



## COMMUNITY UPDATE #2 - JUNE 2003

Welcome to Edition 2 of a series of community updates regarding the planning for the future of the Perth Basin - Yarragadee South aquifer.

This update aims to provide you with an overview of the progress of research (to date) into the Yarragadee aquifer, building upon local issues captured previously from the South West community and other stakeholders. Studies and consultancies have been built upon the issues of the community are providing us with valuable information which will enable the Water and Rivers Commission to prepare the statutory Blackwood Groundwater Area sub-regional management plan and make recommendations on the future use and monitoring of SW Yarragadee water. Diagram 3 (Page 8) outlines how the studies fit together. How your issues are being built into the planning process is described on pages 2 and 3.

Updates from the scientific investigations being undertaken by the Water and Rivers Commission are provided on pages 4 to 9. Independent professional research into social, Aboriginal heritage issues, as well as ecological water requirements in the Yarragadee area is being undertaken. An economic study and specific industry reviews of dairying and viticulture are also in progress. The future water needs of local horticulture are being considered in a joint initiative between the Department of Agriculture and the consultants undertaking the economics study.

The Commission is also supporting South West local governments by providing resources for an independent assessment of the scientific data being gathered and used

in the decision-making, especially the groundwater modelling.

This is in addition to an independent professional peer review of the research, to be undertaken for the Commission.

The investigation program is intensive and thorough, and we are conscious that the community has concerns that the assessment timeframe is too short. However, this is just the beginning and our studies will not finish when the draft allocation plan is released - they will continue.

As the State's water managers, the Water and Rivers Commission maintains regular and comprehensive monitoring and assessment of the impact of any use of the State's water. Should issues arise then these can be included in the water management plan revision that must occur at least every 7 years.

Anyone with comments on the Yarragadee studies is encouraged to contact the Commission's Bunbury Office. Further information can be obtained from our website at [www.wrc.wa.gov.au/whicher](http://www.wrc.wa.gov.au/whicher). A report of the issues of the South West community in relation to the Yarragadee studies is available on the website.

A further round of community meetings is planned for the end of July 2003. Details of these public briefings will be distributed when dates and venues are finalised.

Thank you once again for your involvement in the SW Yarragadee allocation planning process.

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# PLANNING FOR THE BLACKWOOD GROUNDWATER AREA

The Blackwood project contains a number of different facets which are being worked together to contribute to a water allocation plan based upon the best available science and the issues gathered from the community. From this, decisions regarding the future of the SW Yarragadee aquifer will be made.

Diagram 1 (Page 3) provides an overview of the approach we are taking. This approach includes a number of mechanisms for checking to ensure the issues raised by stakeholders and other community members in phase one of the program are clearly addressed within the context of the planning. The information is being collated to enable us to fully understand the hydrology of the Blackwood Groundwater Area and to provide us with tools to make informed water allocation decisions relating to the SW Yarragadee aquifer, and to incorporate these into the plan.

*How are we doing this?* A model is being developed for the SW Yarragadee aquifer and all associated groundwater bodies in the Whicher region. The model is based upon the historical and scientific data at hand and the results of the extensive drilling program.

Issues and concerns raised by the SW community in phase one are now providing the basis upon which intensive social, Aboriginal heritage and cultural values, ecological and economic studies are being undertaken. From the studies, we are finding specific information which will be directly included in the modelling and planning, as well as contributing to the development of principles and operational elements upon which the water allocation plan is being developed.

These principles include such things as ensuring regional development needs will be met. The results of the studies will enable us to attain a very good understanding and appreciation of the development plans and aspirations of the South West so we can consider this in our planning and decision making, within the context of the RiWI Act which underpins our work.

The issues, principles and data from the investigations and studies will then be incorporated into a range of planning scenarios for water use from the Yarragadee. The scenarios include a number of different water volume demands.

Planning Scenario One is the current amount of water being abstracted from the SW Yarragadee. This includes water for agriculture, and supply for the Bunbury and Busselton Water Boards.

Planning Scenario Two is the volume currently extracted (Scenario One) PLUS the volume of water which the Water and Rivers Commission has allocated to various users, but is not currently being abstracted.

Planning Scenario Three builds upon Scenario Two, by adding to this the amount of water which various users have applied for, and that the WRC is currently considering. This includes the 45GL proposal by Water Corporation.

Numerous scenarios which consider future regional needs will be developed.

The scenario figures will then be considered in the model. Once the scenarios are modelled we will be able to identify the impact on the local environment and make decisions as to whether or not these impacts are acceptable. Other issues raised by the community will also be addressed through the modelling. The aim of the planning scenarios is to predict where, and to what extent, changes will occur in the hydrological and ecological systems in the Whicher Region.

The information gathered will then be combined with the economic and social findings in a full water study, which is being prepared as a precursor to the statutory Blackwood Groundwater Area Sub-regional Management Plan. This plan will contain recommendations for the future of all groundwater in the Blackwood Area. The Commission will make recommendations to Government, following which the Government will make a decision on the proposed use of 45GL of the Yarragadee water to supplement the Integrated Water Supply Scheme.

Diagram 1 (Page 3) presents a summary of ways in which community issues and concerns are guiding the decision making process by providing a basis upon which all of our studies are built. In addition, the Whicher Water Resources Management Committee (see Page 9) will be continually briefed on the scenarios and have input into the building of the model, on behalf of the community.

An example of how the issues of the community are being incorporated is provided below in Box 1. The Community Consultation and Communications Team at the Commission will be able to show you how each of the issues have been addressed, if you would like to review this process.

## **BOX 1: Applying the planning scenarios in the aquifer modelling – an example**

**ISSUE:** Security of existing water licenses

**OBJECTIVE:** To protect all existing licenses and allocations

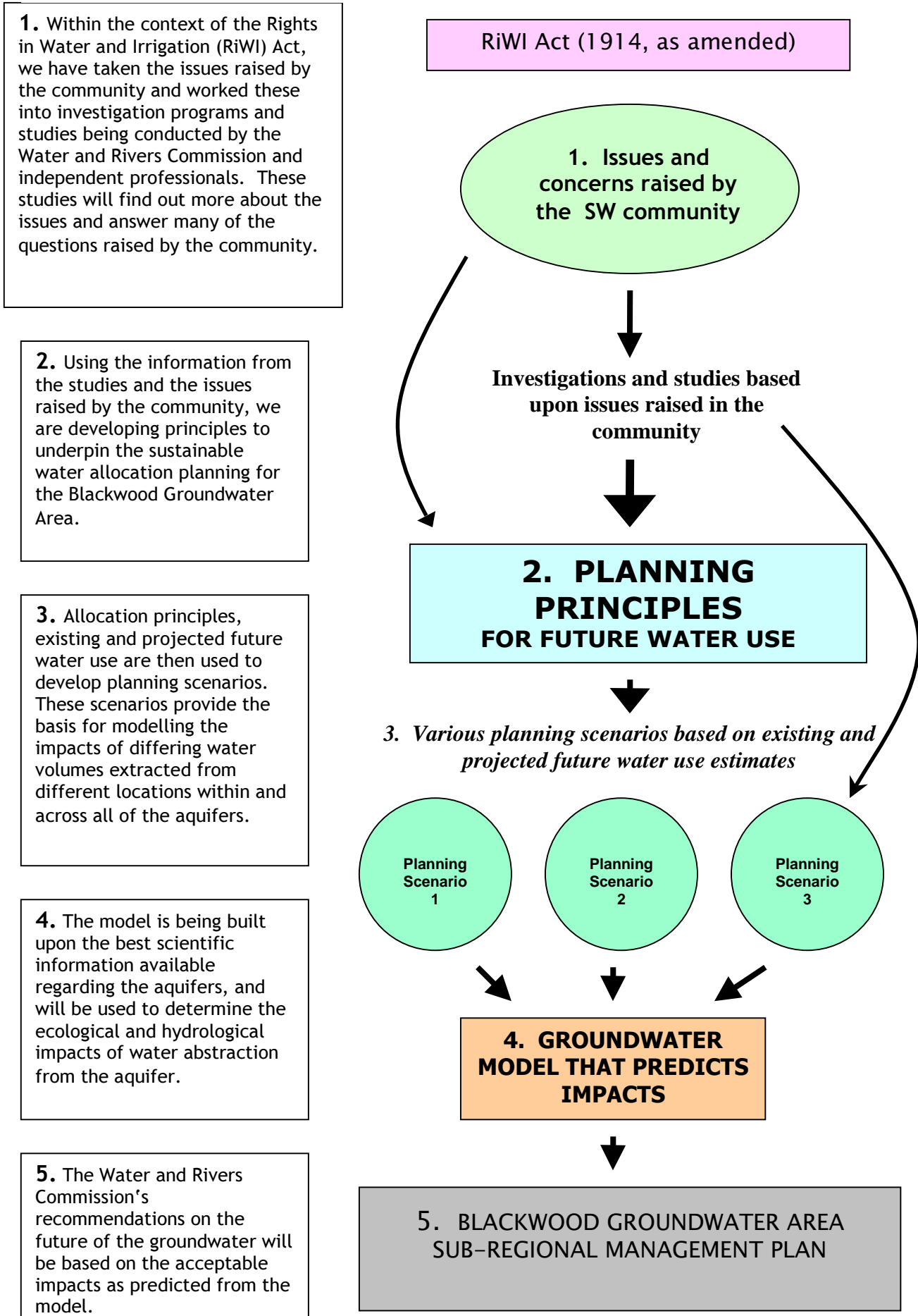
**PRINCIPLES:** Within the water allocation plan, all existing entitlements will be acknowledged, identified and protected, within the principle of reasonable licence tenure

**SCENARIOS & MODELLING:** The total volume of all existing entitlements will be deducted from the estimated sustainable yield.

Once the sustainable yield of the aquifer system is determined the first step is to ensure existing entitlements are maintained. This will be identified in the model as Scenario 1.

**CONCLUSION:** All current licensed water allocations will be protected as an allocation objective within the plan.

**DIAGRAM 1: How your issues are guiding the planning for the Blackwood Groundwater Area.**



# HYDROGEOLOGY OF THE YARRAGADEE FORMATION

The Yarragadee Formation is up to 1500m thick and composed mostly of coarse sand to fine gravel sized quartz grains. It was deposited during the Jurassic Period from about 180 to 140 million years ago. It extends from Australind to the south coast, and is bounded on the east by the Darling Fault, and on the west by the Busselton Fault. The formation contains fresh water, as low as 180 mg/L total dissolved salts.

The formation overlies the Cockleshell Gully Formation, which generally contains saline water. Locally, where the Cockleshell Gully Formation is in faulted contact with the Yarragadee Formation, it contains fresh water as part of the Yarragadee flow system (see Diagram 2).

The groundwater storage in the aquifer is vast, containing a minimum estimate of 400 cubic kilometres (400,000 gigalitres) of fresh water.

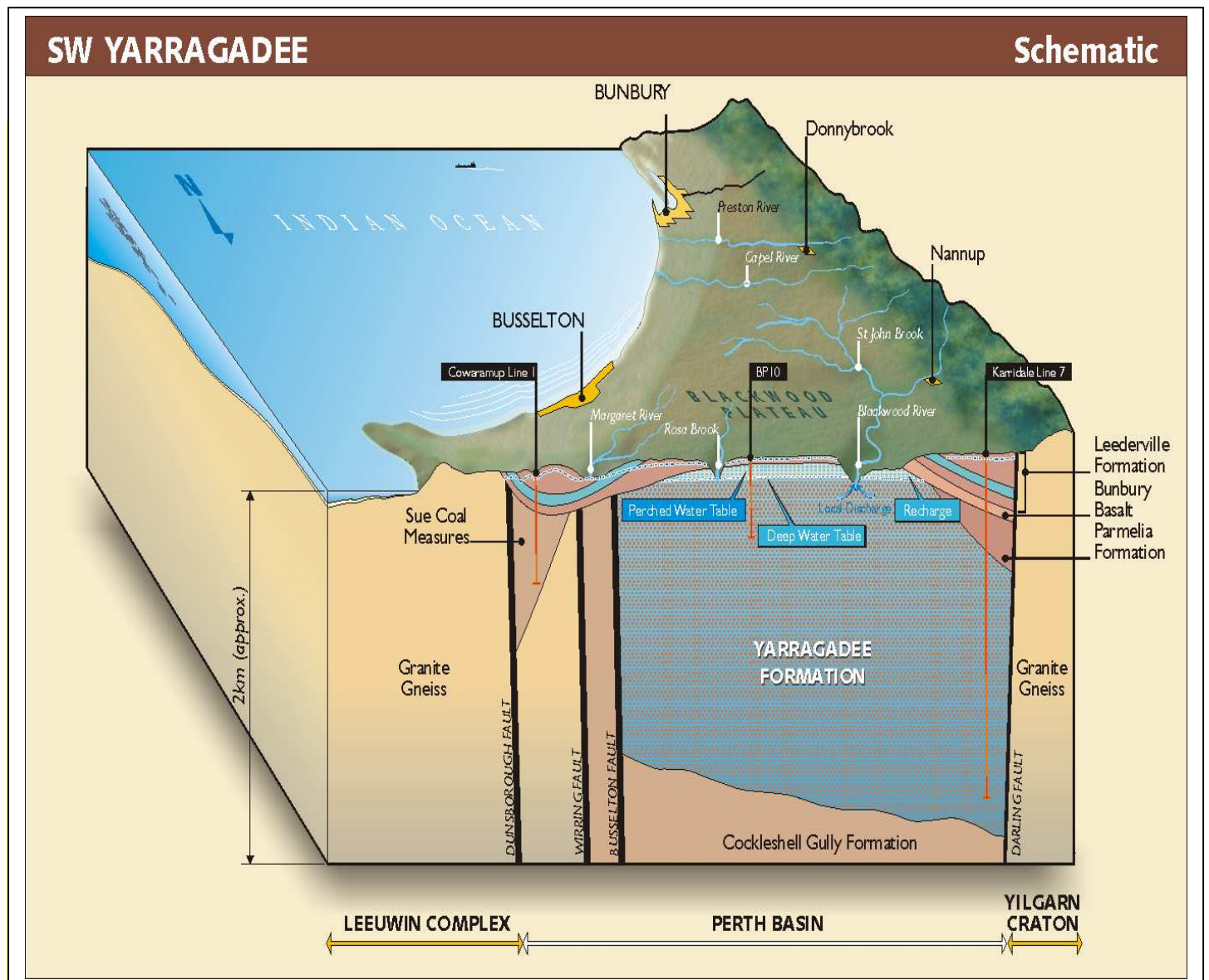
## Groundwater Movement

Groundwater in the Yarragadee Formation originates directly from rainfall soaking in past the root zone of vegetation where the Yarragadee Formation is exposed at the surface, or where the overlying sediments are thin and permeable.

Groundwater moves slowly, taking about 40 000 years to reach Bunbury from the recharge area near Nannup. Fresh groundwater extends beyond the present coastline out onto the continental shelf, which was dry land more than 10 000 years ago.

The water table in the Yarragadee Formation is 90 to 150 metres deep below the Blackwood Plateau and only comes to the surface locally in the Blackwood River valley, where groundwater discharge maintains part of the river flow during the summer months.

DIAGRAM 2



# HOW DOES WATER ENTER THE SOUTH WEST YARRAGADEE AQUIFER?

Water from rainfall that infiltrates (or seeps) into the ground to become 'groundwater' is called 'recharge', and the area on the land surface where major recharge occurs is called the 'recharge area'. The amount of water that seeps into the ground varies widely from place to place according to the vegetation and soil surface present. In porous surface material such as sand or gravel, water seeps through quickly and a lot of the rainfall becomes groundwater. On the other hand, water movement through less porous surface material such as clay is very slow so that only a very small portion of the rainfall becomes groundwater. The remainder of rainfall either runs off the land surface into streams, or evaporates from the soil surface, or is absorbed by plants through their roots and then 'transpired' into the atmosphere through their leaves.

## Recharge into the South West Yarragadee aquifer

We already know that the recharge into the SW Yarragadee aquifer comes from direct and indirect sources, as follows:

- **DIRECT SOURCES:** Two recharge areas on the land surface in the State Forest, north and south of the Blackwood River, about 40 km west of Nannup provide recharge from rainfall direct into the SW Yarragadee aquifer.
- **INDIRECT SOURCES:** Elsewhere on the Blackwood Plateau recharge is indirect - by leakage from the overlying superficial and/or Leederville aquifers, which lie over most of the SW Yarragadee.

## How much recharge is going on?

We need to know how much water recharges the aquifer system - this will limit how much water can be withdrawn safely from the aquifer. Unfortunately, recharge can't be measured directly. The project Investigation Team is using a range of internationally accepted techniques to get a best estimate of the recharge, with

assistance from research organisations such as CSIRO and UWA, and leading consultants with specialist knowledge.

Three recharge estimate methods are being used:

**Chloride balance method** - uses the ratio of chloride that is deposited on the surface with rainfall (and dryfall), and that stored within the soil profile and groundwater to estimate the proportion of rainfall that becomes groundwater recharge.

**Geochemical and stable isotopic analysis** - can assist in telling us how 'old' the groundwater is and how long it has been since it infiltrated (eg. carbon-14 age dating of water).

**Numerical modelling** using two physically based recharge models (WAVES and WEC-C) simulates the fate of the rainfall using physical data for the recharge area, including soil and vegetation properties.

## Work progress to date

Chlorine content and soil hydraulic properties are being measured in soil samples taken from 7 auger holes.

The salt content of rainfall is being measured for chloride balance analysis.

Water samples from different aquifers are being taken for isotopic analysis, including carbon-14.

Vegetation and soil properties have been determined using computer-aided mapping (GIS), remote sensing, and from soil classification data.

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## DISCHARGE FROM THE SW YARRAGADEE INTO THE BLACKWOOD RIVER

### What is the issue?

The Blackwood River is directly connected to the South West Yarragadee aquifer over about a 10 km length of the river south west of Nannup. Previous studies have shown that groundwater from the aquifer discharges into the Blackwood River over this length. The volume of discharge is very low compared with the winter streamflow in the river, but it is important in maintaining small river flows in the Lower Blackwood River over the summer months when there is no water coming down from the upper reaches.

### Why is it important?

The discharge from the SW Yarragadee into the Lower Blackwood River is fresh water, while most of the flow from higher up in the river system is saline or brackish. The fresh water from the SW Yarragadee contributes to river health in the Lower Blackwood, particularly during the summer months, when it contributes most of the streamflow in the river.

### What is being done?

Management of the SW Yarragadee aquifer must look after this source of streamflow for the Blackwood. The project Investigation Team and consultants are undertaking studies into the discharge, its role and how it reacts to changes in the aquifer. Preliminary estimates from stream flow measurement in March 2003 indicate the discharge from the Yarragadee aquifer may be as much as 12 to 16 gegalitres a year. Once determined, the discharge figure will be incorporated into the groundwater model.



# WATER QUALITY IN STREAMS OF THE LOWER BLACKWOOD CATCHMENT

## The issue

Management of the surface water and groundwater in the Lower Blackwood catchment needs to consider the ecology of the water resources, and how these are affected by season, location within a groundwater discharge area, streambank and river bed condition. The Water and Rivers Commission has begun intensive studies of water 'health' within the Lower Blackwood catchment, to provide the 'base line' data to allow it to measure and manage future trends.

## How is water quality being investigated?

Work is being done to get base line data on the biological, physical and chemical water quality in the streams in the Lower Blackwood catchment and, in particular, how these characteristics are affected by location within a groundwater discharge area. There are 17 sites under study throughout the area. Streams being investigated include the Scott River, St John's Brook, Rosa Brook, Barlee Brook, St Paul's Brook and the Chapman Brook. Information is being collected on the following water quality indicators and initial findings are also presented:

[1] **Animals without a backbone that live in water (aquatic invertebrates).** When compared to pristine environments, some impact was seen at all sites sampled. Notably, the degree of impact was not related to whether the site was located on an aquifer discharge area.

[2] **Microscopic free floating aquatic plants (phytoplankton).** The number of plants were low but satisfactory densities were recorded at all sites.

[3] **Water quality as compared with Australian guidelines for fresh and marine waters - for nutrients, biodegradable organic matter and pH (a measure of water acidity).** Water quality was good for 11 of the 17 sites, with combinations of nutrients, pH and organic matter higher than recommended in guidelines for 6 sites.

[4] **Annual and summer flows in streams** - using data from measurements made between 1968 and 2002. Summer flows in streams in the Lower Blackwood have been lower since the 1970s than in previous years, mainly due to the change in annual rainfall patterns that date from that time. Annual rainfall has dropped significantly from the 1970s throughout the South West region of WA (see section on climate change, page 7).

## How will environmental water needs be managed?

The ecological water requirements (EWR's) will be defined in a separate study, currently being undertaken by independent professionals. The results from the EWR's will inform the water allocation stated in the water allocation plan for the Blackwood area.

## Conclusions

The Lower Blackwood streams all have similar features in relation to the water quality indicators studied. However, this is based on only one sampling. We will increase the base line information - with additional sampling in spring 2003.

Ongoing work will include further surface water measurement and assessment of the four indicators in order to monitor any changes occurring in the water quality and adjust our management accordingly.

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## IMPACTS ON MARINE HABITATS

### The issue

Concern has been expressed about the impact on oceanic and coastal environments of any change in the rate of undersea discharge from the SW Yarragadee aquifer.

### What is known?

The SW Yarragadee aquifer is overlain by the SW Leederville aquifer over most of the south west. This situation also occurs under the sea, where the SW Yarragadee aquifer is generally confined by the Leederville Formation. In this situation, the SW Yarragadee is not directly connected to ocean waters.

However in small areas, such as near Bunbury and Black Point, the SW Yarragadee aquifer is likely to be connected to the sea. In these areas, natural discharge of fresh groundwater to the sea bed in the form of slow seepage is likely. Currently no marine species are known to be wholly dependent on groundwater seepage. The distribution of seagrass meadows, for instance, does not indicate any

linkage with the location of groundwater discharge, and variation in type and density of seagrasses on the ocean floor can be explained by other factors.

### What effect will groundwater pumping have?

Groundwater pumping from the aquifer - known as 'abstraction' has the potential to reduce the level of seepage, but only if the pumping occurs in nearby areas. Groundwater is pumped from the Yarragadee aquifer near Geographe Bay to supply the needs of coastal populations. This abstraction from the Yarragadee has a greater potential to reduce seepage than the current proposed abstraction from the Yarragadee aquifer further south in the Blackwood Groundwater Area.

To put the matter beyond reasonable doubt, further investigation of the literature and consultation with marine scientists is being undertaken.



# IMPACTS OF CLIMATE CHANGE ON SOUTH WEST GROUNDWATER

## Our climate - How does it change and how do we know?

We have always known that climate variability plays an important role in determining what the natural systems look like. In the millions of years since the earth's formation climate has varied to extremes. Evidence of past variations in climate is evident in the ice ages experienced as recently as 10,000 years ago.

Within our own lifetimes, we are used to thinking of 'climate' as being a constant. In the South West we have cool wet winters and warm dry summers - and that is how it has been since our grandparents were born. Over the 20 to 30 years, climate scientists have begun to understand that our South West climate is not a constant, and that variability occurs over periods as short as a few decades. We have had wetter periods - such as the 1960s, and drier periods, such as the early 1900s, and the years since 1975.

We are fortunate that the data available to study climate is improving fast, and the computing power to analyse climate patterns and predict changes is huge. Data sources include weather records from recording stations all over the world, satellite images, ice cores from Antarctica and atmospheric monitoring. Putting all this together into complex models that can describe and predict climate variation is a major activity for scientists around the world. In Australia, climatologists in CSIRO, government and universities are working to improve our understanding, so that we can better manage agricultural production, surface and groundwater supplies and the design of items like bridges and dams into the future.

## Climate change - what do we know and how will it affect the Yarragadee aquifer?

There are two main issues in climate change in the South West.

**Firstly**, climate change includes unprecedented and mostly unpredictable climatic shifts - which make some decades wetter and some drier. Recent work by the Indian Ocean Climate Initiative (IOCI) has looked at climate variability and change in the South-West of the State (SW of the Geraldton-Esperance line). Rainfall in the last 25 years has been less than the previous 50 years. Some areas have experienced up to a 15% decrease in annual rainfall, however, the Blackwood Groundwater Area was shown to have approximately 5% reduction in annual rainfall over the last 25 years. In short, we have been in a dry period since the mid-1970s.

**Secondly**, we are starting to understand human influences on climate change - caused by the so-called 'greenhouse effect'. This has been led by the authoritative Intergovernmental Panel on Climate Change (2001), which is confirming a strong connection between the rising level of carbon dioxide and increasing global temperatures that provide evidence of

'human induced' climate change. The best available predictions are that this may lead to slightly reduced rainfall in areas with Mediterranean climates (such as the South West) if current trends persist.

## How will climate variability be considered in planning the SW Yarragadee - Blackwood Groundwater Area?

The Investigations Team takes climate variability and change very seriously in predicting how the SW Yarragadee will respond. We will be using best existing knowledge in testing the effect of three realistic 30-year climate 'climate scenarios' on recharge and water storage. This work will be completed by August.

The three climate scenarios are:

1. Similar to now - using rainfall data for the last 25 - 30 years, a 'dry period';
2. Rainfall pre-1975 - a 'wet period', and
3. Drier than now - looking 30 years into the future with the possibility of a 'very dry period'.

Current recharge studies are using three methods to find out how much rainfall seeps into the aquifer in the current climate (Climate Scenario 1). This relationship between rainfall and recharge can be used with the wetter and drier scenarios to show how total recharge will vary across the three climate scenarios.

The Model of the SW Yarragadee aquifer considers all the factors influencing aquifer behaviour, including recharge rate. 'Running' the Model with the three climate scenarios will show how aquifer characteristics differ between the scenarios - in water storage, and the response of pumping water from the aquifer.

## Summary

The Investigations Team will be using the best available information on climate variability and predicted changes in determining how the Yarragadee aquifer will respond to lower rainfalls. Given the huge size of the aquifer, any small decrease in rainfall or increase in temperature will have an extremely small effect on water in storage. Stream flows or natural vegetation will be more sensitive to climate change than our aquifer system but current understanding is that the vast majority of natural systems in the Blackwood Groundwater Area will continue to respond to climate variability as they have for recent decades.

The final climate change scenario to be used in the model will be declared and justified by the investigations and planning teams.



# SALT-WATER INTRUSION - Is it a potential problem?

## The issue

Concern has been expressed, particularly by people living in Busseton and Augusta, that changes in the hydraulic head resulting from groundwater pumping ('abstraction') from the SW Yarragadee aquifer may lead to salt water intrusion into the aquifer. If this were to occur, a further concern would be that local bores would become salty.

## What we already know

The SW Yarragadee formation, and its aquifer of fresh water extends out onto the continental shelf, at least 50 km off the coast. This is a legacy from the last ice age when the sea level was lower, and the coastline was out along the edge of the shelf. The aquifer was already well formed, and full of fresh water during the ice age. The water in the Yarragadee aquifer under Bunbury is about 40,000 years old. The end of the ice age about 10 000 years ago led to the rise in sea levels, which covered the area between the edge of the continental shelf and the current shoreline. All this geological history means that any interaction between seawater and fresh water in the confined Yarragadee aquifer will only be occurring a long way from the present coastline.

The SW Yarragadee Formation is overlain by and confined by the Leederville Formation, except in small areas (near outcropping Bunbury Basalt). The 'protective' covering of the lower Leederville Formation reduces the potential for direct entry of salt water into the SW Yarragadee. There is a small area where the SW Yarragadee outcrops on the seabed off the coast near Bunbury, and there is some groundwater discharge into the

ocean. Here close monitoring of groundwater salinity in observation bores is carried out, as intrusion and salinity increases are possible.

In most instances where bores have become salty, it has been the shallow bores established in superficial formations, close to the coast that were affected. This impact is caused by over pumping from bores in the same locality.

## What are we doing about it?

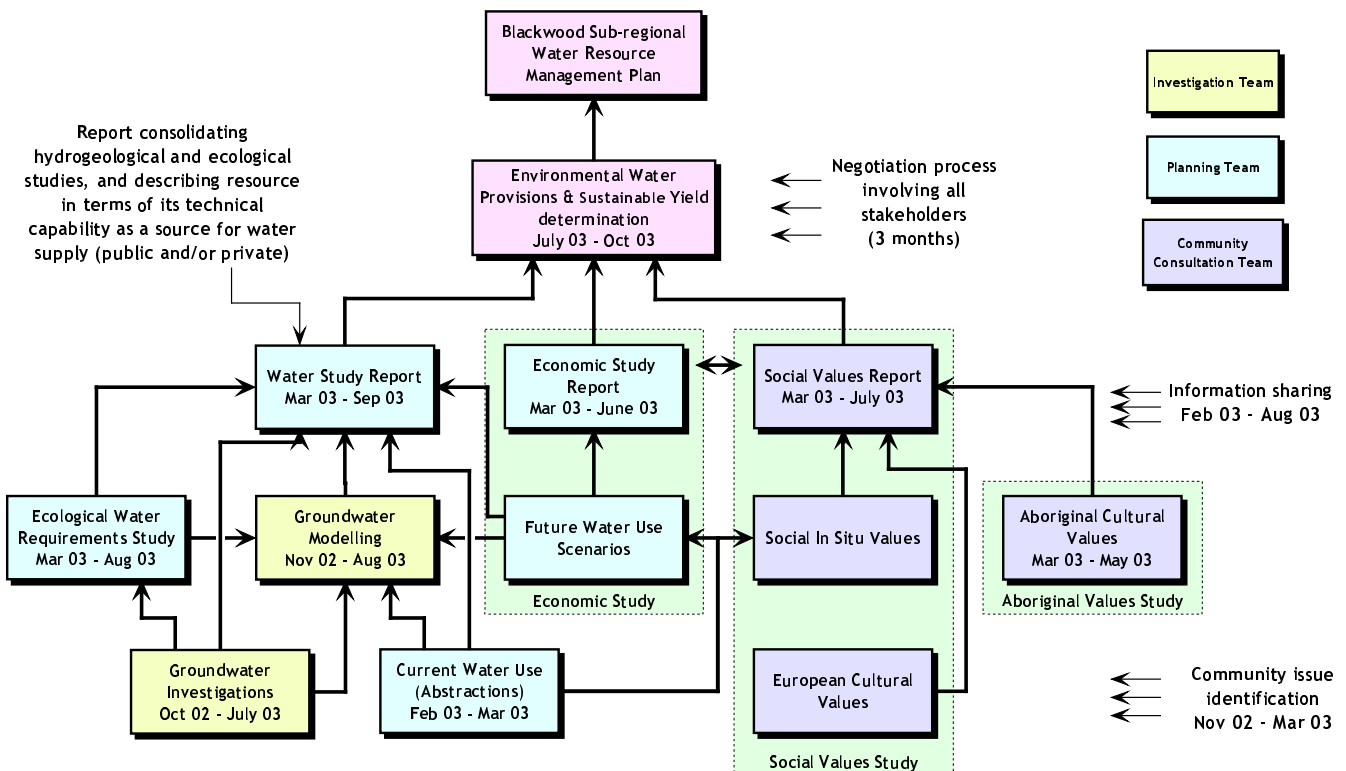
Where the Yarragadee aquifer is confined, as it is close to the coast and under the sea, pressure changes in the water body can be transmitted rapidly, but the rate of actual groundwater flow is very slow - 40,000 years to get from west of Nannup to Bunbury. Therefore it takes a long time for the effects of salt water intrusion to become apparent. This makes it important that we monitor water salinity trends very carefully.

In summary, the potential problem of sea water intrusion into the SW Yarragadee aquifer is being taken seriously. It will be managed through our existing understanding of how water behaves in the aquifer, through additional information we get from the current modeling, through our understanding of the geological structure, and by close monitoring of groundwater behaviour in susceptible areas.

Salt water intrusion is not expected to be an issue for the proposed groundwater abstraction from the Yarragadee aquifer west of Nannup.

## DIAGRAM 3

Blackwood Sub-Regional Water Resource Management Plan: Project Components, Relationships & Timing



# ACID SULPHATE SOILS

## What are acid sulphate soils?

'Acid sulphate soils' contain sulphide minerals, predominantly pyrite (an iron sulphide). In coastal areas of Australia, including along the Swan Coastal Plain, soils containing sulphides were mostly formed during the last 10 000 years since the last major sea-level rise at the end of the last ice age.

Under natural conditions these soils are covered by water and natural vegetation. In this situation the soils cause no undesirable impacts. However, if the soils come into contact with the air, the sulphides will oxidise to form sulphuric acid. Any activity that allows contact with the air, such as draining, excavating the soil, or lowering the water levels by groundwater pumping will result in oxidation.

The sulphuric acid in the water leaching out of disturbed soils - called an 'acidic leachate' can:

- cause major ecological damage to aquatic ecosystems;
- severely affect estuarine fisheries and aquaculture projects;
- contaminate groundwater with arsenic and heavy metals;
- reduce agricultural productivity through metal contamination of soils (predominantly by aluminium), and
- cause damage to urban infrastructure through the corrosion of concrete and steel pipes, bridges and other sub-surface infrastructure.

## Acid Sulphate soils on the Scott Coastal Plain

Acid sulphate soils occur in some parts of the Scott Coastal Plain associated with mineral sand deposits, and in some wetlands that are connected to the groundwater. Careful management is required by all land and water users to prevent undesirable impacts, and we are aware of the community concern about how these soils are handled. Currently, we do not know whether long term pumping from the Yarragadee aquifer will affect near surface acid sulphate soils, and the Water and Rivers Commission will shortly carry out an investigation to determine whether this is a significant risk.

## Acid Sulphate soils elsewhere in the Blackwood Groundwater Management Area

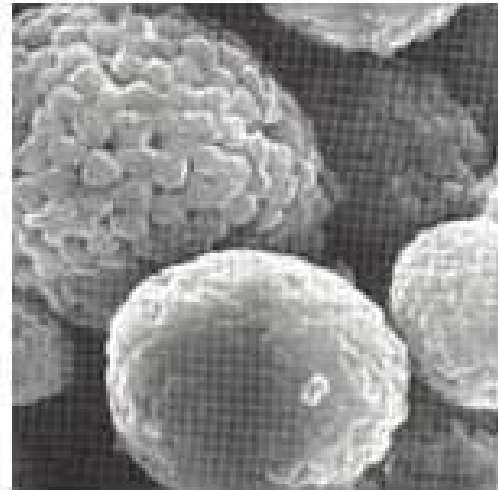
Acid Sulphate soils on the Blackwood Plateau pose a much smaller risk but any potential borefield areas will be located to avoid the acid sulphate effect.

## What are we going to do about this issue?

The following work will occur over the next two months:

- Existing soil and vegetation maps will be used to pick out those areas 'at risk' - that is where sulphide minerals may be found, and where the shallow groundwater (the 'superficial aquifer') is connected to the SW Yarragadee Aquifer.
- Most sites will be on the Scott Coastal Plain, plus a couple of sites on the Blackwood Plateau.
- All sites in areas 'at risk' will be drilled to about 2 m below the waterlevel to see if sulphide minerals are there - based on an assumed maximum drawdown of 2 m in a pumping scenario. Depending on the findings, we will do field tests to see if the material that is under water is likely to acidify if exposed to the air.

This work we mean that we will know whether we either have minimal (no) risk, or large risk. If it is the latter, we will immediately commence more intensive studies.



*Spherical aggregates of pyrite crystals (known as framboids) in an acid sulphate soil viewed by an electron microscope.*

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## Whicher Water Resources Management Committee

The Blackwood groundwater management planning is being undertaken with input from the local water user's group, the Whicher Water Resources Management Committee (WWRMC). The WWRMC comprises the following representatives:

Mr Barry Oates (Chair) - Beef and dairy farmer  
Ms Wendy Alpers - Leeuwin Conservation Group  
Mr Keith Scott - Farmer and grape grower  
Mr Ian Carter - Potato farmer and grape grower  
Mr John Alguire - Planning Manager, Iluka Resources  
Ms Stephanie Camarri - Beef farmer, Nannup  
Mr Andrew Highet - Viticulturalist

Mr Ross Reading - Rural tourism / farmer  
Mr David Reid - Busselton Water Board  
Mr Conor Lagan - Shire Councillor, Augusta-Margaret River  
Ms Gloria Millward - Shire Councillor, Nannup  
Mr Wayne Tingey - Water and Rivers Commission  
Mr Eric Wright - Department of Agriculture  
Ms Anne Wood - Department of Conservation and Land Management

The aim of the Management Committee is to provide a direct link to the community's views and play an integral part in managing and planning the water resources for the greater Cape to Cape, Vasse and Whicher areas. Members provide the South West Regional Office of the Water and Rivers Commission with advice and assistance in considering the allocation and use of water resources in the respective Shires.

# INDEPENDENT INVESTIGATIONS AND PROFESSIONAL ADVICE

The Water and Rivers Commission, in response to community perceptions of conflicting interests and "government favouring government", has initiated a number of consultancy studies to address issues raised by the public in phase one of the consultation program, and to provide information and advice to assist with our planning and decision making.

Social water values, Aboriginal heritage and cultural issues, ecological water requirements, and economic issues associated with water in the region are being investigated. The following pages provide an overview of the research being undertaken by independent analysts. Copies of the Terms of Reference for each of the studies are available from the Bunbury office of the Water and Rivers Commission or at our website [www.wrc.wa.gov.au/whicher](http://www.wrc.wa.gov.au/whicher).

## Social Values and Impact Study

The value placed on groundwater resources by the community is the focus of this research. The work involves two community surveys: a major one of the impacted South West communities; and a second shorter one of the Perth community. These surveys have been completed and a report is expected by the end of June.

The principle consultant for the social and community investigation is Blair Nancarrow who is the Director of the Australian Research Centre for Water in Society (ARCWIS), part of CSIRO Land and Water. This Centre specialises in social and community analyses associated with water resources management. ARCWIS was established as a national research Centre over ten years ago by the then Standing Committee of the Australian Water Resources Council. The focus of the Centre is on the development of social scientific theory and implementation methodologies to ensure quality community input to policy formulation.

A specialist area of ARCWIS over the past ten years has been in the area of social justice in environmental management, and in particular, the community definition of "what's fair" in the allocation of water to multiple uses. This has involved working with rural communities in most states of Australia in a number of "real" allocation challenges. An ongoing collaboration with the Psychology Department at the University of Trier in Germany has been established, this group being the only other researchers internationally to apply social justice theories to allocation conflicts in environmental management.

It is these skills and theoretical development that the ARCWIS team brings to the Social Values and Impact Study.

## Economic Impacts Studies

Economics Consulting Services (ECS) is currently undertaking a study to define the economic value of the region's groundwater, in terms of its current and potential uses both in the region and if it is exported through the Integrated Water Supply Scheme (IWSS).

ECS is in the process of consolidating existing information on current and proposed regional water uses in order to understand the value of groundwater to the region's economy. They will then use this information to contribute to the scenarios described on Pages 2 and 3 which include various future water demands. The costs and benefits of each of the future water use scenarios are being considered by ECS.

In addition to this, three industry-specific analyses are being undertaken in relation to viticulture, dairying and horticulture in the region.

## Aboriginal Heritage and Cultural Values

Anthropologist Mr Brad Goode has been contracted to consult with the South West Noongar community to determine the heritage and cultural issues and values associated with local groundwater. Information on Noongar perceptions, issues and concerns in relation to the Blackwood Groundwater Area planning is currently being gathered. This will be followed up by a forum to discuss Aboriginal heritage and cultural implications of the planning, to be held in early July.

## Ecological Water Requirements

How much water is required by the natural environment and ecosystems present in the South West in order to be maintained and sustained? This is one of the questions being addressed by URS Australia which will provide valuable and essential understanding of the region's groundwater systems.

URS has a national and international reputation for delivering practical solutions to complex policy, technical and institutional issues, as well as providing support for regionally-based land and water resource development projects. URS has extensive experience in the South West, providing surface water and groundwater skills and knowledge to the mineral sands and coal mining industries, environmental and risk management services in the marine area, economic and environmental assessments in the Collie River Catchment and community consultation for scenario development in the Busselton, Margaret River and Augusta areas.

In determining environmental water requirements for the South West Yarragadee - Blackwood Groundwater Area, URS will be providing expertise in surface water and groundwater investigations and management, environmental and ecological assessments, water quality management, and community consultation.

Dunsborough viticulture consultants Albert Haak and Associates have been contracted to provide information on the wine and grape-growing industry and projected water demands of the industry into the foreseeable future.

Primary Consulting Services (Colin Bosustow) is addressing trends in the dairying industry, and related water-demand implications.

Horticultural water requirements into the future in the region are being discussed and addressed by the Department of Agriculture in conjunction with Economics Consulting Services.

Further information on any of these studies is available from the Community Consultation and Communications Team at the Water and Rivers Commission office in Bunbury.



## MEETING REGIONAL NEEDS

The importance of meeting the water needs of the community of the South West was emphasised throughout the initial community consultation phase. Water leaving the region was seen by the community to be “exporting wealth.” Ensuring the water requirements of the South West are met now and into the foreseeable future is integral to the planning for the Blackwood Groundwater Area and SW Yarragadee, and is included as a fundamental principle of this water planning process.

How much water will be needed by the South West community into the future? While independent advice on this issue is being sought through the consultants working on the economic studies mentioned previously in this paper, the Water and Rivers Commission is addressing the concerns of the community within the context of the RiWI Act, as well as the State Water Strategy. Under the State Water Strategy, “reasonable regional needs” will be met. So, what is regional?

Answering this question has become fundamental to the continuation of the investigations and studies being undertaken. The approach being currently taken to the “regional” question is to consider local needs as being water needs within the six shires primarily overlying the SW Yarragadee, but with consideration given to potential major developments within the broader area of the twelve shires of the South West Region, for which the Yarragadee Formation groundwater might be a viable source. The six local government areas directly affected are the City of Bunbury and the Shires of Dardanup, Capel, Busselton, Nannup, and Augusta-Margaret River.

The concept of “reasonable” is very subjective. “What is reasonable” is being discussed in terms of existing proposals for the region and predictions for regional growth over coming decades. As the scenario planning and modelling being undertaken are based on potential locations of bore sites as well as volumes proposed for abstraction, it becomes difficult but not impossible to factor “reasonable” into the water allocation planning process. However, the future local needs are being considered a very high priority in the allocation planning, and any decisions made will err on the side of caution to ensure that the region is not disadvantaged if Government makes a decision to support the 45GL application.

## WATER FOR A GROWING REGIONAL POPULATION

The Water and Rivers Commission is addressing the community requirement that future demands of the growing South West population must be considered in the decision-making.

At 30 June 2001, the population of the South West Region was 129,925. This made up 6.8 per cent of the State’s population. This growth represented an increase of 2.4 per cent over the previous year, compared with 1.3 per cent for regional WA and 1.4 per cent for WA as a whole over the same period.

Over the 10 year period (1992-2001) the South West population grew from 104,663 to 129,925. Annual growth varied from 1.3 per cent to 3.3 per cent per annum, averaging slightly over 2.3 per cent - above the State average of approximately 1.7 per cent per annum. Medium Scenario Population Projections (by the Department for Planning and Infrastructure) for the period

2001-2031 suggest the South West will grow to 218,000 by the year 2031.

These figures clearly indicate increased demand for local and regional water use will be likely over coming years. Given this, the allocation planning scenarios are factoring in likely demand increases for water in the South West. This is being undertaken with due consideration of the findings and recommendations of the various independent consultants regarding the social, cultural and economic values of water in the local area.

Meeting the water needs of future populations in the region provides a principle upon which the planning scenarios are being built.

## DEALING WITH POLITICAL ISSUES

Community stakeholders have raised many questions and concerns in relation to planning for the Blackwood Groundwater Area and the SW Yarragadee aquifer which are associated with Government policy directions and political issues. Within the context of the RiWI Act, the Water and Rivers Commission is limited in its ability to deal with many of these issues directly. However, in keeping with our commitment to ensuring the voices of south west residents and water users are heard, we have passed the issues on to relevant Ministers and policy makers. The State Water Strategy Taskforce has been briefed and is being kept informed of the concerns of the community and issues arising from the research and water allocation planning program.

The Water and Rivers Commission understands the policy and equity-related issues of the South West community and will keep your issues on the agenda for discussion and incorporation into decisions made regarding the resources of the region.

Your issues are being heard.

## FURTHER OPPORTUNITIES FOR COMMUNITY INPUT

The Communications and Community Consultation Team at the Water and Rivers Commission is maintaining its ongoing consultation program to confirm that we have heard correctly the voice of the community, and to ensure the information emerging from the investigations and studies answers the questions of the water users and other stakeholders in the region. Over the coming weeks we will be contacting those groups and individuals who provided valuable insight and advice during phase one of the consultation program. Many of the key stakeholders in the region will also be contacted by various consultants working for the Water and Rivers Commission on the studies mentioned in this update.

A further round of public briefings will be held in the Shires of Nannup, Capel, Augusta - Margaret River and Busselton and the City of Bunbury at the end of July. Local shires are also being provided with copies of display posters outlining the investigation and planning programs, as displayed at the recent Margaret River Wine Industry Field Day at Cowaramup.

Please feel free to contact the Community Consultation and Communications Team as detailed below if you have any comments or concerns related to the Blackwood Groundwater Area planning. We value the input of the community and maintain a commitment to being open and accountable in our dealings with the community.

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### ACKNOWLEDGEMENT

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