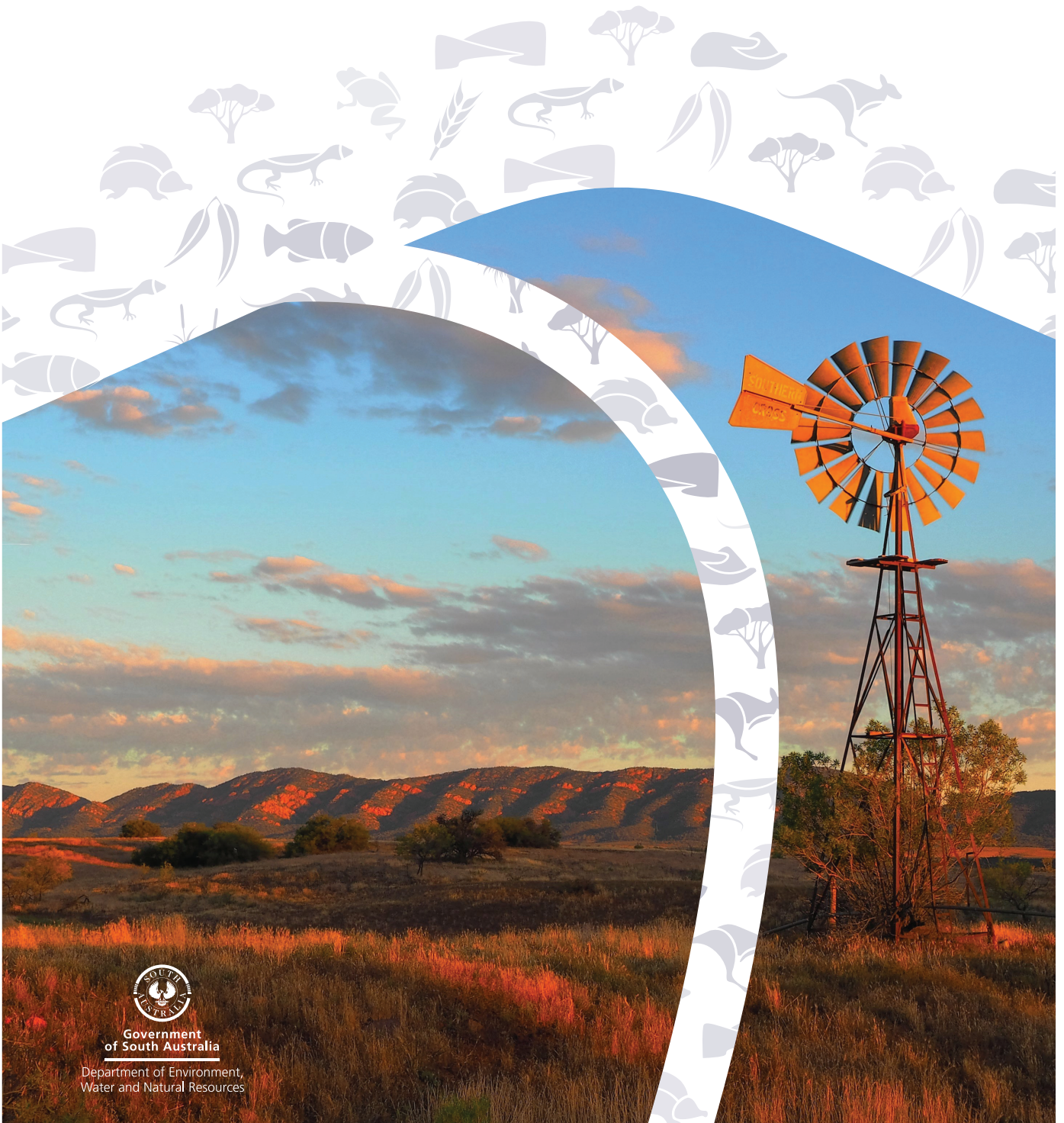


Peake, Roby and Sherlock PWA Confined aquifer

2016 Groundwater level and salinity status report



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of South Australia

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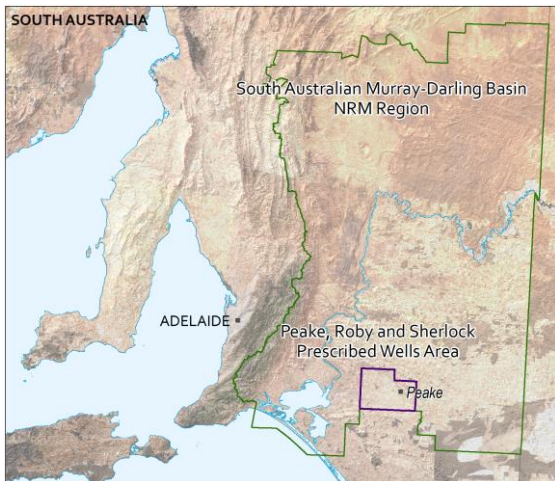
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Regional setting



The Peake, Roby and Sherlock Prescribed Wells Area (PWA) is located around 120 km south-east of Adelaide in the South Australian Murray-Darling Basin Natural Resources Management Region. It is underlain by sedimentary aquifers of the Murray Basin and is a local-scale groundwater resource used by mainly a small number of irrigators, feedlots and for public water supply. Groundwater is prescribed under the *Natural Resources Management Act 2004* (SA) and a water allocation plan (WAP) 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 are taken from the confined aquifer and 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 to 25 m. This coral layer begins to merge laterally with the Renmark Group in the eastern area of the PWA. The Renmark Group comprises interbedded sands and clays and there are very few wells that extract from this aquifer. As the Buccleuch and Renmark Group aquifers are confined, they are not recharged by local rainfall. The primary source of recharge is the lateral inflow of groundwater from aquifers located in south-western Victoria.

Despite being a confined aquifer that does not receive direct recharge from incident rainfall, the intensity and timing of local rainfall and subsequent extraction practices can have an effect on groundwater levels. For example, if the region experiences above-average rainfall during typically dry summer months, this could result in less groundwater being extracted for irrigation and consequently there may be a rise in groundwater levels. Conversely, below-average rainfall might result in increases in irrigation extraction and groundwater levels may fall.

2016 Status

The confined aquifer of the Peake, Roby and Sherlock PWA has been assigned a green status for 2016:

2016 Status



Positive trends have been observed over the past five years

The 2016 status for the confined aquifer is based on:

- all monitoring wells show a five-year trend of rising groundwater pressure levels
- over the past five years, all monitoring wells show stable groundwater salinities.

Rainfall

The Peake rainfall station (BoM Station 25513) recorded 314 mm of rainfall in the 2015–16 water-use year. This is 19% less than the long-term average annual rainfall (1900–2016) of 386 mm and just below the five-year average annual rainfall (2011–16) of 324 mm (Figs 1 and 2). In the 2015–16 water use year, March recorded rainfall which is markedly greater than their respective long-term monthly average, while September, October, December, and April recorded considerably below their respective long-term monthly average (Fig. 2). A trend of decreasing rainfall is evident over the long term, particularly towards the eastern and southern boundaries of the PWA (Figs 1 and 2).

Water use

In 2015–16, licensed extractions from the confined aquifer totalled 86¹ ML, a decrease of 46% from the previous water-use year of 160 ML and 88% below the five-year average extraction of 723 ML (Fig. 3). This reduction in the rate of extraction is due to major irrigation enterprises ceasing operations over the past few years. The volume of extraction from the confined aquifer during 2015-16 equates to only 4% of the total allocation limit of 2168 ML for the Peake, Roby and Sherlock PWA.

Groundwater pressure levels

Recent reductions in rates of groundwater extraction (Fig. 3) have resulted in a recovery of groundwater pressure levels over the past three years. In the five years to 2016, all monitoring wells (14 wells) show a trend of rising groundwater pressure levels (Fig. 4), at rates which range between 0.05 and 1.93 m/y, with a median rise of 0.58 m/y.

Groundwater salinity

Rising salinity resulting from irrigation extraction had been identified as the greatest risk to the quality of the groundwater resource. However, recent reductions in rates of extraction (Fig. 3) have resulted in stabilising salinities (Fig. 6). In 2016, salinities range from 2995 to 4640 mg/L (from 10 wells) (Fig. 5). In the five years to 2016, all nine monitoring wells show stable salinities (Fig. 6).

Resource condition indicators

The WAP for the Peake, Roby and Sherlock PWA stipulates resource condition indicators that apply to the confined aquifer. These limits are designed to give early warning of trends in water (pressure) levels and salinity that may adversely impact users of the resource.

Water levels: As stated in the WAP, 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. In all designated observation wells (Fig. 7), 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. Similarly, in all designated wells (Fig. 8), the rolling three-year average maximum drawdown water levels shown during the irrigation season (usually February–March) are also above the drawdown thresholds. This indicates that the resource condition limits have not been reached or exceeded. Observation well SHK004 has only one year of data to allow the calculation to be made at this time.

¹ The licensed groundwater use for the 2015–16 water-use year are based on the best data available as of March 2017 and may be subject to change, as some extraction volumes may be in the process of being verified.

Salinity: As stated in the WAP, 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. 9) which indicates that the resource condition limits have not been reached or exceeded.

More information

To determine the status of the confined aquifer in the Peake, Roby and Sherlock PWA for 2016, the trends in groundwater pressure levels and salinities over the past five years (2012 to 2016, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the [Frequently Asked Questions](#) on the *Water Resource Assessments* page on WaterConnect for more detail on the current method of evaluating the status of groundwater resources.

To view descriptions for all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view the *Peake, Roby and Sherlock PWA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page [WaterConnect](#).

To view or download groundwater level and salinity data from monitoring wells within the Peake, Roby and Sherlock PWA, please visit [Groundwater Data](#) on WaterConnect.

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

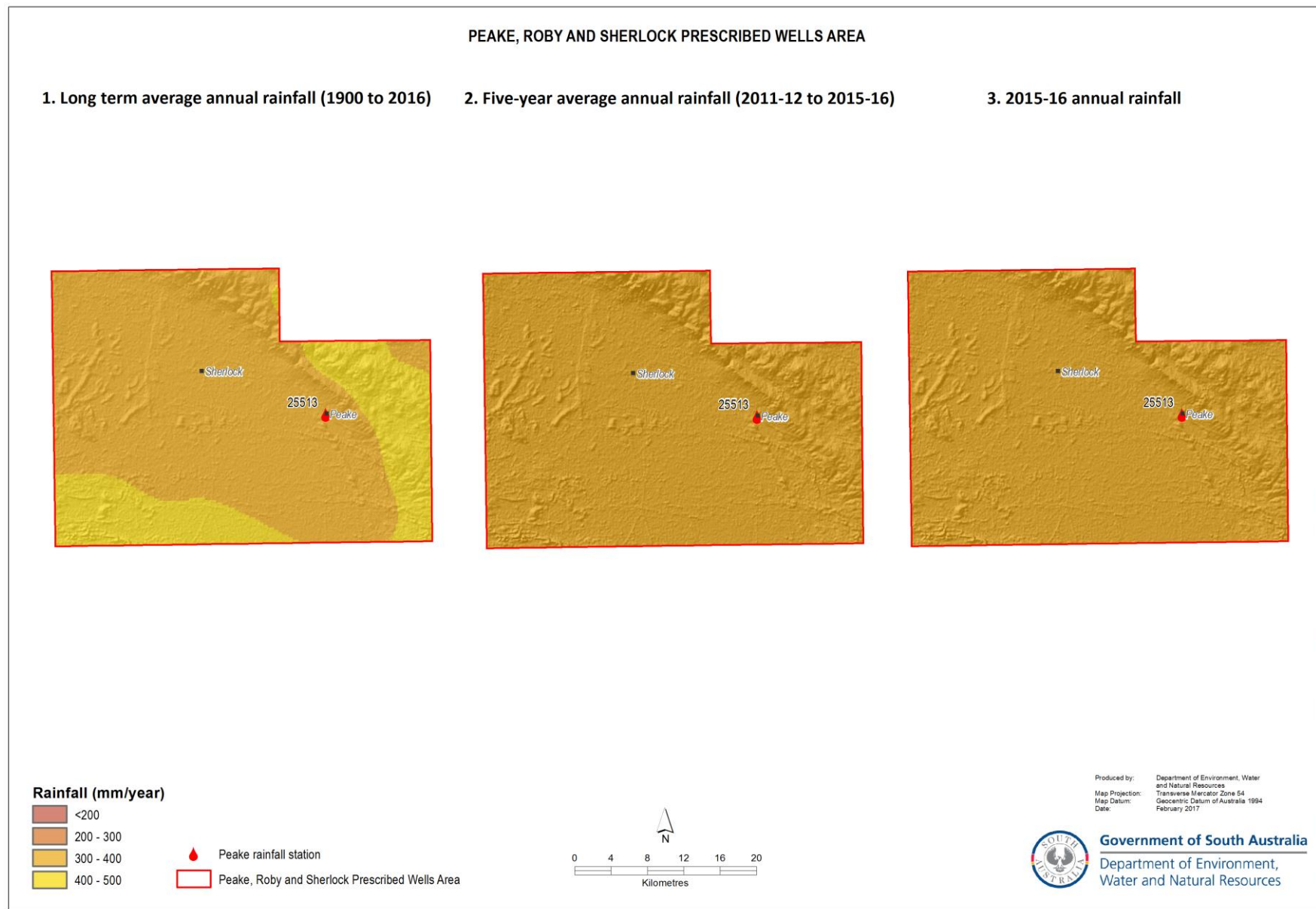


Figure 1. (1) Long-term and (2) five-year average annual rainfall and (3) annual rainfall for the 2015–16 water-use year in the Peake, Roby and Sherlock PWA²

² 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.

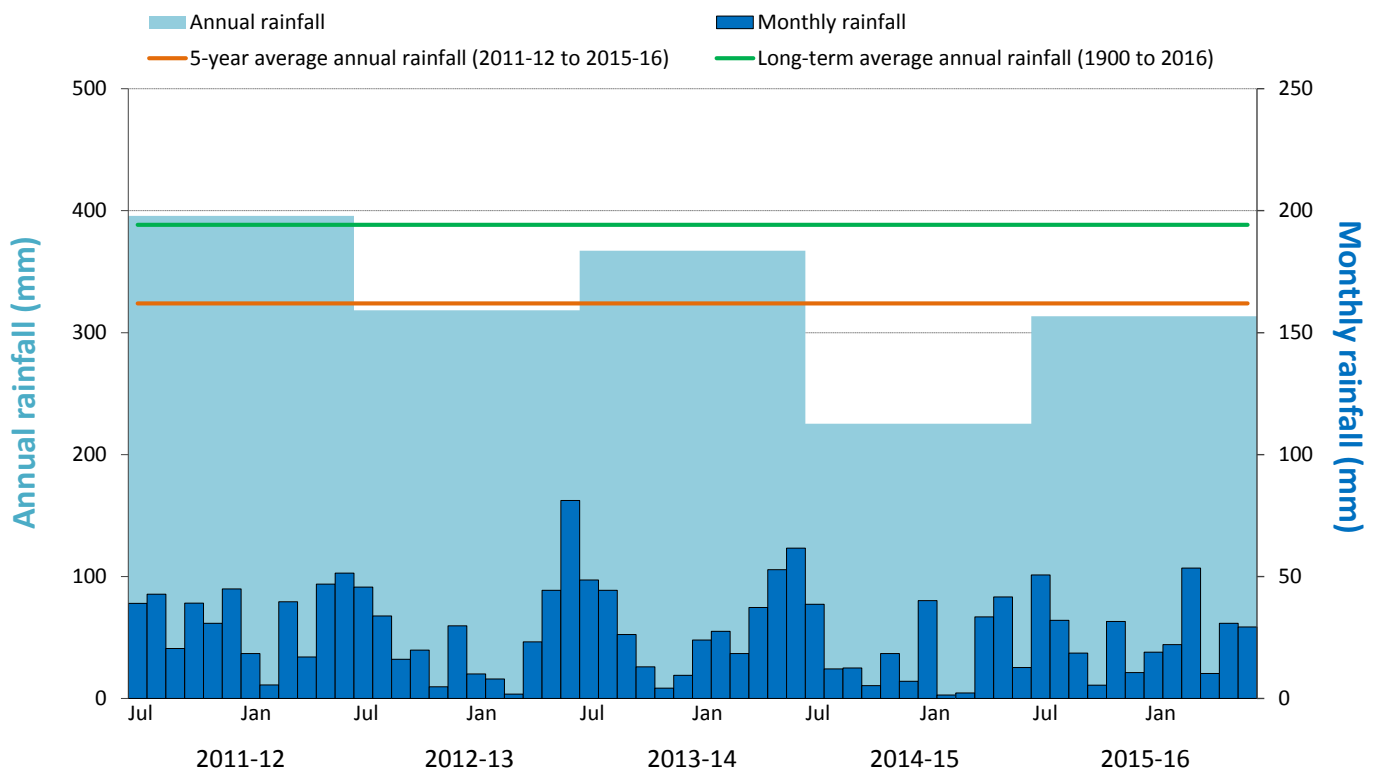


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-yearly and long-term average annual rainfall recorded at Peake (BoM Station 25513)³

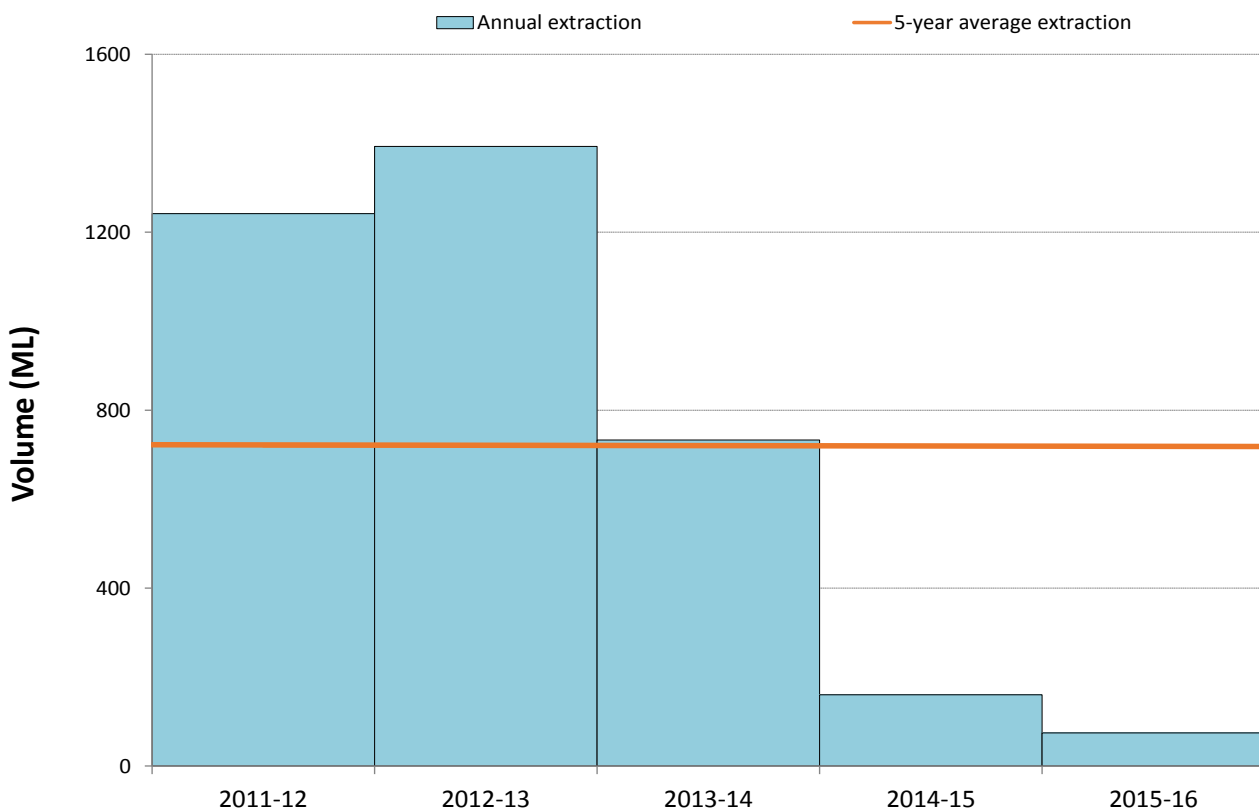


Figure 3. Licensed groundwater extraction volumes⁴ for the past five water-use years, from the confined aquifer in the Peake, Roby and Sherlock PWA

³ 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.

⁴ The licensed groundwater use for the 2015–16 water-use year are based on the best data available as of March 2017 and may be subject to change, as some extraction volumes are yet to be validated.

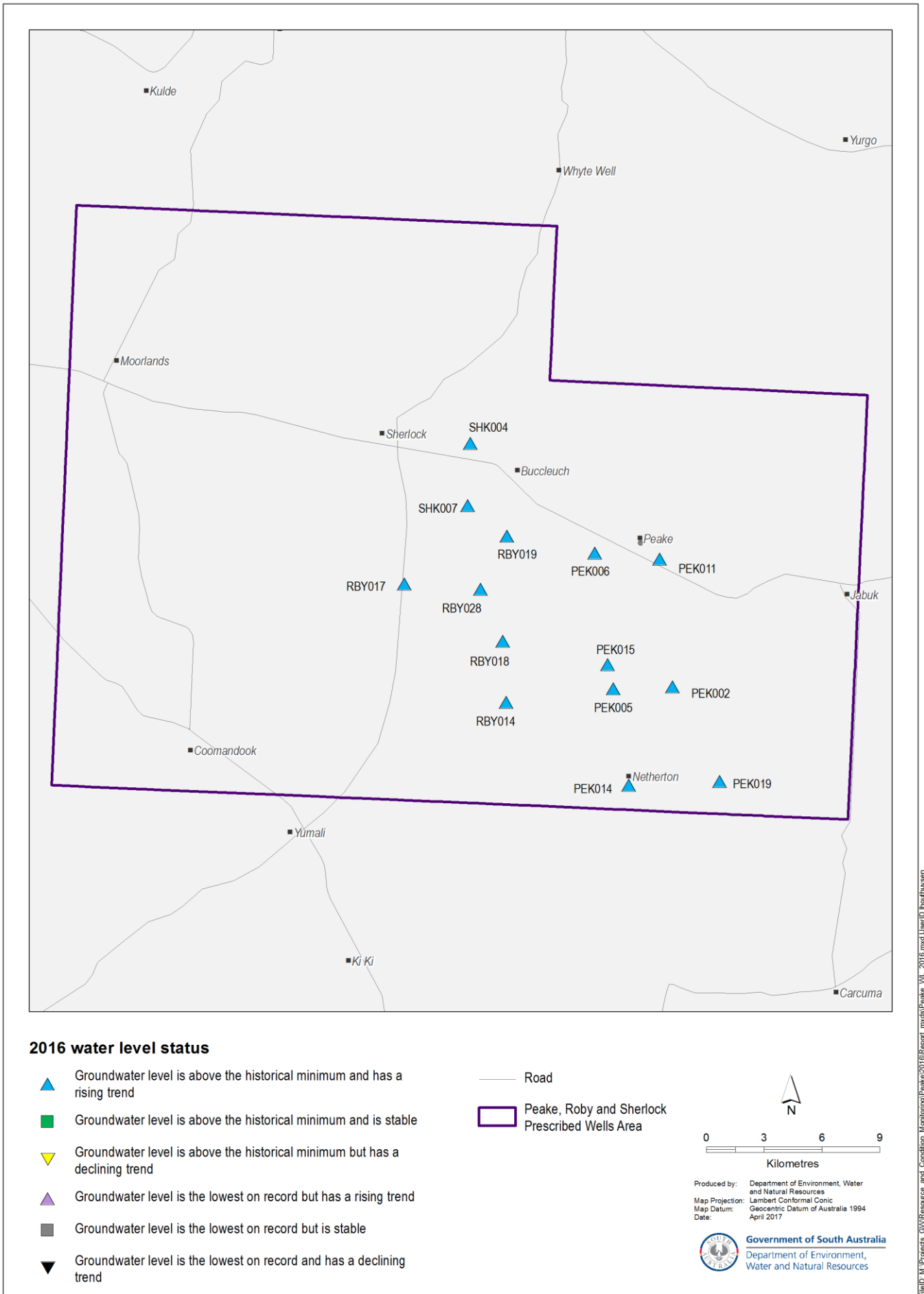


Figure 4. 2016 status of groundwater levels in the confined aquifer (Peake, Roby and Sherlock PWA) based on five-year trends from 2012 to 2016

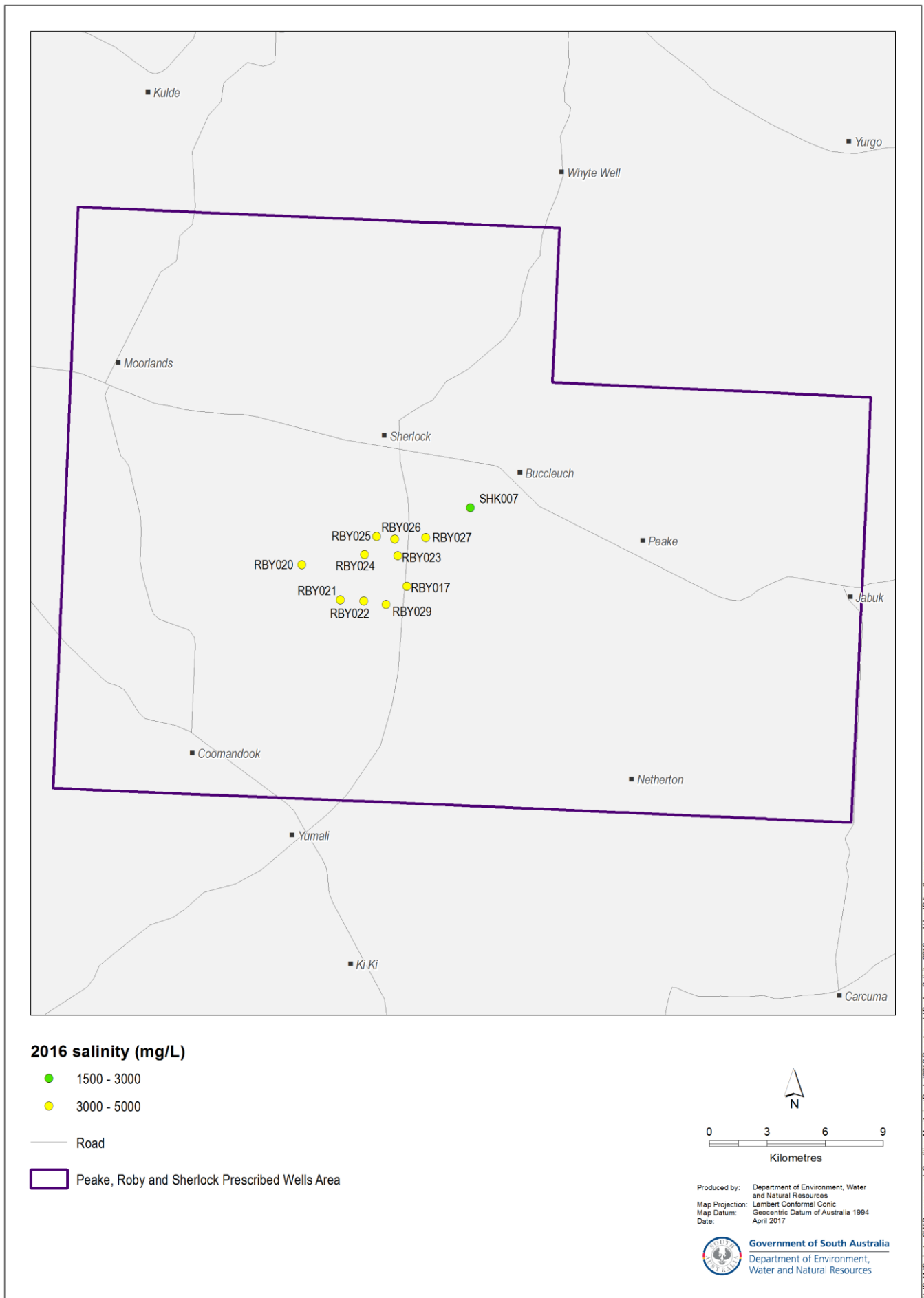


Figure 5. 2016 groundwater salinities of the confined aquifer (Peake, Roby and Sherlock PWA)

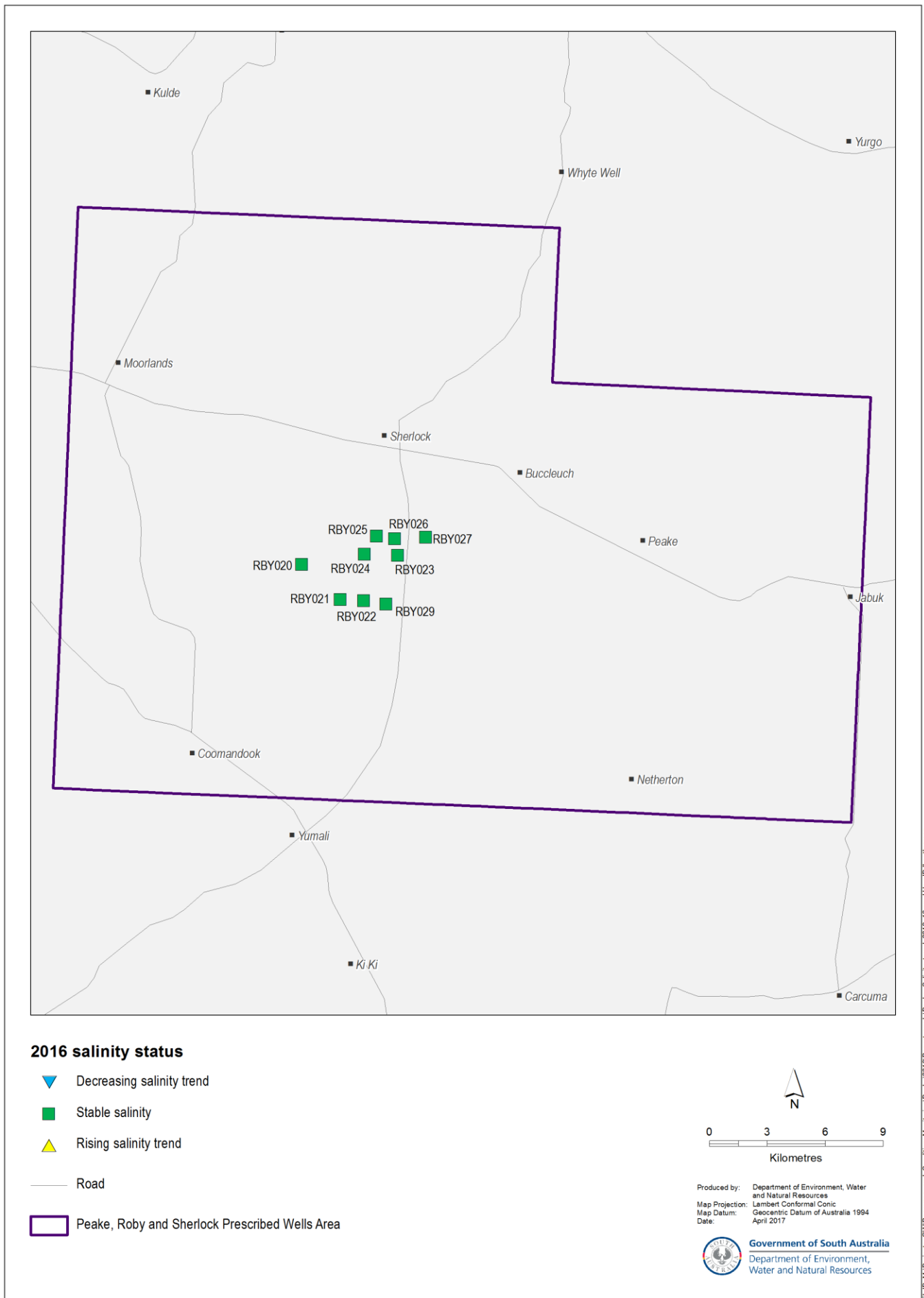


Figure 6. 2016 status of salinity in the confined aquifer (Peake, Roby and Sherlock PWA), based on five-year trends from 2012 to 2016

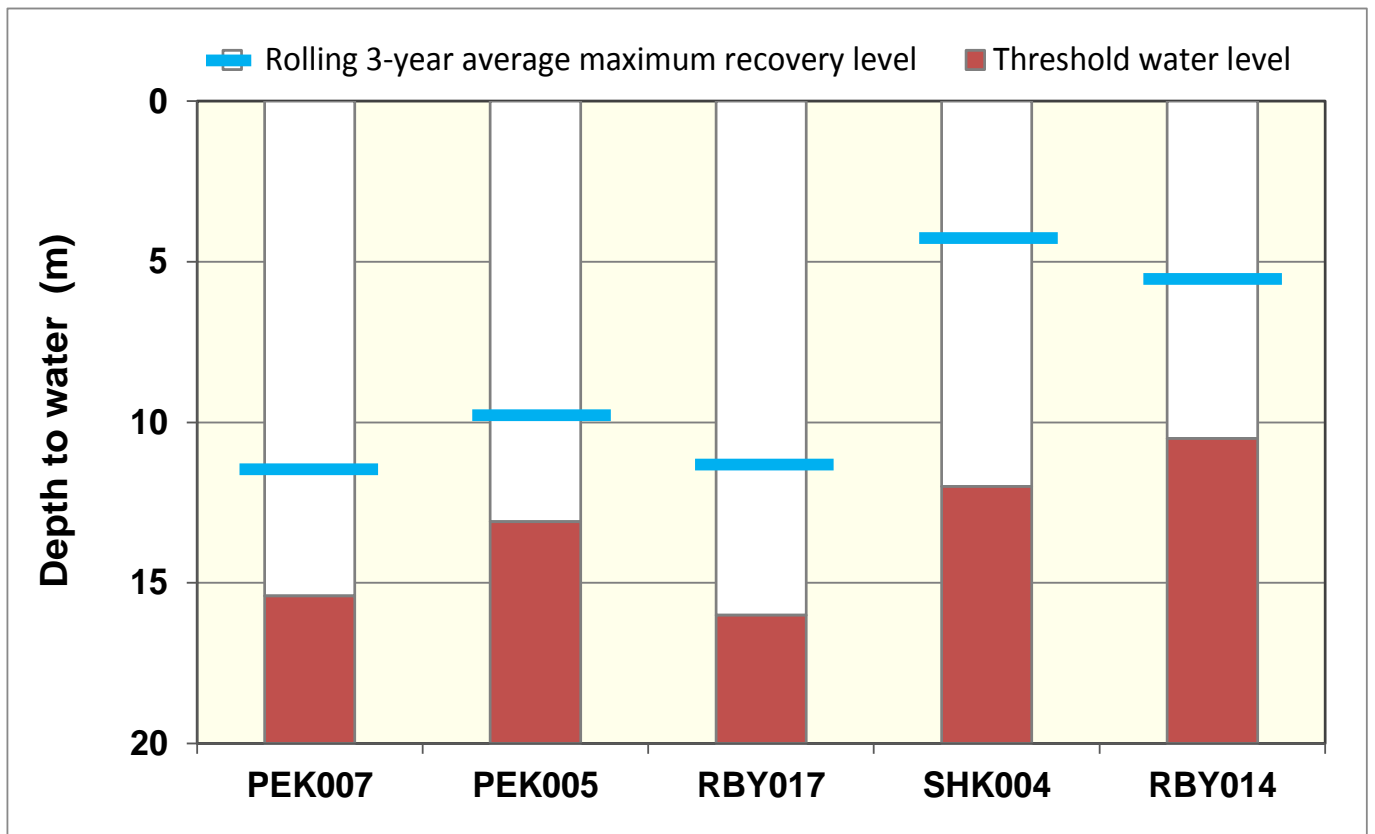


Figure 7. Maximum recovery level condition indicator thresholds of the Peake, Roby and Sherlock PWA as defined in the WAP and rolling three-year average maximum recovery level (from 2014 to 2016)

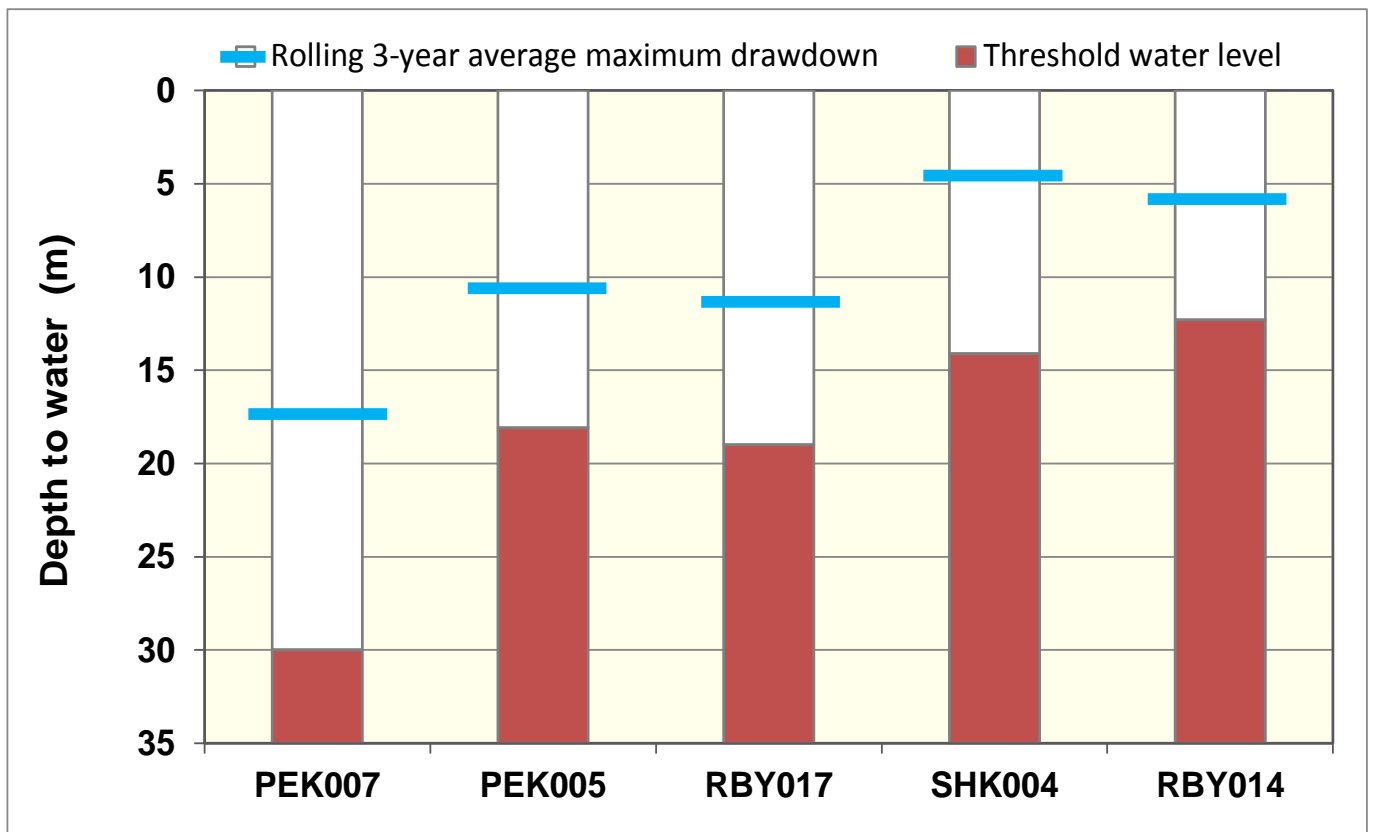


Figure 8. Maximum drawdown condition indicator thresholds of the Peake, Roby and Sherlock PWA as defined in the WAP and rolling three-year average maximum drawdown (from 2014 to 2016)

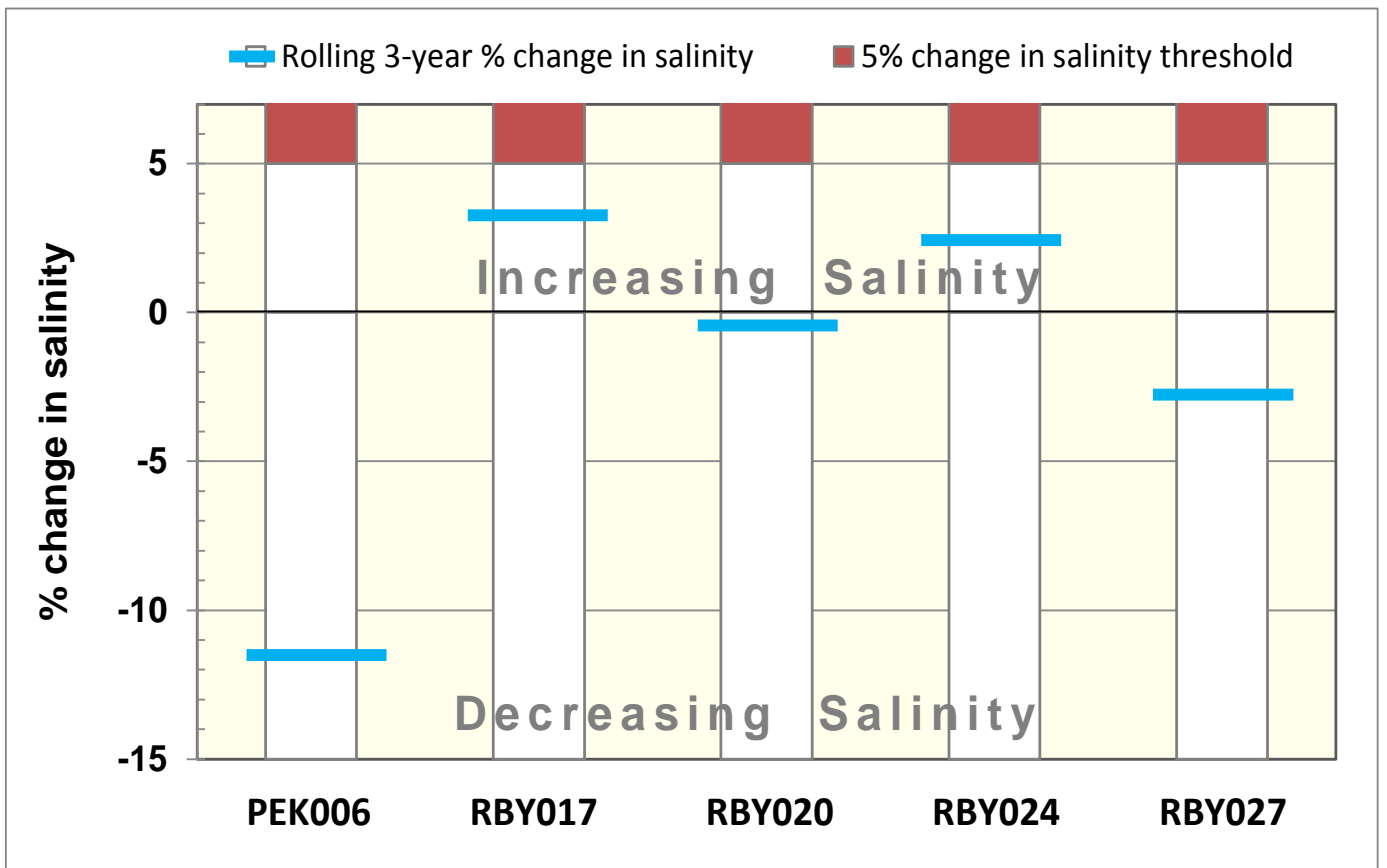


Figure 9. Salinity condition indicator thresholds of the Peake, Roby and Sherlock PWA as defined in the WAP and rolling three-year change in salinity (from 2014 to 2016)



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