

South West Yarragadee Blackwood Groundwater Area

FactSheet

10

July 2003

Groundwater level trends in the South West

Within the South West, fresh groundwater drawn ('abstracted') from the Superficial, Leederville and South West Yarragadee aquifers is important for towns and irrigated agriculture across the region. Augusta, Bunbury, Busselton, Donnybrook, Dunsborough obtain all of their domestic water supplies from these sources. Water from the Leederville aquifer is very important for irrigated agriculture in the Jindong area. The South West Yarragadee aquifer supplies water for irrigation on the Scott Coastal Plain.

The growing demand for fresh water supplies requires that we identify and carefully manage the available supplies. We need good information on how the aquifers being used are responding to current levels of groundwater abstraction.

Monitoring groundwater level trends across the South West

There are 119 sites across the South West where exploratory bores have been drilled to find out about the groundwater and its behaviour. The earliest of these bores was drilled in 1966. Water levels have been measured at these sites twice each year – at the end of summer and at the end of winter. Current drilling investigations in 2003 have added a further 47 sites to the network.

The information collected from the water level measuring is presented as 'hydrographs', which are trends in groundwater levels through time. An example of a hydrograph from a borehole in the Leederville aquifer is shown in the figure below. Water levels in the borehole vary according to the seasonal conditions. In this example, there is also evidence of a long-term downward trend over the 15 years of recording.

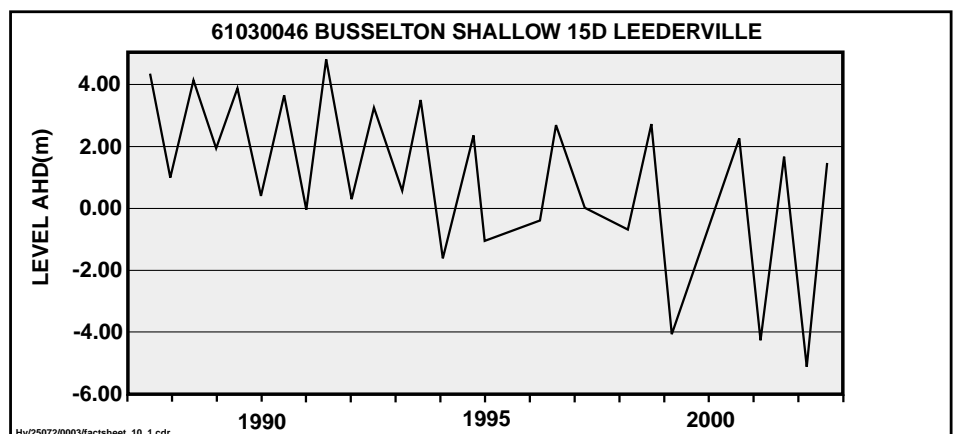
Hydrographs are not easy to interpret. Techniques are available to separate the effect of different annual rainfalls from any longer-term impacts of groundwater abstraction. A longer-term impact is normally seen as a 'drawdown' in the average water level in areas close to the production bore. The amount of drawdown provides important information on how groundwater moves in the aquifer, and how much water can be abstracted without damaging the aquifer.

Trends in water levels in the Superficial aquifer

The *Superficial Formations* consist of a thin (20 m) layer of clays and sands that lies over the Swan and Scott Coastal Plains. Short-term changes in water levels in bores in the superficial aquifer are influenced by whether the year has been wetter or drier than normal. After the effects of seasonal variations are removed, the trends in water levels in most superficial bores are stable. There has been some local lowering of groundwater levels close to production bores.

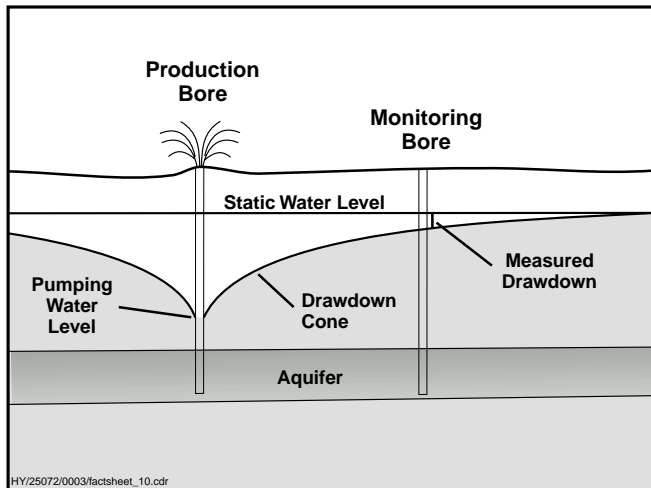
Trends in water levels in the Leederville aquifer

The *Leederville Formation* is a multi-layered body of sand, clay and shale sediments, about 150 m thick. It extends over most of the Blackwood Groundwater Area and lies over the South West Yarragadee aquifer. Around 25 GL/year is allocated for abstraction from the Leederville aquifer along the Swan Coastal Plain in the Bunbury-Capel-



Groundwater hydrograph –1987 to 2002

Busselton area. Most of the bores drilled into the Leederville aquifer in this area show decreasing groundwater levels (between 0.5 and 2 m lower over the last twenty years), with a minority being stable and no further abstraction is being permitted. The impact of abstraction on groundwater levels is greater close to a production bore, as shown in the cross-section below.



Diagrammatic section through a drawdown cone

As well as lower water levels, there are large seasonal trends in bores where high rates of groundwater abstraction occur.

Groundwater level trends in the Leederville aquifer are stable on the Blackwood Plateau and the Scott Coastal Plain, where historical groundwater abstraction has been low.

Trends in water levels in the South West Yarragadee aquifer

The *South West Yarragadee aquifer* is the largest and most extensive aquifer in the region. It lies beneath the Leederville aquifer over most of its range and is about 1,200 m thick. Approximately 47 GL/year is allocated to be pumped from bores in the South West Yarragadee aquifer near Bunbury and Busselton to supply the needs of communities and industry.

Water levels in the South West Yarragadee aquifer close to the major production bores show a drop in water level of about 1 to 2 m over the last twenty years. The largest fall

in water level of 5 m has occurred in Quindalup Line 10 bore close to the site where groundwater is extracted to supply Busselton.

On the Scott Coastal Plain, about 8 GL/year is allocated to be pumped from the South West Yarragadee aquifer to supply irrigated agriculture in the area. Water levels in bores in the western part of the plain have decreased by 0.5 to 2 m over a ten year period near major production bores. Water levels in bores are stable on the eastern parts of the plain. Seasonal variation in water levels in these bores is about 0.5 to 1.5 m.

Over the last 10 years, water levels have actually increased in some of the bores on the Blackwood Plateau which are located in a line across the forest south of the Blackwood River (the 'Karridale Line'). This trend is in response to wetter years in the late 1990s. There is no extraction from the aquifer in this area.

How is this information used in managing the groundwater resources?

The record of trends in groundwater levels across the Blackwood Groundwater Area is important information in guiding future use of the groundwater resources. Existing water use from these aquifers and the water level responses are being included in the current groundwater flow modelling (see *FactSheet 11*). The way water levels are changing close to major production bores will help in determining what can be expected if other production bores are drilled across the region.



Measuring groundwater levels

For more information contact

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