HYDROLOGY

GROUNDWATER TRENDS IN THE NORTHERN AGRICULTURE REGION

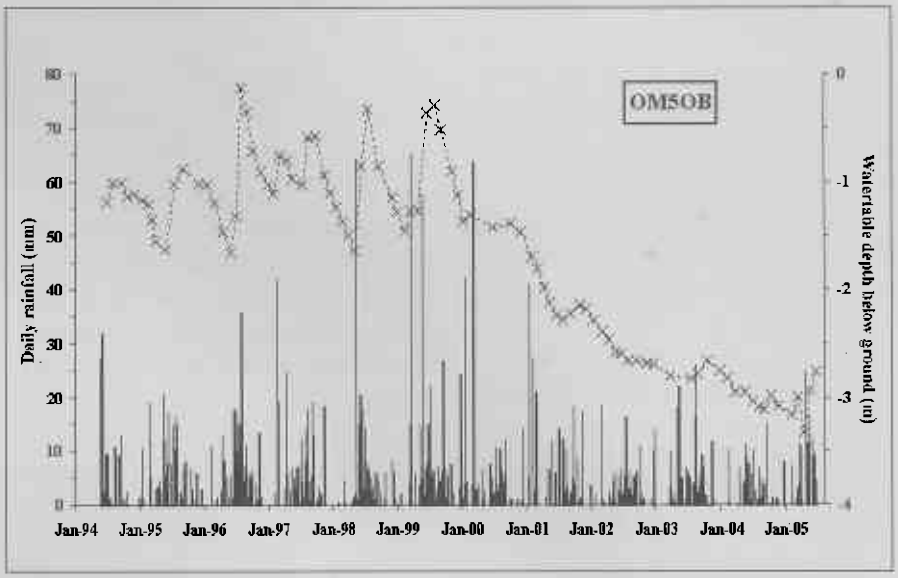
Russell Speed

The past five dry years have had a significant impact on groundwater trends throughout much of the Northern Agricultural Region. The only area where rising groundwater trends persist is within cleared portions of the Perth Basin. Elsewhere, including the northeastern wheatbelt, most groundwater levels are either similar to where they were a decade ago or in some cases, significantly lower.

Reduced rainfall and a reduction in the number of significant rainfall events have resulted in reduced recharge. This effect becomes more pronounced to the north and east of the Northern Agricultural Region. It is less significant to the south and west, for example at Dandaragan.

Where there are reasonable topographic gradients, such as occur in Chapman Valley, many groundwater levels have been observed to significantly decline over the last five years. Groundwater contributes to base flow in many of the streams in this region. As groundwater has drained to the streams, reduced recharge has failed to maintain watertables and declining groundwater trends are observed.

In flat wheatbelt valleys groundwater levels have been significantly lowered by evaporation. The figure shows the watertable hydrograph for an observation bore in a wheatbelt valley about 10 km northwest of Morawa. The valley was severely salt affected and had not been cropped for at least a decade before the bore was installed. Groundwater quality at this site is about 4000 millisiemens per metre (about two thirds seawater). For the first six years of monitoring (1994 to 2000) the watertable seasonally fluctuated between the surface and about 1.5 metres depth, typical of saline valley floors. From 2000 the watertable declined to a depth of just over three metres below the surface. The improved seasonal conditions in 2005 have resulted in some recharge and upward kick at the far right of the graph. The valley is very flat and there are no drains. The decline in the watertable is due to evaporative loss of shallow groundwater during a particularly dry period. It appears the watertable has approached a limiting depth of evaporation of about three metres.



Watertable hydrograph for observation bore OM5OB located in a typical wheatbelt valley floor affected by secondary salinity near Morawa. Columns show daily rainfall at Morawa.

Evaluation of salinity management options (e.g. drains or trees) needs to demonstrate management outperforming simple evaporation in a reduced rainfall, low recharge environment. Such evaluation requires sufficient data highlighting the importance of maintaining monitoring programs.

The other implication of the groundwater trends observed, providing an even stronger imperative for monitoring, is the impact on groundwater resources and groundwater dependent ecology. If the drier conditions persist, or worse, our climate continues to become drier, salinity may fade as a priority, as far more serious consequences emerge.

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Keep up with the monitoring!

It is really important that, if you have a monitoring bore installed, you keep up with regular recording of water levels. Only with long-term records can we start to understand what effect our management actions are having.