

Barossa PWRA

Fractured rock aquifers

2014 Groundwater level and salinity status report



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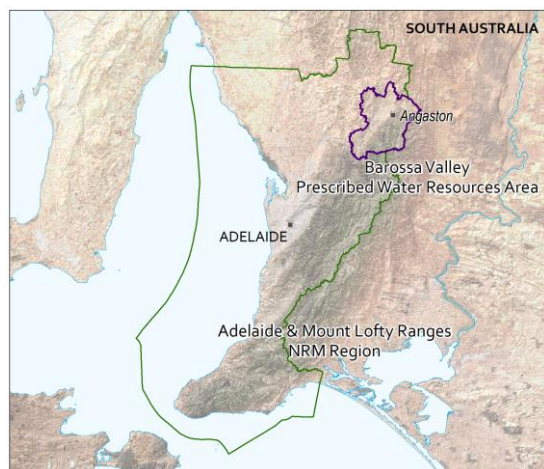
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2014 Summary



The Barossa Prescribed Water Resources Area (PWRA) encompasses both the highland areas of the Mount Lofty Ranges (MLR) and the Barossa Valley, approximately 60 km north-east of Adelaide. It is located within the Adelaide and Mount Lofty Ranges NRM Region and is a regional-scale resource for which surface water and groundwater have been prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan provides for the sustainable management of the groundwater resources.

The Barossa PWRA consists of three major aquifer systems: two sedimentary aquifers (Upper and Lower) that are located within the valley, and fractured rock aquifers that crop out in the MLR to the east and west of the valley and underlie the sedimentary aquifers. This report focuses on the fractured rock aquifers (FRAs) of the Barossa PWRA.

Groundwater flow within the FRAs generally follows the topography and flows from the higher elevations of the MLR to lower areas within the valley, with some discharge to streams and the sedimentary aquifers. Trends in groundwater levels and salinity in the fractured rock aquifers of the Barossa PWRA are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause the groundwater levels to fall and salinity to increase. Conversely, increases in rainfall results in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinity stabilise or decline.

Data from the Angaston rainfall station (number 23300) were chosen for analysis of rainfall. In 2014, significantly below-average rainfall was evident in January, March and August through to October. However, well-above average rainfall occurred in February, June and July (Fig. 1). The total rainfall was 552 mm, slightly above the long-term (1889–2014) annual average of 535 mm and 35 mm more than in 2013.

In the Barossa PWRA, groundwater is primarily used for the irrigation of vineyards and the FRAs are the main source of extraction, supplying 58% of groundwater extracted during 2014. Metered extractions from the FRAs totalled 1602 ML¹ in 2013–14, a 19% decrease from the previous water-use year (Fig. 2).

Overall, the groundwater elevation of the FRAs in the Barossa PWRA has remained relatively stable over a long period of time, although there have been small fluctuations over the years. Groundwater levels in the FRAs in the highlands display a broad relationship with rainfall patterns, with water level rises of several metres occurring in wet years such as 1983, 1992 and 2005.

Of the 35 observation wells within the FRAs that have both 2013 and 2014 data available for comparison, most (23 wells) recorded a rise in the maximum recovered groundwater level, with four wells recording increases of more than 1 m (Fig. 3). Negligible change in water level was recorded in two of the observation wells, where the change in maximum recovered water level between 2013 and 2014 was less than 0.05 m. The remaining 10 wells recorded declines of between 0.15 m and 2.1 m, with a median of 0.64 m. The rising change may be due to the slightly above-average rainfall and a lower volume of extractions in groundwater compared to the previous water-use year.

Groundwater salinity in the FRAs is highly variable due to the complex system of preferential flow paths affecting recharge and movement through the aquifer, and ranges from 450 mg/L to over 5500 mg/L, with more saline groundwater in the south-west of the Barossa PWRA. Two wells have been selected to illustrate long-term salinity trends (Fig. 4). Long-term salinity data indicate that well MOR 246 has experienced a rising trend in salinity over the past 10 years (but has stabilised over the last 3 to 4 years), while well MOR 223 has shown little variability except during the drought period when decreased recharge is likely to have caused a peak in salinity.

¹ The licensed groundwater use for the 2013–14 water-use year is based on the best data available as of February 2015 and may be subject to change, as some extraction volumes are in the process of being verified.

In 2014, four wells were monitored for salinity, which ranged from 360 mg/L to 5660 mg/L (Fig. 4). Three wells recorded a salinity value higher than 1500 mg/L, the maximum recommended salinity concentration for grape vines. These four observation wells with available data for both 2013 and 2014 recorded an 8 to 55% decline in salinity in 2014 when compared to 2013 salinity values.

The fractured rock aquifers of the Barossa PWRA have been assigned a green status for 2014:

2014 Status



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

This means that the groundwater status was observed to be stable (i.e. no significant change) or improving over the 12-month reporting period. If these conditions were to continue, there is a very low likelihood of negative impacts on the beneficial uses of the resource (e.g. drinking water, irrigation or stock watering).

The 2014 status for the fractured rock aquifers is supported by:

- an overall rise in the maximum recovered groundwater level when compared to 2013 water level data
- an overall decline in groundwater salinity when compared to 2013 salinity data, albeit from limited data.

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

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

To download groundwater level and salinity data from observation wells within the Barossa PWRA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details about the Barossa PWRA, please see the *Water Allocation Plan for the Barossa Prescribed Water Resources Area* on the Natural Resources Adelaide and Mount Lofty Ranges [website](#).

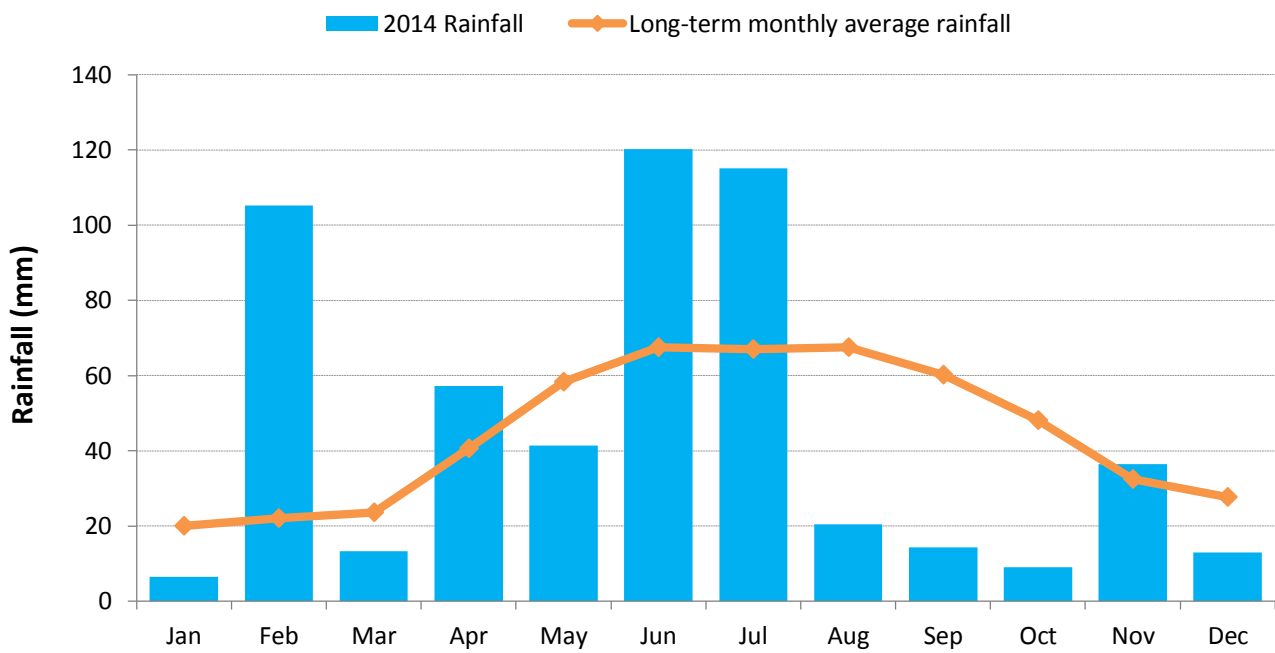


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Angaston rainfall station² (number 23300) in the Barossa Prescribed Water Resources Area

Barossa PWRA: Fractured rock aquifers annual groundwater extraction

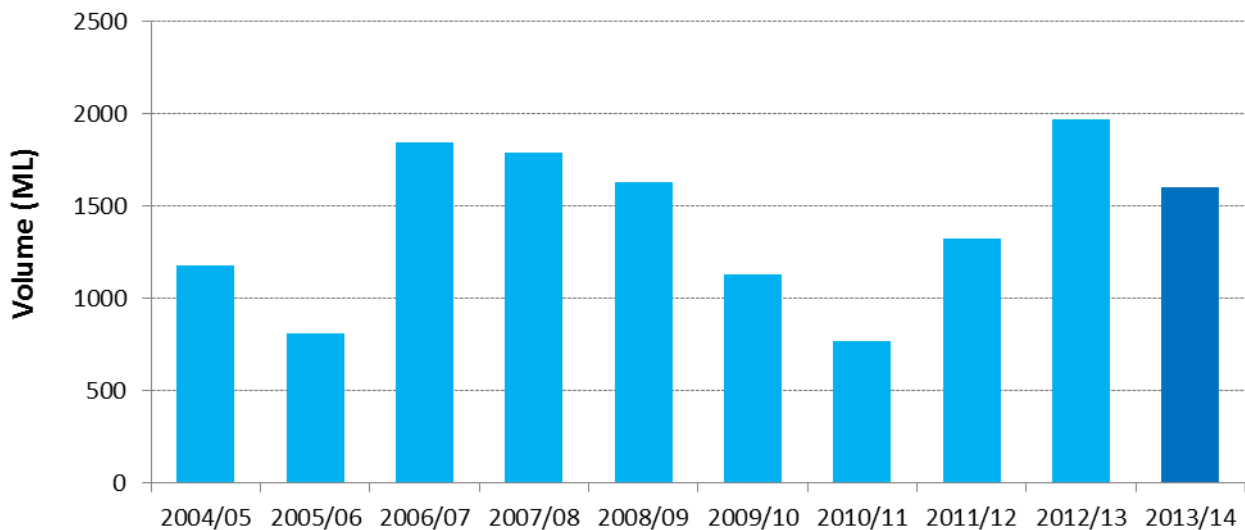


Figure 2. Historical licensed groundwater use for the fractured rock aquifers in the Barossa Prescribed Water Resources Area

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

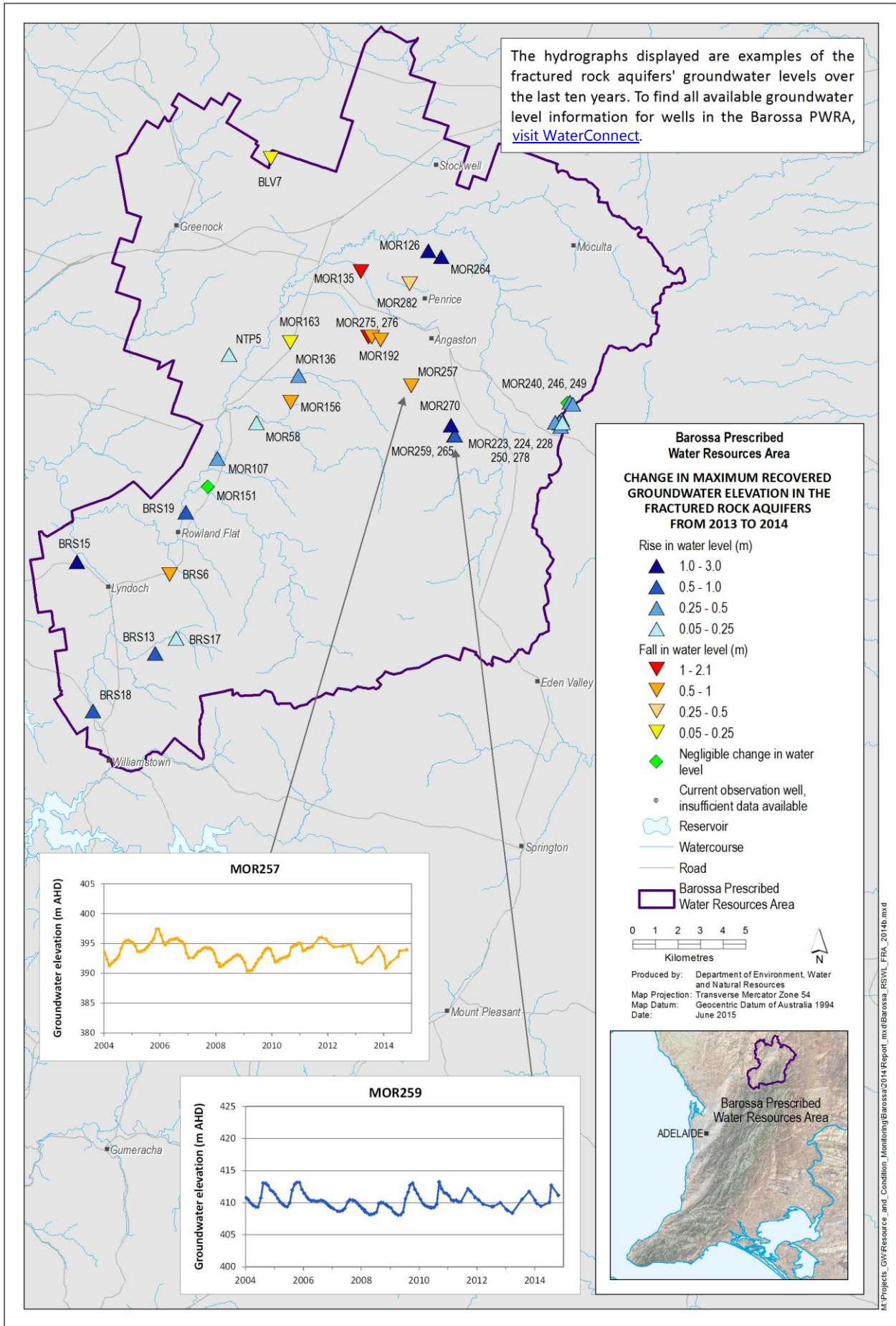


Figure 3. Overall changes in maximum groundwater levels in the fractured rock aquifers of the Barossa Prescribed Water Resources Area from 2013 to 2014

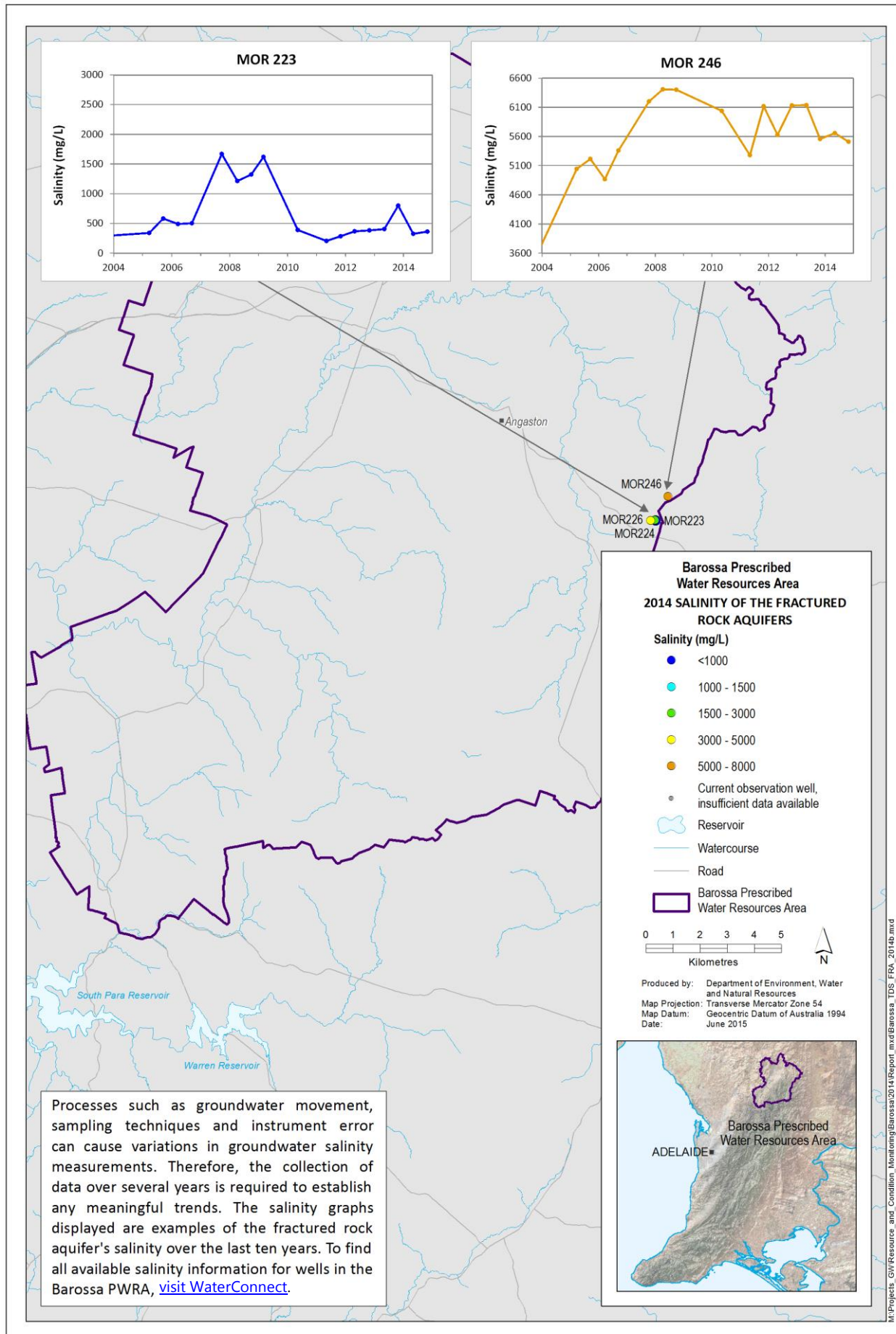


Figure 4. Groundwater salinity of the fractured rock aquifers in the Barossa Prescribed Water Resources Area for October 2014