South West Yarragadee
Blackwood Groundwater Area

FactSheet 5

July 2003

The hydrology of the Blackwood River

The Blackwood River catchment is the largest in the South West of Western Australia. The river system rises in a series of salt lakes and broad saline flats near Dumbleyung in the Wheatbelt, and drains a large area of the Great Southern Region. The drainage system becomes a clearly defined river at Boyup Brook. It then passes through Bridgetown, Balingup, Nannup and Alexandra Bridge before meeting the Southern Ocean at the entrance to Hardy Inlet near Augusta.

The Blackwood River passes through the Blackwood Groundwater Area from Nannup to Molloy Island.

The value of the Blackwood River

Originally, the Blackwood River was fresh enough to supply water for domestic uses to the towns along its route. Clearing of the Great Southern and Wheatbelt lands for agriculture has made the river flows from the upper catchment too salty for this purpose. Although the water quality is no longer suitable for domestic supplies, the Blackwood River from Boyup Brook to the Southern Ocean at Augusta is attractive scenically, important for wildlife conservation and is valued for recreation and cultural activities.

It is vital that this major waterway is used and managed wisely for the contribution it makes to the natural environment and our lifestyle. We need to be able to protect the Blackwood River for the benefit of future generations.

The lower Blackwood River

Understanding the Blackwood River system

We are fortunate in that we already have a lot of existing knowledge about the Blackwood River.

There are three major gauging stations on the river within the Blackwood Groundwater Area – one at Hutt Pool (43 km upstream from Molloy Island), one at Darradup (96 km) in the middle of the Blackwood Plateau and one at Nannup (133 km). The gauging station at Darradup is located near the area where the bed of the Blackwood River intersects with outcrops of the South West Yarragadee aquifer.

Studying records of river flows and water quality measured at these points over many years provides a good basic understanding about how the river behaves in response to seasonal variations, changes in land use and changes in groundwater behaviour.

Water quantity and quality in the Blackwood River

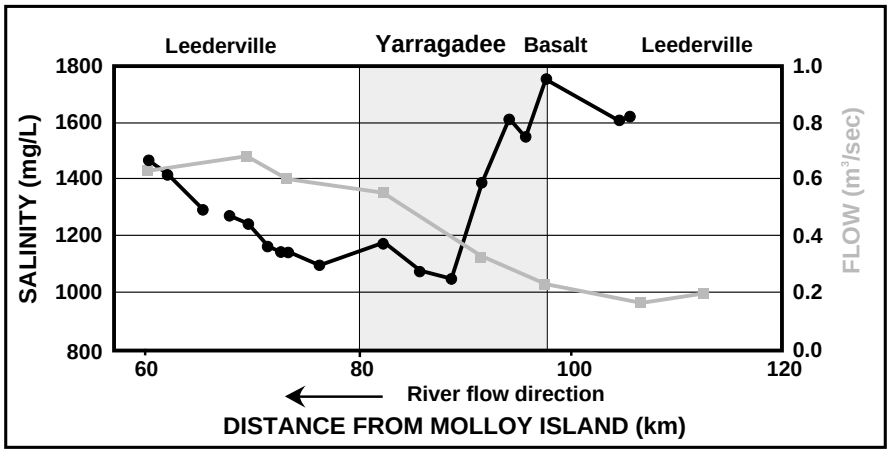
At the point where the Blackwood River enters the Blackwood Groundwater Area at Nannup, the river flows are saline to brackish in quality – about 5,000 mg/L Total Dissolved Salts (TDS) was recorded in early winter 2003. Most of the flow occurs in the winter months, with very small summer flows. Downstream from Nannup, the river channel is deeply incised into the Blackwood Plateau, with the undulating surface of the Plateau being about 80 m above the river bed. Through this area down as far as Alexandra Bridge, the river channel intersects sediments of the Leederville and South West Yarragadee aquifers.

Groundwater discharge into the Blackwood River and its tributaries

Both aquifers discharge fresh water into the river system throughout the year. An estimated 10 to 20 GL/year from the South West Yarragadee aquifer enters the Blackwood River about 20 km west of Nannup. This forms only a small proportion of winter flows, but makes up the majority of the summer flows in the Lower Blackwood River. Salinity levels and river flows in the graph below for March 2003 show that the river flow increases as it passes through

the South West Yarragadee and the salinity falls from about 1,750 mg/L to 1,100 mg/L TDS over this stretch of the river.

Smaller volumes of water from the Leederville aquifer enter the tributaries of the Blackwood River in this area. These are locally important for maintaining flows in streams such as St John's Brook.



Blackwood River - flow and salinity

Current investigations

Current investigations will improve our understanding about how the Blackwood River interacts with the Leederville and South West Yarragadee aquifers. These investigations are tackling two issues.

One study into the 'Groundwater Dependent Ecosystems (GDEs)' on the Blackwood Plateau is looking at the importance of fresh water discharge from the South West Yarragadee in maintaining riparian and aquatic environmental values along the Lower Blackwood River. This study, due to be completed in October 2003, will define 'Environmental Water Requirements (EWRs)' for the wetlands and waterways on the Blackwood Plateau.

Another study is investigating the quantity of run-off from areas underlain by the Leederville aquifer into tributaries of the Blackwood River. The approach involves using rainfall records, and stream flows from a gauging station on St John's Brook to build a simulation model that can be used to predict surface stream flow for any similar waterway in the area. This model will be used to predict flows for Rosa Brook based on historic rainfall records. The difference between predicted runoff from similar catchments and recorded stream flows for Rosa Brook will allow estimation of how much water from the brook is recharged to the South West Yarragadee aquifer.

Complementary investigations into groundwater behaviour, aquifer recharge and groundwater quality are described in other *FactSheets* in this series.

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