

South West Yarragadee Blackwood Groundwater Area

FactSheet

6

July 2003

The 2003 drilling program on the Blackwood Plateau

The State Government has funded a major program to investigate the groundwater resources in the South West Yarragadee – Blackwood Groundwater Area. The program will increase our knowledge of these groundwater resources, and how they can best be used and managed.

We need to be able to protect these resources for the benefit of future generations. Understanding our groundwater resources is an essential first requirement in establishing wise use and sound management.

The role of drilling bores in understanding groundwater

One of the most important means of investigating groundwater resources is by drilling bores into an aquifer. These bores provide information on the soils and rocks in which the water is held, the depth of water, the quantity and quality of water, and the pressure under which it is stored. Test pumping of such bores provides information on how the aquifer responds to ‘groundwater abstraction’ – which is the term for the process of pumping groundwater to the surface for normal uses. Information from a drilling program is used along with findings from other investigation methods, such as geophysics, to build a picture of how an aquifer works. The improved understanding of our aquifers will help the sustainable management of valuable groundwater resources.

Previous drilling programs in the South West Yarragadee - Blackwood Groundwater Area

Systematic drilling of exploratory bores into the South West Yarragadee aquifer has been undertaken since the 1960s. As described in *FactSheet 2*, 119 boresites have been drilled across about 70 per cent of the area. Water levels in the bores at these sites are being monitored twice-annually.

This has provided a very good basis for understanding the Superficial, Leederville and South West Yarragadee aquifers, and the relationships between them.

The current drilling program

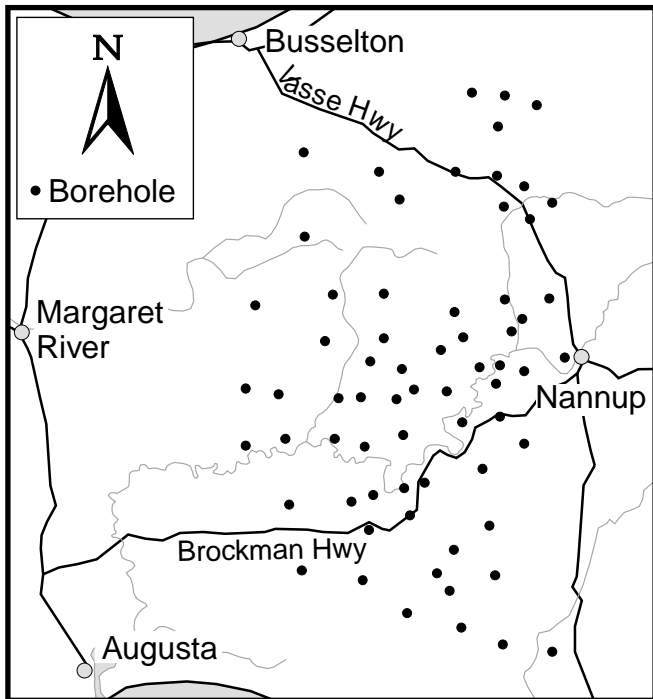
The objective of the current drilling program was to complete a network of investigation and monitoring bores mainly across the Blackwood Groundwater Area. It has been targeted at the middle part of the Blackwood Plateau, in between areas that were drilled in the late 1980s (see *FactSheet 2* for details). This area includes the recharge zone for the South West Yarragadee aquifer. The current drilling program was completed in June 2003. Results from this drilling program will increase our understanding about:

- the nature of the South West Yarragadee aquifer;
- how recharge into the aquifer occurs;
- the relationship between water in the Leederville and South West Yarragadee aquifers;
- the water levels and groundwater directional flows (the ‘potentiometric head’); and
- the distribution of salinity in the water in the South West Yarragadee aquifer.

Site selection

The current program has involved drilling an additional 47 sites, with three bores being drilled at most sites. Sites were selected to avoid drilling through the harder Bunbury Basalt. Most of the bores have been drilled to between 100 and 200 m, depending on the nature of the site and the depth of the Parmelia and Leederville formations over the South West Yarragadee aquifer. Five of the bores were drilled to a depth of 400 m.

The attached map shows the existing and current drilling sites. All of these sites are exploratory only, and they cannot be used as production bores. However, most of the bores will be used to monitor groundwater in the area.



Investigation sites in the 2003 program (not all have been completed)

Drilling the bores

Drilling has been done by four drilling rigs using two standard techniques:

- Air core drilling – 50 mm diameter casing. This is an efficient technique that produces good information on the strata of soils and rock types. It enables collection of water samples from different depths in the borehole, and is good for detecting variable salinities through the aquifer.
- Mud rotary drilling – 80 mm diameter casing. This is a standard technique for drilling normal water well bores. It allows for deeper drilling and geophysical logging in an uncased hole.



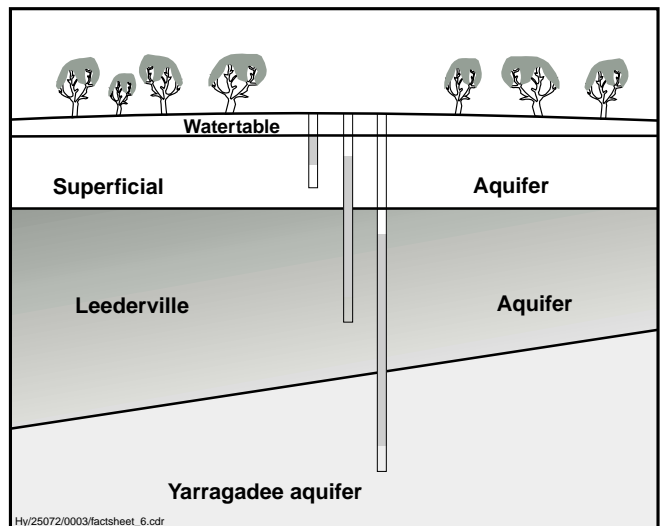
Investigation drilling on the Blackwood Plateau

Investigations at each site

Each of the 47 sites has between one and three boreholes or ‘piezometers’, which will allow water levels to be monitored at different depths.

Boreholes, drilled to different depths – shallow, intermediate and deep – have been ‘cased’ (that is, lined) with a PVC piping to enable water sampling at different depths. The depth to water will be measured as the height in relationship to sea level. Samples will be analysed for water chemistry (e.g. salinity), and age (using C_{14} dating techniques). Drilling through the boundary between the Leederville and South West Yarragadee formations, combined with sampling the water stored in each aquifer, will build an understanding of the relationship between these two aquifers.

The new information from these 47 sites, together with the existing information from the 119 boresites, will be used to develop a picture of groundwater quantity, depth and quality across the study area. This information is being fed into the groundwater modelling as described in *FactSheet 11*.



Schematic layout of deep, intermediate and shallow investigation bores

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