Watertable Trends and Graphs

Chris Henschke– Senior Consultant Hydrogeology
PIRSA Rural Solutions

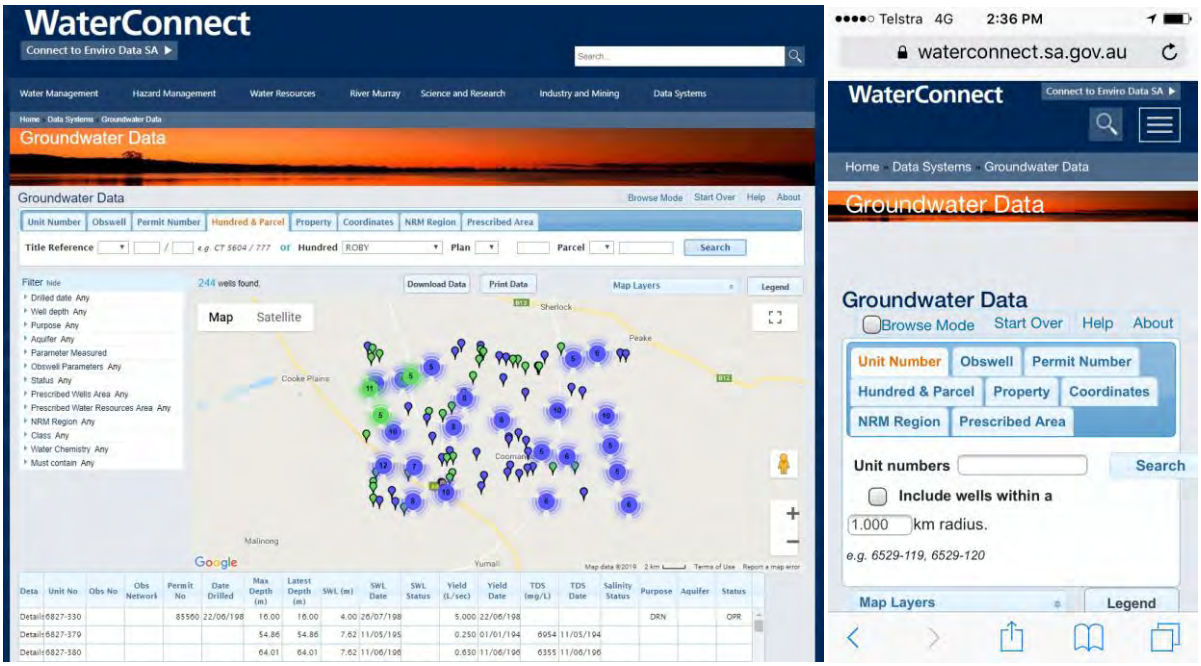
Background

The groundwater monitoring localities focussed on in this report are:

Location	Watertable Trend Graphs Appendices	PAGE
1. Coomandook-Cooke Plains	Coomandook – Cooke Plains Site Location Information & Hydrographs	
2. Coomandook Landcare Network	Coomandook Landcare Network	
3. Meningie East	Meningie East Site Location Information and Hydrographs	
4. Tintinara West / Colebatch	Tintinara West Hydrographs	

Water level data is available on the Department of Environment and Water (DEW) website. The address is www.waterconnect.sa.gov.au. The Obswell tab on the Groundwater Data page can be used to find records for each water well.

Each site has an Obswell Number based on the Hundred in which the bore is located (e.g. SHK003) and may have a field number that was used to identify the site when the bore was being drilled.



Screen shots of the Water Connect Groundwater Data pages – computer and smart phone

Obswell sites were selected in each focus area based on the reliability of the record. Unfortunately there is very limited data available in the Tintinara West / Colebatch area.

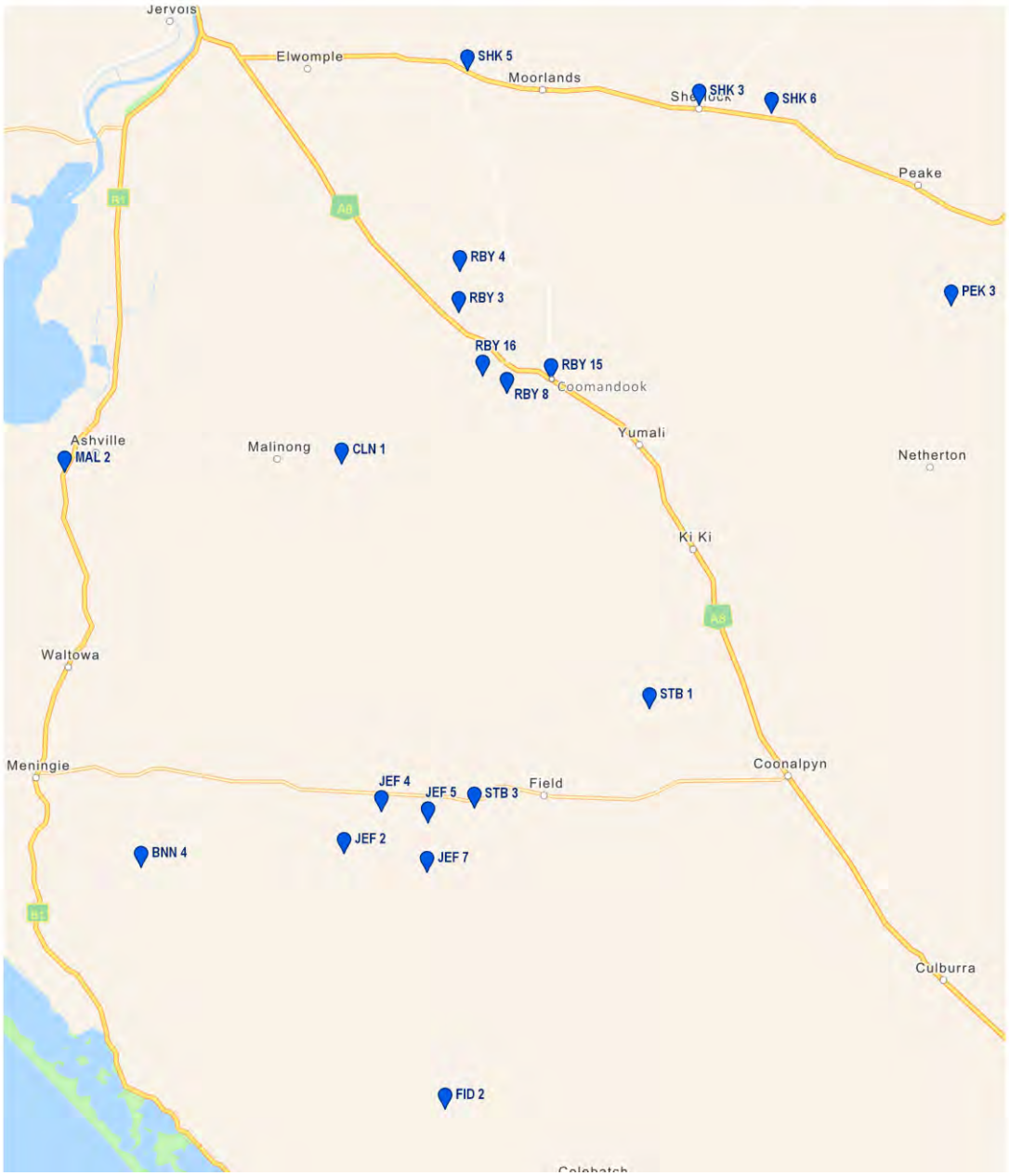
In the northern areas, the shallow wells are completed in the Bridgewater Formation (**Qpcb** unconfined aquifer). The formation is described as an aeolian calcarenite with palaeosol horizons often capped with calcrete. In southern areas, shallow wells are completed in the Padthaway Formation.

Watertable trends fall into the following categories:

- Continuously rising trend
- Episodic rise (rises and falls, but each rise is higher than the previous one)
- Seasonal trend (strong seasonal peaks and troughs which correlates with winter rainfall and summer evaporative discharge)
- Static / stable (has rises and falls but no overall change in the longer term)
- Falling trend

The data is summarised over the next several displays graphs of water level with time (groundwater hydrographs) for observation wells installed in the unconfined aquifer for each of the three focus areas, against rainfall.

Location of Watertable Monitoring Wells, Coomandook / Meningie below shows the location of 21 obswell sites that were selected based on the continuity of water level records over a reasonable period of time.

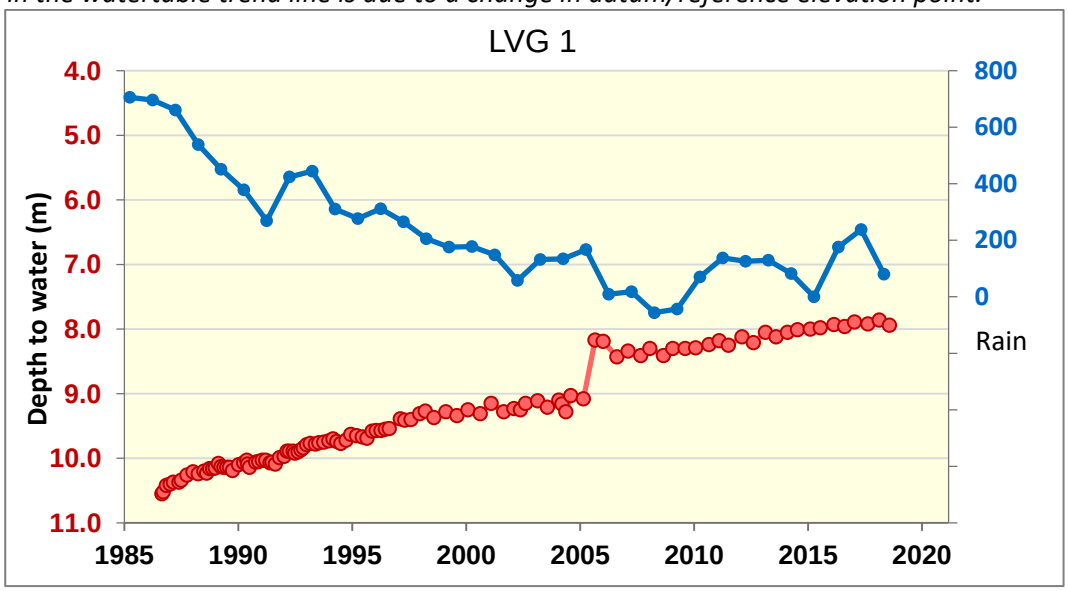


Results

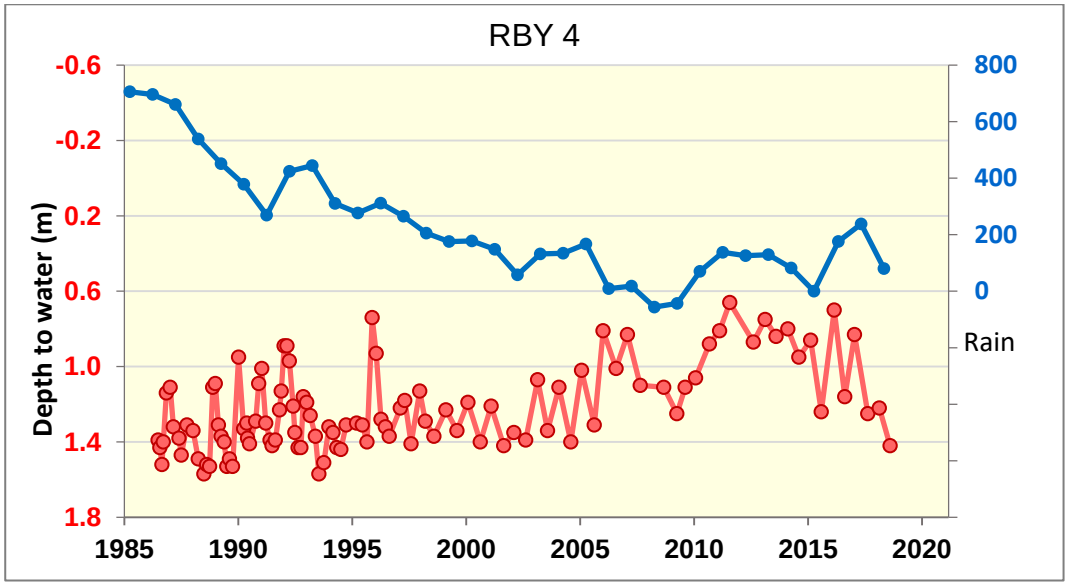
The patterns of groundwater trends can be related to landscape, topography, and elevation. Rising watertables are often associated with higher elevation land while fluctuating watertables (seasonal highs and lows) can be correlated with rainfall on flat lower lying land.

Reading the Hydrographs:
The top blue line in each graph is the rainfall trend.
The bottom red line in each graph is the depth to watertable trend line.

LVG 1 below is an example of a rising watertable under elevated land. *The sudden'blip' in the watertable trend line is due to a change in datum/reference elevation point.*



RBY 4 below is an example of a seasonally fluctuating water table on low lying land

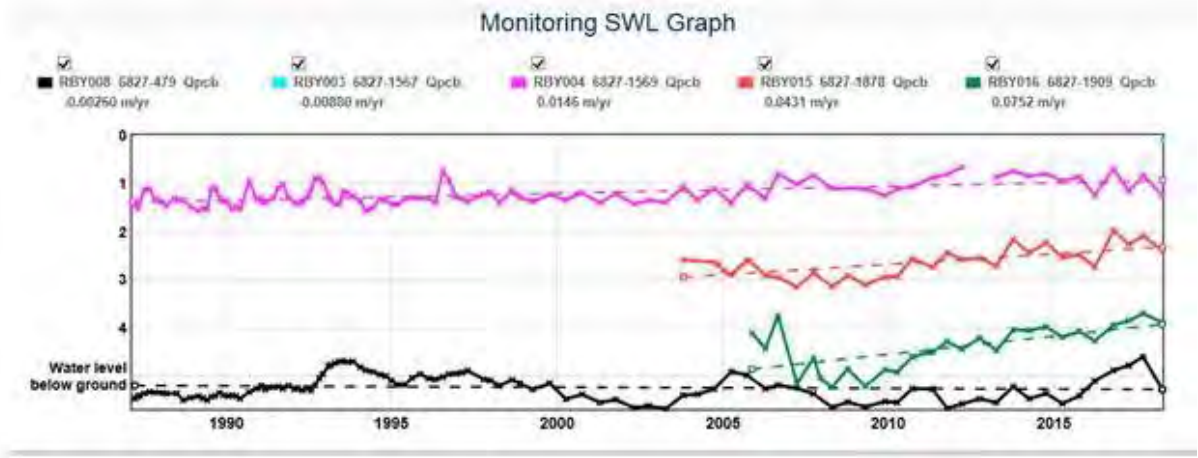


Discussion

The hydrographs of rainfall vs depth across the project area are shown in **Appendix 4**. These graphs show that over a large area the water level in shallow unconfined system is highly responsive to winter recharge, particularly in wetter years and where the groundwater is relatively shallow. This indicates that the recharge process is very local in nature (i.e. in the immediate vicinity area surrounding salinity hotspots).

Short term water level trends are superimposed on longer term trends. For example the watertable rose by up to 1 m following high rainfall episodic events in 2010/11, 2013 and 2016. In the longer term (since 1987), there has a general rising trend of +0.002 to +0.015m/year in the unconfined aquifer in this region.

Below: Graph illustrating long term rising trends



Of greatest relevance to the sudden appearance of dryland salinity in 2018 is the rapidly rising watertable trend from 2015/16 until late spring of 2017. This brought the watertable at many sites to its highest recorded level. The large episodic rainfall events as noted appears to coincide with the sudden increase in salinised area in 2018.

RBY 8 shows an example of the highest ever water level in 2017 following record rainfall in 2016