *(please specify)*

.....

.....

CASE STUDY 2: ALLOCATION OF WATER IN NORTHERN VICTORIA FOR AGRICULTURAL IRRIGATION

QUESTIONS:

1. How much do you agree with the following statements? *(Use the scale below and write the number which shows how much you agree or disagree with the statements in the space next to each statement.)*

Scale:
1 = strongly agree
2 = agree
3 = neither agree nor disagree
4 = disagree
5 = strongly disagree

Statements:

It would be better for all if the RWC allocated water to farmers without charges. .....

'Extra water' should not be allocated but kept in the dams for times of shortage. .....

Irrigators with more money will now waste more water. .....

All present allocations should be withdrawn and all available irrigation water auctioned among irrigators. .....

No-one should profit financially from selling water. .....

All interest groups, including environmentalists, should have the chance to bid for allocations. .....

2 Water is presently being charged for at a flat rate per megalitre. Do you think this is appropriate? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 DON'T KNOW 3

Why? .....

.....

.....

3 Allocations to irrigators are the same now as when the water was free. Irrigators can now buy and sell some of their allocations. Is this fair? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

If you answered YES, go to question 5.
If you answered NO or NOT SURE, continue with question 4.

4 How would you allocate water in this situation?

.....

.....

.....

5 Do you think Transferable Water Entitlements are a good idea? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

6 Do you think the process for appealing against water allocation decisions should be the same as for general planning appeals (such as appealing against a road being built through your property)? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

7 When you were thinking about this case study and answering the questions, how important were the following thoughts about water & allocation to you in making your decisions. ***(Use the scale below and write the number from the scale which shows how important each thought was to you in the space next to them.)***

Scale:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

The equal treatment of all groups .....

The chance for everyone to have a say .....

Water is owned by everyone and therefore it should be managed for the overall public good .....

The rights of the environment .....

Management for future generations .....

That no matter what's done, someone will be favoured .....

How efficiently water was being used .....

How hard the user worked and therefore deserved the water .....

Whether the user had water rights previously or not .....

Whether it was important that all user groups were doing the "right thing" by others .....

Whether it was good for the state's (nation's) overall economy .....

The needs of the particular situation rather than general rules .....

Thinking of the users as individuals .....

Whether individual users paid for what they got .....

The benefit to community lifestyle .....

The role of local people in making decisions .....

Any other **important** thoughts in making your decisions? *(please specify)*

.....

.....

CASE STUDY 3: WATER FOR THE BARMAH-MILLEWA FOREST

QUESTIONS:

1. How much do you agree with the following statements? *(Use the scale below and write the number which shows how much you agree or disagree with the statements in the space next to each statement.)*

   Scale:
   1 = strongly agree
   2 = agree
   3 = neither agree nor disagree
   4 = disagree
   5 = strongly disagree

Statements:

The taxpayer shouldn't have to pay for water for an environment which has always been there and needed water. .....

It's only fair that recreationalists should pay for use of water the same as other users of the water. .....

It is Australia's duty to preserve the forest as part of the international agreement. .....

Only those making money using their water allocation should have to pay for it. .....

If the environmentalists want the water, they should pay for it. .....

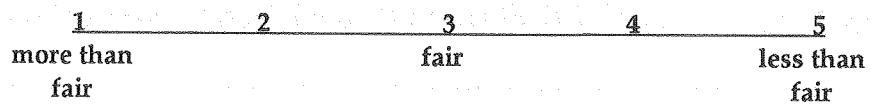
2. If the economic method of allocation (ie. payment for allocations for all uses) were introduced, how fair do you think it would be for each of the users? **(Circle the number you think is appropriate on the fairness scale for each user and then say why you think this.)**

commercial foresters:

1	2	3	4	5
more than fair		fair		less than fair

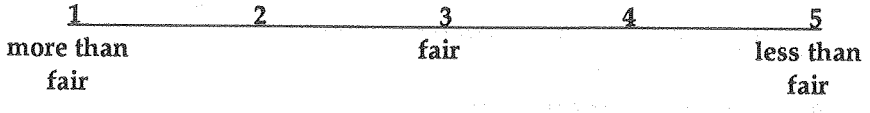
Why? .....

irrigators:



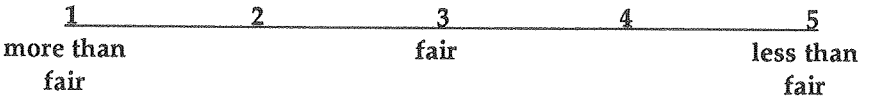
Why? .....

recreators:



Why? .....

environment:



Why? .....

3 Even if you may think that the economic process for allocating water would be unfair to some users, *overall with all things considered,* do you think it would be a fair process? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

4 What process for allocating water do you think would be *fairest* in this situation?

.....

.....

.....

5 If the economic solution was introduced, who should pay for the environmental allocation?

.....

.....

.....

6 Should New South Wales and Victoria have the same policy of allocation?

YES .... 1 NO .... 2 NOT SURE 3

7 When you were thinking about this case study and answering the questions, how important were the following thoughts about water & allocation to you in making your decisions. ***(Use the scale below and write the number from the scale which shows how important each thought was to you in the space next to them.)***

<u>Scale</u>:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

The equal treatment of all groups .....

The chance for everyone to have a say .....

Water is owned by everyone and therefore it should be managed for the overall public good .....

The rights of the environment .....

Management for future generations .....

That no matter what's done, someone will be favoured .....

How efficiently water was being used .....

How hard the user worked and therefore deserved the water .....

Whether the user had water rights previously or not .....

Scale:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

Whether it was important that all user groups were doing the "right thing" by others .....

Whether it was good for the state's (nation's) overall economy .....

The needs of the particular situation rather than general rules .....

Thinking of the users as individuals .....

Whether individual users paid for what they got .....

The benefit to community lifestyle .....

The role of local people in making decisions .....

Any other **important** thoughts in making your decisions? *(please specify)*

.....

.....

GENERAL QUESTIONS
MURRAY-DARLING RIVER SYSTEM

Please answer these two questions when you have finished Case Studies 1, 2 and 3 (or as many of the three studies as you have time to do).

1 *When you think of the Murray-Darling System as a whole,* how important do you think it is to provide water for the following uses? **(Use the scale below to show how important you think each use is.)**

Scale:
1 = essential
2 = very important
3 = quite important
4 = slightly important
5 = not important

water for:

irrigation	.....
salinity control	.....
town supply	.....
stock supply	.....
industry	.....
recreation	.....
conservation of environment	.....
generation of hydro-electricity	.....
flood mitigation	.....
tourism	.....
educational and research purposes	.....

2 Now please **rank** in order of importance. That is, who should get first priority for the water, who should have next priority. **(Put a 1 next to the most important use; then a 2 next to the second most important use; and so on until you put an 11 next to the least important use.)**

water for:

irrigation	.....
salinity control	.....
town supply	.....
stock supply	.....
industry	.....
recreation	.....
conservation of environment	.....
generation of hydro-electricity	.....
flood mitigation	.....
tourism	.....
educational and research purposes	.....

CASE STUDY 4: WHO OWNS THE WATER IN THE SOUTH ESK CATCHMENT, TASMANIA?

QUESTIONS:

1. How much do you agree with the following statements? *(Use the scale below and write the number which shows how much you agree or disagree with the statements in the space next to each statement.)*

Scale:
- 1 = strongly agree
- 2 = agree
- 3 = neither agree nor disagree
- 4 = disagree
- 5 = strongly disagree

Statements:

The major use for Tasmania's water should be power generation. .....

Fish have as much right as any other user to a formal allocation of water. .....

Different systems of allocation on different rivers is a good idea as this caters for local situations. .....

Polluters of water should pay compensation to downstream users. .....

The lakes created by the HEC are a great tourist attraction. .....

The mining industry should not have special rights to water. .....

As the HEC must provide 'all reasonable requirements' to irrigators on the Lake River because of their diversions, they should have to do the same for tourists and recreators to The Gorge in Launceston. .....

Rather than trying to sustain fish in the rivers, they should be restocked. .....

2. How fair do you think the present systems of water allocation are for each of the following users? **(Circle the number you think is appropriate on the fairness scale for each user and then say why you think this.)**

irrigators in the Cressy-Longford Irrigation Scheme: [see B (ii) in Case Studies booklet]

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

irrigators on the Lake River: [see B (iii)]

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

irrigators with Prescriptive Rights (Nile River): [see B (iv)]

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

irrigators with <u>no</u> Prescriptive Rights on the Nile River: [see B (iv)]

1	2	3	4	5
more than fair		fair		less than fair

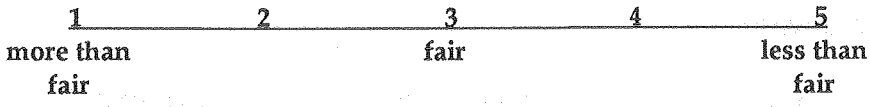
Why? .....

other irrigators using run-of river: [see B (i)]

1	2	3	4	5
more than fair		fair		less than fair

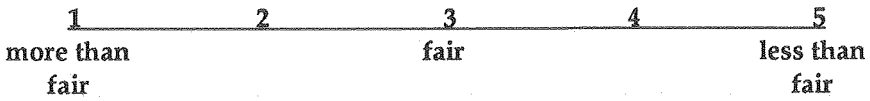
Why? .....

town of Westbury: [see B (v)]



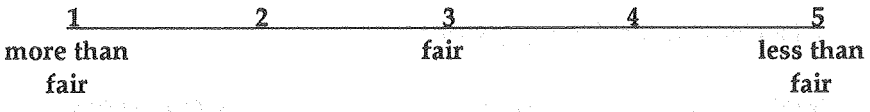
Why? .....

town of Deloraine: [see B (v)]



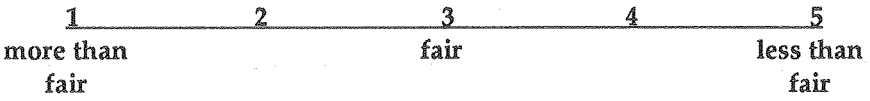
Why? .....

recreational fishermen: [see B (vi)]



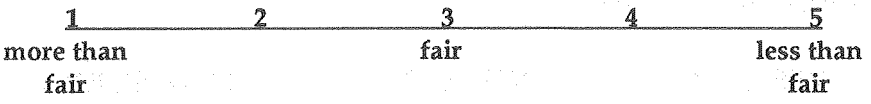
Why? .....

tourists to the Gorge: [see B (vii)]



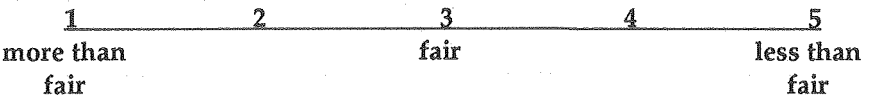
Why? .....

mining industry: [see A]



Why? .....

Hydro-Electric Commission; [see A]



Why? .....

3 Given the variety of circumstances which govern the different processes for water allocation in the South Esk Catchment, *overall with all things considered*, do you think the combination of processes is fair? **(Circle the number next to your answer.)**

YES .... 1 **NO .... 2** **NOT SURE 3**

Why? .....

.....

.....

.....

4 Would you change the role of any of the following bodies in the allocation processes?

Rivers & Water Supply Commission:

YES .... 1 **NO .... 2** **NOT SURE 3**

How? .....

.....

Why? .....

.....

.....

Hydro-Electric Commission:

YES .... 1 **NO .... 2** **NOT SURE 3**

How? .....

.....

Why? .....

.....

.....

Inland Fisheries Commission:

YES .... 1 NO .... 2 NOT SURE 3

How? .....

.....

Why? .....

.....

.....

Department of Environment & Planning:

YES .... 1 NO .... 2 NOT SURE 3

How? .....

.....

Why? .....

.....

.....

Division of Mines & Minerals Resources:

YES .... 1 NO .... 2 NOT SURE 3

How? .....

.....

Why? .....

.....

.....

Department of Primary Industry:

YES .... 1 NO .... 2 NOT SURE 3

How? .....

.....

Why? .....

.....

.....

5 The town of Deloraine has to purify its water and may have to spend a considerable amount on an advanced filtration system to provide water of sufficient quality to be able to drink. Land uses upstream (eg. farming & logging) are polluting the water.

Who should pay to provide water of quality for drinking for the town?

the Municipal Council	.....	1
the 'polluters'	.....	2
both	.....	3

6 Integrated catchment management (ie. the management of the catchment *as a whole*) could deal with the conflict between land use and good quality water for allocations. It could also deal with other environmental conflicts. Who do you think should be involved in such a body to manage the catchment?

.....

.....

.....

Who should oversee this catchment management body?

.....

.....

7 As most users pay for their allocations, should water which is allocated to the environment also be paid for?

YES .... 1 NO .... 2 DON'T KNOW 3

If YES, who should pay for it. (Tick as many of the options below as are appropriate.)

state government .....

local government .....

environmentalists .....

recreationalists .....

interested community .....

other:
(who?) .....

8 *When you think of the South Esk Catchment as a whole,* how important do you think it is to provide water for the following uses? **(Use the scale below to show how important you think each use is.)**

Scale:
1 = essential
2 = very important
3 = quite important
4 = slightly important
5 = not important

water for:

irrigation .....

town supply .....

recreational fishing .....

conservation of environment .....

generation of hydro-electricity .....

tourism .....

industry (such as mining) .....

9 Now please **rank** in order of importance. That is, who should get first priority for the water, who should have next priority. **(Put a 1 next to the most important use; then a 2 next to the second most important use; and so on until you put a 7 next to the least important use.)**

water for:

irrigation	.....
town supply	.....
recreational fishing	.....
conservation of environment	.....
generation of hydro-electricity	.....
tourism	.....
industry (such as mining)	.....

10 When you were thinking about this case study and answering the questions, how important were the following thoughts about water & allocation to you in making your decisions. ***(Use the scale below and write the number from the scale which shows how important each thought was to you in the space next to them.)***

Scale:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

The equal treatment of all groups	.....
The chance for everyone to have a say	.....
Water is owned by everyone and therefore it should be managed for the overall public good	.....
The rights of the environment	.....
Management for future generations	.....
That no matter what's done, someone will be favoured	.....
How efficiently water was being used	.....

How hard the user worked and therefore deserved the water .....

Whether the user had water rights previously or not .....

Whether it was important that all user groups were doing the "right thing" by others .....

Whether it was good for the state's (nation's) overall economy .....

The needs of the particular situation rather than general rules .....

Thinking of the users as individuals .....

Whether individual users paid for what they got .....

The benefit to community lifestyle .....

The role of local people in making decisions .....

Any other **important** thoughts in making your decisions? *(please specify)*

.....

.....

CASE STUDY 5: ALLOCATING GROUNDWATER FROM THE GNANGARA MOUND, PERTH, WA

QUESTIONS:

1. How much do you agree with the following statements? *(Use the scale below and write the number which shows how much you agree or disagree with the statements in the space next to each statement.)*

Scale:
1 = strongly agree
2 = agree
3 = neither agree nor disagree
4 = disagree
5 = strongly disagree

Statements:

People waste water when it is free. .....

Urban garden irrigators should have groundwater restrictions the same as other users. .....

All rural land should have access to water. .....

The lakes should be sacrificed rather than have people miss out on water. .....

Water uses which are not necessities (eg. turf & flower growers) should not be allowed when others miss out on water. .....

Urban development should be kept away from wetlands. .....

Artificial lakes are as good as natural ones. .....

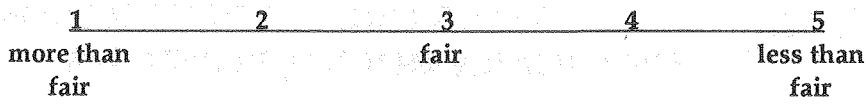
2. How fair do you think the present system of water allocation is for each of the following users or potential users? **(Circle the number you think is appropriate on the fairness scale for each user and then say why you think this.)**

market gardeners:

1	2	3	4	5
more than fair		fair		less than fair

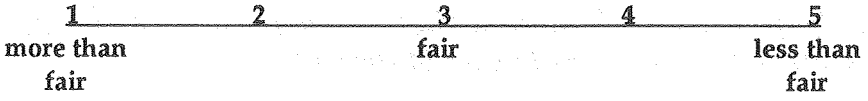
Why? .....

turf growers:



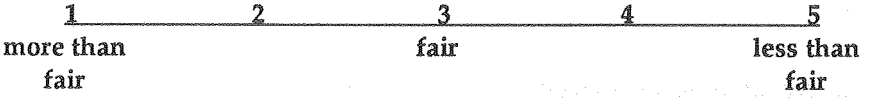
Why? .....

plant nurseries:



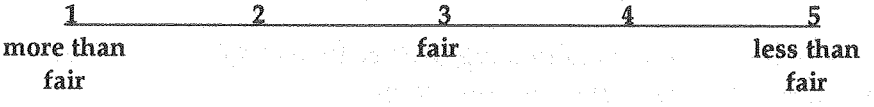
Why? .....

flower growers:



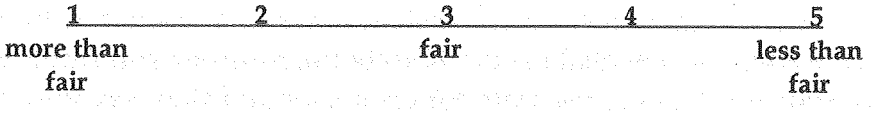
Why? .....

golf courses:



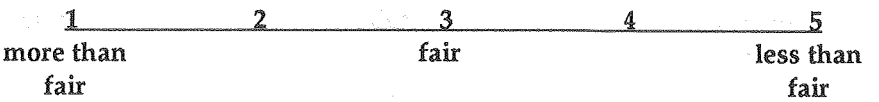
Why? .....

parks & ovals:



Why? .....

special rural dwellers:



Why? .....

urban households with no scheme supply:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

urban households with scheme supply & garden bores:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

pine forests:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

wetlands:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

rural landholders with no allocation:

1	2	3	4	5
more than fair		fair		less than fair

Why? .....

3 Even if you may think some groups are being treated unfairly, *overall with all things considered*, do you think the present system of allocating the groundwater is fair? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

If you answered YES, go to question 5.

If you answered NO or NOT SURE, continue with question 4.

4 Have you any suggestions on how the groundwater should be allocated which would be fair to everyone? **(Circle the number next to your answer.)**

YES .... 1 NO 2

If YES, what?

.....

.....

.....

5 As WAWA is, in a sense, a major 'user' of the groundwater in providing urban supplies, should they also be deciding on other user's allocations? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

6 Should there be compensation for those who miss out on water? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

7 Does the process for appeal against water allocation decisions seem appropriate to you? **(Circle the number next to your answer.)**

YES .... 1 NO .... 2 NOT SURE 3

Why? .....

.....

.....

If you answered YES, go to question 9.
If you answered NO or NOT SURE, continue with question 8.

8 What process of appeal do you think would be better?

.....

.....

.....

.....

9 How important is it to provide water for the following uses? **(Use the scale below to show how important you think each use is.)**

Scale:
1 = essential
2 = very important
3 = quite important
4 = slightly important
5 = not important

water for:

existing flower growers & nurserymen	.....
urban water supply	.....
wetlands (lakes) preservation	.....
new market gardeners	.....
pine forests	.....
golf courses	.....
special rural dwellers	.....
existing market gardeners	.....
parks & ovals	.....
new flower growers & nurserymen	.....
turf growers	.....

10 Now please rank in order of importance. That is, who should get first priority for the water, who should have next priority. **(Put a 1 next to the most important use; then a 2 next to the second most important use; and so on until you put a 11 next to the least important use.)**

water for:

existing flower growers & nurserymen	.....
urban water supply	.....
wetlands (lakes) preservation	.....
new market gardeners	.....
pine forests	.....
golf courses	.....
special rural dwellers	.....
existing market gardeners	.....
parks & ovals	.....
new flower growers & nurserymen	.....
turf growers	.....

11 When you were thinking about this case study and answering the questions, how important were the following thoughts about water & allocation to you in making your decisions. ***(Use the scale below and write the number from the scale which shows how important each thought was to you in the space next to them.)***

Scale:

1 = extremely important
2 = very important
3 = quite important
4 = not very important
5 = hardly thought of it

The equal treatment of all groups .....

The chance for everyone to have a say .....

Water is owned by everyone and therefore it should be managed for the overall public good .....

The rights of the environment .....

Management for future generations .....

That no matter what's done, someone will be favoured .....

How efficiently water was being used .....

How hard the user worked and therefore deserved the water .....

Whether the user had water rights previously or not .....

Whether it was important that all user groups were doing the "right thing" by others .....

Whether it was good for the state's (nation's) overall economy .....

The needs of the particular situation rather than general rules .....

Thinking of the users as individuals .....

Whether individual users paid for what they got .....

The benefit to community lifestyle .....

The role of local people in making decisions .....

Any other **important** thoughts in making your decisions? *(please specify)*

.....

.....

GENERAL QUESTIONS

Answer the following general questions *ONLY AFTER* you have finished *ALL* the Case Studies (or as many as you have time for).

1 When you consider your personal interests, how close do you feel to the interests of the following water users? **(Circle the number you think is appropriate on the closeness scale which best describes how close your personal interests are to those of the interests of the users.)**

commercial irrigators:

1 2 3 4 5
extremely close — extremely distant

environmental users:

1 2 3 4 5
extremely close — extremely distant

urban water users:

1 2 3 4 5
extremely close — extremely distant

water recreationalists:

1 2 3 4 5
extremely close — extremely distant

industry users:

1 2 3 4 5
extremely close — extremely distant

2 When you think back to answering the questions for each Case Study, how confident were you in answering the questions or making judgements on each study? **(Circle the number you think is appropriate on the confidence scale and give your reasons for each of the following Case Studies.)**

Case Study 1: ***Allocation of Water at Lake Hume***

1 2 3 4 5

extremely confident — extremely non-confident

Why? .....

.....

Case Study 2: ***Allocation of Water in Northern Victoria for Agricultural Irrigation***

1 2 3 4 5

extremely confident — extremely non-confident

Why? .....

.....

Case Study 3: ***Water for the Barmah-Millewa Forest***

1 2 3 4 5

extremely confident — extremely non-confident

Why? .....

.....

Case Study 4: ***Who Owns the Water in the South Esk Catchment, Tasmania?***

1 2 3 4 5

extremely confident — extremely non-confident

Why? .....

.....

Case Study 5: *Allocating Groundwater from the Gnangara Mound, Perth, Western Australia*

1	2	3	4	5
extremely confident				extremely non-confident

Why? .....

.....

3 Which of the following groups would you regard yourself a member of. *(You may nominate more than one option if you wish. Tick as many as apply.)*

conservationist	.....
commercial irrigator	.....
water recreationalist	.....
urban water user	.....
water planner	.....
dryland farmer	.....
local government	.....
state government	.....
federal government	.....
parks & gardens irrigator	.....
forest industry	.....
special rural / hobby farmer	.....

other: .....

4 Do you have any other comments you would like to make on water allocation or this questionnaire?

.....

.....

.....

.....

.....

.....

.....

WHAT IT'S ABOUT

Australia has limited water resources. The management of these resources is becoming extremely complex and more difficult for the water planners.

There are many uses for the water - irrigation for food production; water supply for communities; water for industries; water for the environment; water for recreation and so on. *How* do you decide 'who gets what' and 'what's fair'. *Who* should be deciding 'who gets what' and 'what's fair'.

The purpose of this study is to try make a start on finding out how people think about 'fairness' in allocating water. This questionnaire is being sent to a wide variety of people in Australia with different interests in and ideas about how water should be used.

We have presented **five true case studies** from New South Wales; Victoria; Tasmania and Western Australia ***(see the booklet "Water Allocation in Australia - Five Case Studies)***. All of them present different processes for, and conflicts in allocating water between a variety of uses.

Case Study 1: Allocation of Water at Lake Hume
Case Study 2: Allocation of Water in Northern Victoria for Agricultural Irrigation
Case Study 3: Water for the Barmah-Millewa Forest
Case Study 4: Who Owns the Water in the South Esk Catchment, Tasmania?
Case Study 5: Allocating Groundwater from the Gnangara Mound, Perth,WA.

The questionnaire, **(see the separate booklet; Justice in Water Allocation - Survey Questionnaire)** asks a series of questions about how fair you think the present system is and how *you* would allocate water for each Case Study.

At least one case study is near the area where you live. Others are very distant from you. **It is important to have people who are not closely associated with case studies to answer these questions.**

We have presented maps and pictures to help you visualize the five situations.

We have also presented definitions of some of the terms we use in the questionnaire to help you if you have not heard them used before (see p. 5 of this booklet).

Before the first three case studies, there is some background information on the Murray-Darling River System, as these studies all involve water from this System.

At the beginning of the questionnaire, there are a number of statements on different ways people think about allocating water. We want to know how much you agree or disagree with them.

The questionnaire itself is not difficult, though it may look long. Some of the questions take up a lot of space, but have been presented this way to make it quicker for you to answer them.

Some of the problems are difficult, though, which is why there needs to be research on them. We realise that you might find some of these questions hard to answer, but that doesn't matter.

We are interested in your feelings and thoughts as much as your considered opinions.

At the end of the questionnaire we ask you how confident you felt answering questions about each case study. So do your best to answer all the questions in some way.

WHAT TO DO

In answering all questions where scales are used, don't take too long to think about them. Your first thoughts are often your best thoughts.

1 FIRST, ANSWER THE "WAYS PEOPLE THINK ABOUT WATER ALLOCATION" STATEMENTS.

2 THEN START WITH A CASE STUDY IN YOUR OWN AREA.
(ie. If you live in Tasmania, start with Case Study 4. If you live in Victoria or New South Wales, start with one of Case Studies 1, 2 or 3 - whichever is closest to your interests. If you live in WA, start with Case Study 5.)

READ THE INFORMATION ON THE STUDY IN THE BOOKLET FIRST. THEN ANSWER THE QUESTIONS FOR THAT CASE STUDY IN THE QUESTIONNAIRE.

3 THEN WORK ON THE OTHER CASE STUDIES IN ANY ORDER.

4 WHEN YOU HAVE COMPLETED CASE STUDIES 1, 2 AND 3, ANSWER THE TWO QUESTIONS FOR THE MURRAY-DARLING RIVER SYSTEM OVERALL (at the end of questions for Case Study 3).

5 WHEN YOU HAVE FINISHED THE CASE STUDIES, ANSWER THE GENERAL QUESTIONS AT THE END OF THE QUESTIONNAIRE.

HINT:

We suggest that you answer one Case Study a night. That way, the questionnaire will not seem so long and you will be 'fresh' to start thinking about each new case.

If you don't have enough space to write all you want to say when answering some of the questions, feel free to add pages of notes. Make sure you say what questions your comments are referring to. We are also happy to receive any extra comments you may wish to add after any of the Case Studies.

If you feel you don't have enough information to answer some of the questions, have a go anyway. It is impossible for us to include all the information people may need. We have tried to create an overall picture. If you can't give an exact answer, try to write something and note that you needed more information.

Please write clearly and use a biro or pen (not pencil). *Where possible,* we would appreciate it if you could *print* your answers. It is always a shame when data cannot be included because we can't understand the writing. Also, we don't want to mis-interpret your answers because a key-word can't be read.

Your responses to this questionnaire will be completely confidential. We would like your names on the front cover so that we could ring you if we needed to clarify any of your answers. However, you need not do so if you would rather not. We have pencilled a number on the front to check off from our mailing list. You may feel free to rub it off if you want total anonymity.

All information will be entered on computer and no names are included. ***However, we would like you to put the area where you live.*** That is important for our analysis of the Case Studies.

When you have finished, please check you have noted your nearest town or city on the front cover, then put the questionnaire in the 'reply paid' envelope and post it to us. There is no need for a stamp. Please return it no later than 1 to 2 weeks after you receive it. We are not setting a date for return as we realise that some rural post will take longer than others. However, the quicker you can get it back to us the better, as there is a lot of data to be entered on the computer.

If you have any questions or would like any more information, please feel free to ring the following numbers *reverse charges.* (Please note, WA is two hours behind the eastern states.) If we are not available, please leave a message and we will ring you.

Ms Blair Nancarrow PH: (09) 387 0290
or
Dr Geoff Syme PH: (09) 387 0291

PS: If you really can't find the time to do *all* the case studies, please make sure you do **Case Studies 4 & 5** and **any one of Case Studies 1, 2 or 3.**

DEFINITIONS

Allocation of water
An allocation of water is the amount of water which is permitted to be used by a land holder (rural or urban) each year. The allocation is usually decided by a government body, sometimes in consultation with local groups. Some landholders are assigned a set allocation while others have to apply for their allocations and supply information such as what the water will be used for and on what area of land.

Aquifer
A formation in the soil or underlying rock which holds and is sufficiently permeable to yield significant quantities of water.

Catchment
The area of land on which rain falls and runs off to fill particular river(s). stream(s), dam(s) or groundwater aquifers.

Desnagging of Rivers
This is a process where dead tree trunks or branches etc. are removed from rivers to promote the easier and quicker flow of waters down the rivers.

Drainage for Salinity
For the purposes of this study, this is water allocated for flushing out or diluting saline water away from farm lands. Saline water contains an unacceptable amount of salt for sustainable land management.

Entitlement
The conditions under which an allocation has been made.

Flood Mitigation

To prevent spread of flood waters over wide areas during heavy rainfall by building dams or other structures.

Full Costs of Providing Water

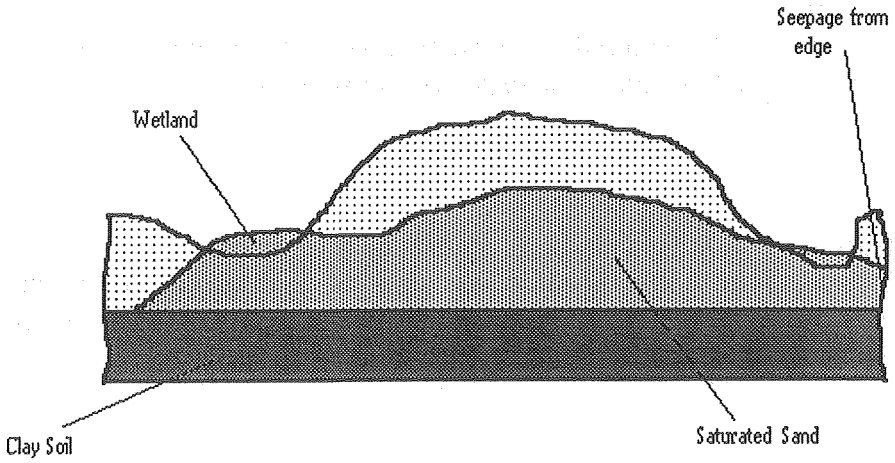
Water comes to us, at no cost, as rain. But it must be stored, piped, treated for drinking etc. Storages in dams, flows in rivers, water in underground aquifers have to be managed to ensure they don't go dry. In the case of formal irrigation schemes, channels have to be built and maintained and water pumped through them. All this costs and 'someone' has to pay for it.

Groundwater

Groundwater is water which occupies the spaces or crevices between rock, soil or sand below the ground.

Groundwater Mound

Put simply, this is an underground aquifer of water which 'is shaped like a mound' and continually flows or seeps downwards and outwards. It is replenished by rainfall. In lower lying areas of land the groundwater can be seen as lakes or wetlands.



GROUNDWATER MOUND

Irrigators

For the purpose of this study, irrigators are those people who water land for the production of crops (eg. rice, vegetables or pasture) to promote growth and earn income. They can do so by obtaining their water through formal schemes (ie. irrigation channels etc.) or by pumping the water directly from a river or from a groundwater source. Irrigators are professions such as farmers, market gardners, plant nurserymen etc.

Special Rural or Hobby Farms

These are smaller rural blocks which vary in size from about two to about fifty hectares. Special Rural blocks are generally smaller and often little farming or horticulture is undertaken. People in this category are primarily looking for lifestyle. On hobby farms there is some farming, but usually the income derived is not the main source for the family.

Transferable Water Entitlement

The ability for a landholder to transfer or sell all or some of his/her allocation to another landholder.

Upstream and Downstream

Upstream locations are situated nearest the head of a river or stream (ie. where it starts inland). Downstream locations are nearer the river or stream's mouth (ie. closer to where it enters the sea or another river or stream). Water in the rivers flow from upstream locations to downstream locations.

THANK YOU

We appreciate your efforts in this study.

The research is very important and a lot of water planners are keen to receive the results. There has been very little research into 'social justice in water allocation' in the world.

It is very important for us to get a range of thoughts and opinions from "all walks of life" and from different areas around Australia. So thank you very much for being involved.

Social Research Unit
CSIRO
Division of Water Resources