
PEAKE, ROBY AND SHERLOCK PWA

CONFINED AQUIFER

Groundwater Level and Salinity Status Report

2013



Government of South Australia
Department of Environment,
Water and Natural Resources

Department of Environment, Water and Natural Resources
25 Grenfell Street, Adelaide
GPO Box 1047, Adelaide SA 5001

Telephone	National	(08) 8463 6946
	International	+61 8 8463 6946
Fax	National	(08) 8463 6999
	International	+61 8 8463 6999
Website	www.environment.sa.gov.au	

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2013 SUMMARY



The Peake, Roby and Sherlock Prescribed Wells Area (PWA) is located about 120 km southeast of Adelaide and is underlain by sedimentary aquifers of the Murray Basin. It is a local-scale groundwater resource with a small number of irrigators. Groundwater is prescribed under South Australia's *Natural Resources Management Act 2004* and a Water Allocation Plan provides for the sustainable management of the groundwater resources.

The Peake, Roby and Sherlock PWA has two distinct aquifers – an unconfined aquifer and a confined aquifer. Almost all licensed groundwater extractions in the PWA are from the confined aquifer, as such it is the focus of this report.

The confined aquifer comprises the Buccleuch Group and Renmark Group formations. The Buccleuch Group consists of a consolidated bryozoal limestone or "coral" that lies at a depth of 90–100 m below the ground and

varies in thickness from 5–25 m. This coral layer begins to merge laterally with the Renmark Group formation in the eastern area of the Peake, Roby and Sherlock PWA. The Renmark Group is made up of interbedded sands and clays and there are very few bores which extract from this aquifer in the PWA. As the Buccleuch and Renmark Group aquifers are confined, they are not recharged by local rainfall. The primary recharge source is the lateral inflow of groundwater into the Peake, Roby and Sherlock PWA from south-western Victoria.

Metered groundwater extractions from the confined aquifer (primarily from the Buccleuch Group) of the Peake, Roby and Sherlock PWA totalled 1393 ML in the 2012–13 water-use year, which represents 12% increase from the previous water-use year (Fig. 1). The volume of extraction from the confined aquifer during 2012–13 equates to 64% of the total allocation limit of 2168 ML for the Peake, Roby and Sherlock PWA.

The climate of the Peake, Roby and Sherlock PWA is characterised by hot, dry summers and cool to cold, wet winters. Data from the Peake rainfall station (number 25513) was chosen for the analysis of rainfall in 2013 (Fig. 2). The long-term monthly average rainfall is graphed in orange against the total monthly rainfall recorded. The monthly rainfall data indicates that in 2013, there was below average rainfall for nine out of the 12 months, with a period of below average rainfall from January to April and August to December. A notable feature is the June rainfall, which was 85 % more than the long-term average. The large depth to the watertable (40–60 m) means that there is little direct correlation between groundwater levels and variations in rainfall. However, there can be an indirect correlation, with lower rainfall resulting in increased groundwater pumping, which in turn may lead to a decline in groundwater levels. Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at www.longpaddock.qld.gov.au/silo.

Considerable seasonal variations in pressure levels of the confined aquifer have been observed since large-scale irrigation practices commenced in 2004. The degree of drawdown decreases with distance from the areas of irrigation. The level of drawdown increased from 2004 to 2010 and appeared to stabilise in 2011 and 2012, reflecting reduced rates of extraction. In 2013, there were 15 observation wells with sufficient data to determine the changes in recovered water levels from 2012 to 2013 (Fig. 3). Rises in the maximum recovered groundwater level ranging from 0.11 to 1.85 m were recorded in four observation wells. Decreases ranging from 0.02 to 0.82 m were recorded in nine observation wells, and two wells recorded no change in maximum recovered levels. The median change in groundwater levels from 2012 to 2013 was a decrease of 0.07 m.

Rising salinity in the western portion of the confined aquifer is identified as the greatest risk resulting from irrigation extraction. The aquifer is highly saline to the west, and lowered water levels in the Peake area arising from groundwater extraction may lead to saline groundwater being gradually mobilised towards the east. Measurements taken in 2013 indicate, however, that the salinity

levels have not noticeably deteriorated: six out of ten observation wells that have sufficient data for both 2012 and 2013 recorded a decrease in salinity ranging from 18 to 308 mg/L, and the remaining wells experienced a slight increase (less than 28 mg/L). Several of the wells experiencing falling salinity levels are located to the west of the PWA (eg. RBY 20, 21, 22). Salinity levels were measured in 12 wells in 2013, with salinities varying from below 2000 mg/L around Peake to over 4000 mg/L in the western areas south of Sherlock (Fig. 4).

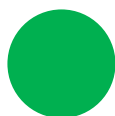
The Peake-Roby-Sherlock PWA Water Allocation Plan has identified resource condition limits for the confined aquifer from which almost all irrigation extractions occur. These limits are designed to give early warning of unfavourable trends in water levels and salinity that may affect other users of the resource.

Water levels: As stated in the Water Allocation Plan, the rolling three-year average of the annual maximum drawdown and recovery levels, measured in at least 50 % of designated observation wells, should not fall below the maximum drawdown or recovery thresholds. The rolling three-year average maximum recovery water levels, referring to the highest level of recovery during the non-irrigation season (usually in August), are above the thresholds in all designated observation wells (Fig. 5). This indicates that the resource condition limits have not been reached or exceeded. Similarly, the rolling three-year average maximum drawdown water levels recorded during the irrigation season (usually Feb–March) are also above the thresholds in all designated wells (Fig. 6).

Salinity: The rolling three-year average of the maximum groundwater salinity, measured in at least 50% of the designated observation wells, should not rise by more than 5 % from the baseline salinity threshold. All designated wells have recorded an average change in salinity of less than 5 % (Fig. 7). Observation well RBY017 does not have sufficient salinity data to allow the calculation to be made at this time.

The Peake, Roby and Sherlock PWA confined aquifer has been assigned a green status for 2013:

2013 STATUS



“No adverse trends, indicating negligible risk to the resource”

This means that groundwater status was observed to be stable (i.e. no significant change) or improving over the reporting period. Continuation of these trends favours a very low likelihood of negative impacts on beneficial use (i.e. drinking water, irrigation or stock watering) of the resource. The 2013 status for the confined aquifer is supported by:

- no significant change in groundwater elevations in 2013 when compared to 2012 groundwater elevation data
- an overall decrease in groundwater salinity in 2013 when compared to 2012 salinity data.

To view the *Peake, Roby and Sherlock PWA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater dependent ecosystems, and to view descriptions for all status symbols, please the Water Resources page on [WaterConnect](#).

For further information about the Peake, Roby and Sherlock PWA, please see the Peake, Roby and Sherlock PWA *Water Allocation Plan* on the SA Murray-Darling Basin Natural Resources Management [website](#).

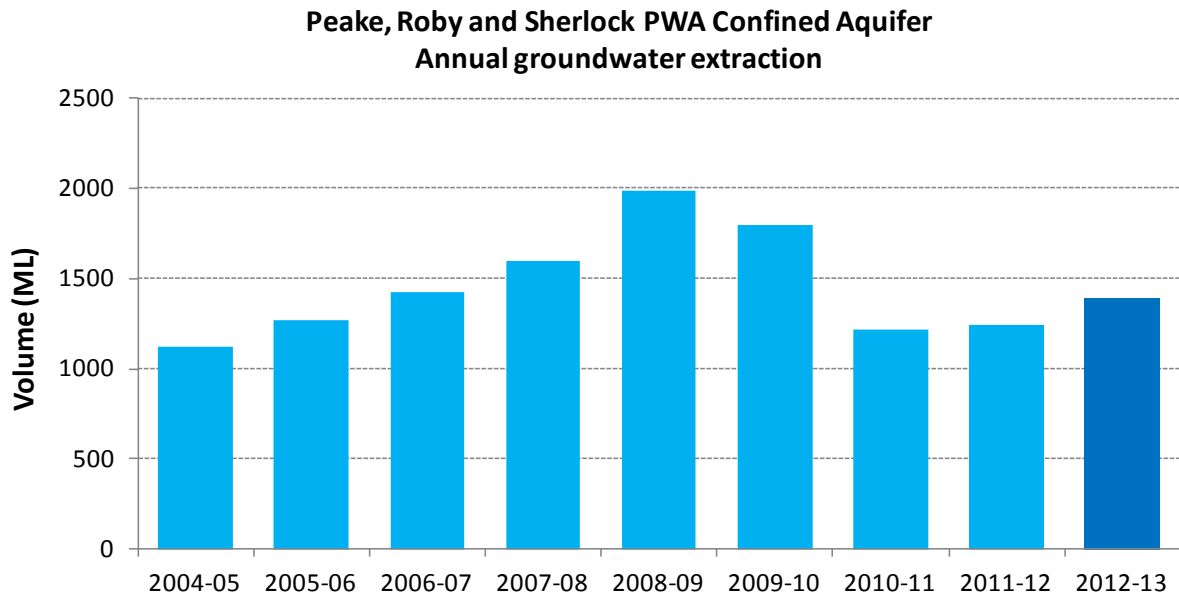


Figure 1. Historical licensed groundwater use for the confined aquifer of the Peake, Roby and Sherlock PWA

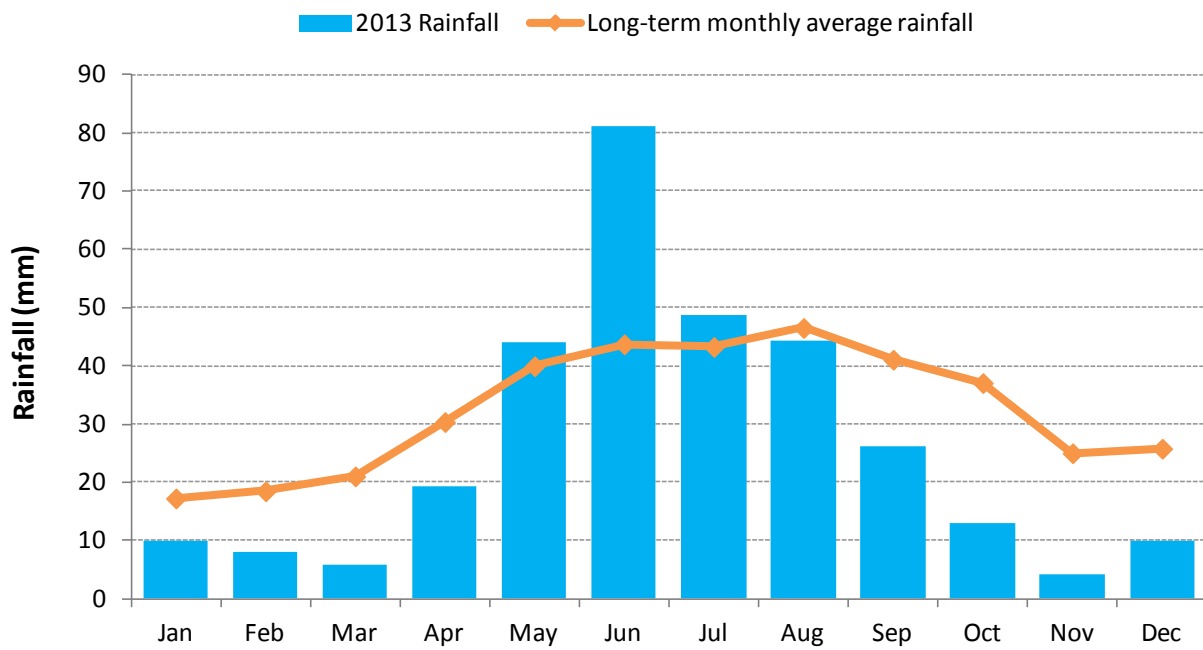


Figure 2. Monthly rainfall (mm) for 2013 and the long-term average monthly rainfall (mm) at the Peake rainfall station (number 25513) in the Peake, Roby and Sherlock PWRA

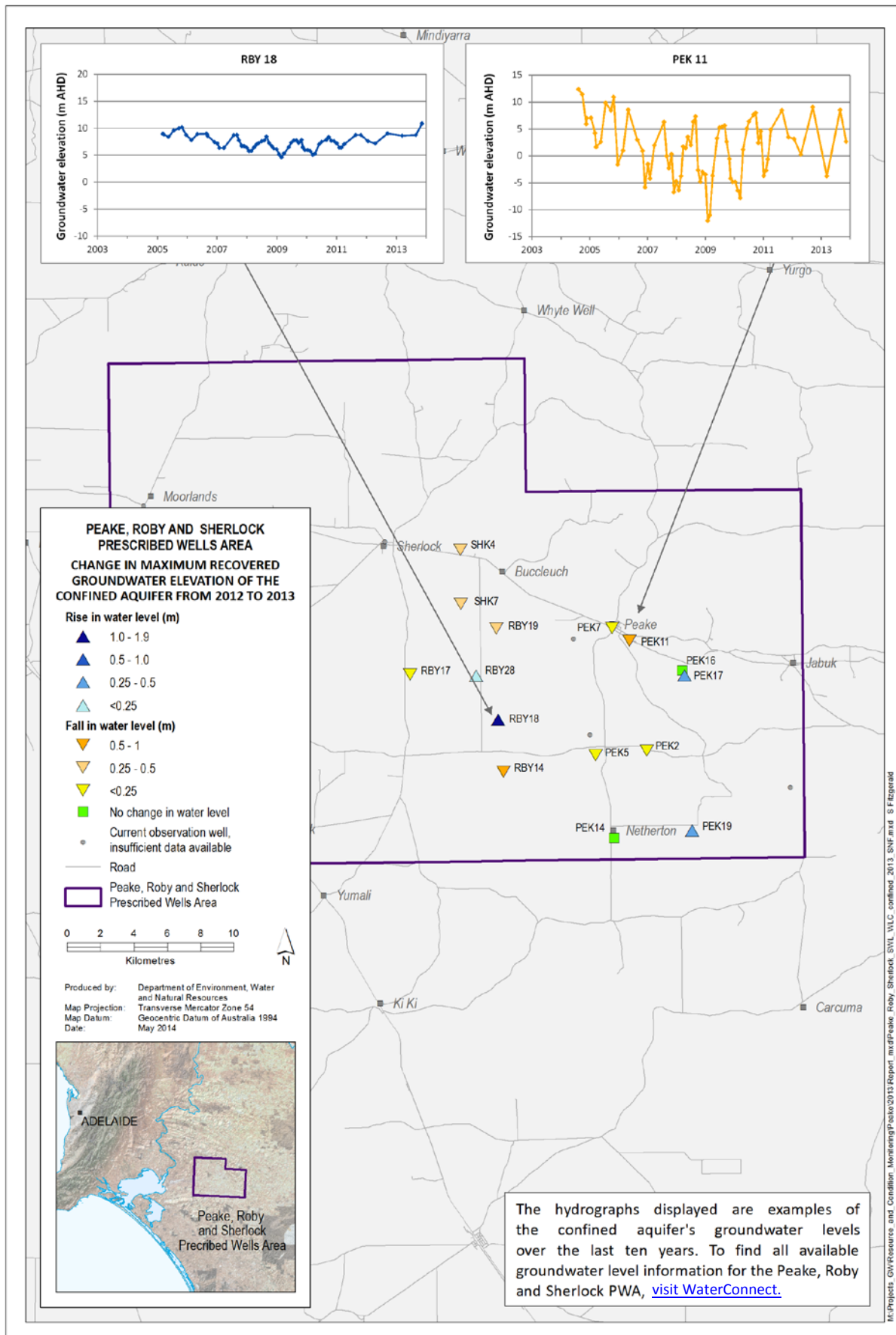


Figure 3. Overall changes in groundwater levels in the confined aquifer of the Peake, Roby and Sherlock PWA from 2012 to 2013

Peake, Roby and Sherlock PWA

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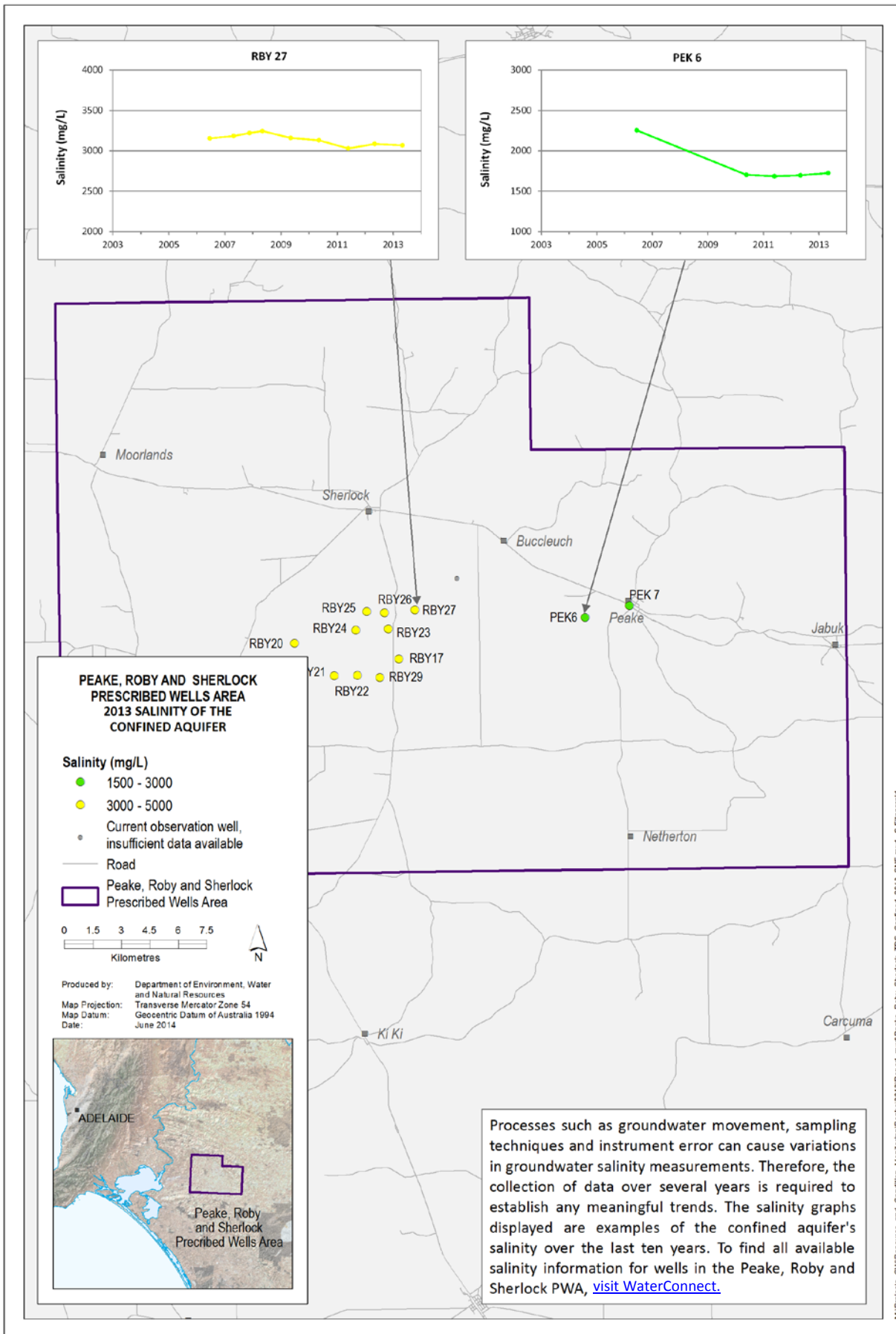


Figure 4. Groundwater salinity of the confined aquifer of the Peake, Roby and Sherlock PWA for 2013

Peake, Roby and Sherlock PWA

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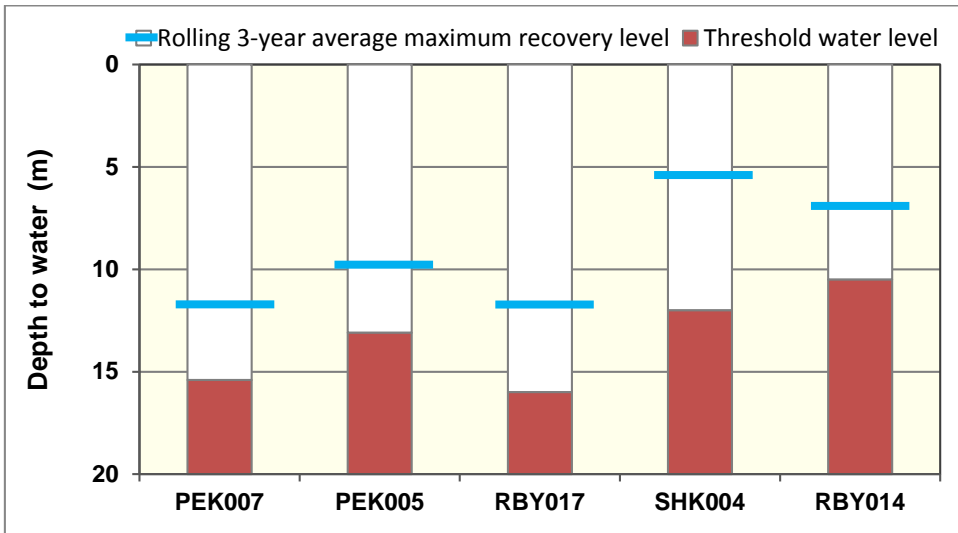


Figure 5. Maximum recovery level condition indicators

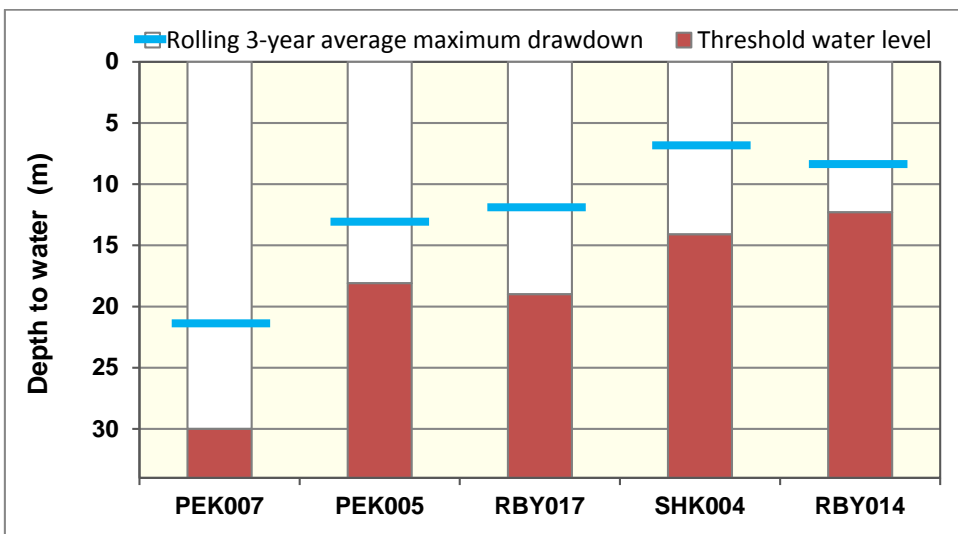


Figure 6. Maximum water level condition indicators

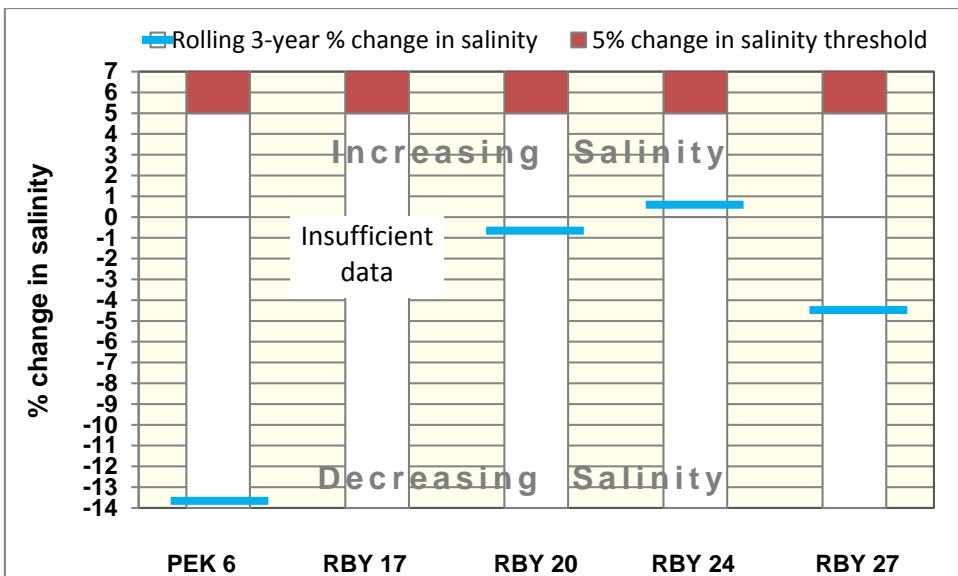


Figure 7. Salinity condition indicators