

# Barossa PWRA

## Fractured rock aquifers

2015 Groundwater level and salinity status report



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

Department of Environment, Water and Natural Resources  
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	<a href="http://www.environment.sa.gov.au">www.environment.sa.gov.au</a>	

#### Disclaimer

The Department of Environment, Water and Natural Resources and its employees do not warrant or make any representation regarding the use, or results of the use, of the information contained herein as regards to its correctness, accuracy, reliability, currency or otherwise. The Department of Environment, Water and Natural Resources and its employees expressly disclaims all liability or responsibility to any person using the information or advice. Information contained in this document is correct at the time of writing.



This work is licensed under the Creative Commons Attribution 4.0 International License.

To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>

© Crown in right of the State of South Australia, through the Department of Environment, Water and Natural Resources 2016

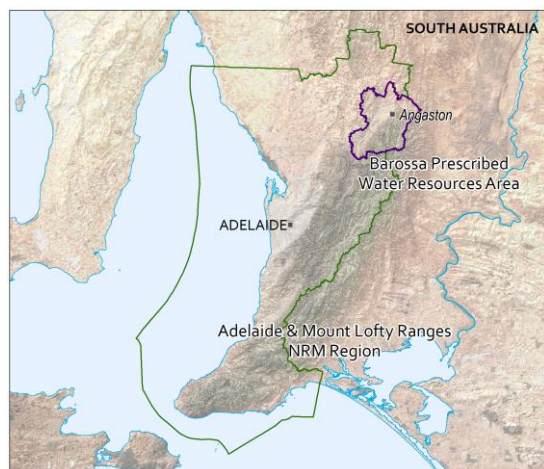
ISBN 978-1-925369-84-7

#### *Preferred way to cite this publication*

DEWNR, 2016, *Barossa PWRA fractured rock aquifers 2015 Groundwater level and salinity status report*, Government of South Australia, through the Department of Environment, Water and Natural Resources, Adelaide

Download this document at [www.waterconnect.sa.gov.au](http://www.waterconnect.sa.gov.au)

# 2015 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 Natural Resources Management 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 water resources.

The Barossa PWRA consists of three major groundwater systems: two sedimentary aquifers (Upper and Lower) that are located within the area's largest valley; and, underlying the sedimentary aquifers, fractured rock aquifers that crop out in the MLR towards the eastern and western margins of the valley. 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 groundwater discharge to streams and the sedimentary aquifers.

Trends in groundwater levels and salinity in the FRAs 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 may result in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinities stabilise or decline.

The Angaston rainfall station (BoM Station 23300) recorded 386 mm of rain in 2014–15, 139 mm below the long-term average of 525 mm (1900–2015) and 145 mm below the five-year average of 531 mm (Figs 1 and 2). Despite three of the past five years recording above-average rainfall, rainfall shows a five-year declining trend (Fig. 2). Furthermore, annual rainfall for 2014–15 is the sixth-lowest on record for the period 1900–2015 (Fig. 2). Long-term seasonal rainfall patterns show generally higher rainfall during the winter months and lower rainfall over summer. Notable seasonal anomalies over the past five years include the wet water-use year of 2010–11, though January and April recorded just 18% of their long-term monthly average, and the dry spring–summers of 2012–13 and 2013–14, which ended in 2014 with February recording more than four-and-a-half times its long-term average monthly rainfall. The 2014–15 water-use year has been particularly dry, with seven months receiving less than half their average monthly rainfall; although, January received more than double its long-term average.

Licensed groundwater extractions are primarily used for the irrigation of vineyards and totalled 1582 ML<sup>1</sup> in 2014–15, a 1% decrease from the previous water-use year and 9% less than the five-year average annual extraction (Fig. 3). The FRAs are the main source of groundwater in the Barossa PWRA, supplying 57% of the total volume extracted.

Groundwater levels in the FRAs display a broad relationship with rainfall patterns. Groundwater level rises of several metres occurred in wet years such as 1983, 1992 and 2005. Above-average rainfall in 2009 and 2010 also resulted in a rise in groundwater levels. In the five years to 2015, most monitoring wells (83%) show a declining trend in groundwater levels, with 7% showing their lowest levels in 2015 (Fig. 4). The rate of decline in groundwater levels ranged between 0.12 and 3.4 m/y with a median of 0.3 m/y. The largest declines are mainly found north and west of Angaston. Seventeen percent of wells show a rising trend in groundwater levels at rates of between just 0.04 and 0.4 m/y with a median of 0.13 m/y. These wells are mainly located between Nuriootpa and Lyndoch (Fig. 4).

Long-term salinity trends in the FRAs are highly variable due to the complex system of preferential flow paths that influence recharge and the movement of water through the aquifer. Historical salinity data show salinity ranges from less than 1000 mg/L to 12 000 mg/L. Good-quality groundwater (<1000 mg/L) is primarily found in and around Angaston and Penrice, and along the

<sup>1</sup> The licenced groundwater use for the 2014–15 water-use year is based on the best data available as of March 2016 and could be subject to change, as some extraction volumes may be in the process of being verified.

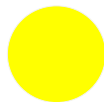
eastern side of the valley down to Williamstown. Higher-salinity groundwater is mainly found along the western edge of the valley and in the western and eastern areas of the PWRA.

Regular salinity monitoring occurs only along the eastern edge of the PWRA between Angaston and Keyneton. In 2015, salinity in this area ranged between 376 and 5937 mg/L (Fig. 5). In the five years to 2015, three of the four available wells in the area show either a trend of decreasing salinity or stable salinity, while the last well shows a rising trend (Fig. 6). Due to the limited availability of salinity data, salinity has not been used in assessing the status of the resource.

To determine the status of the FRAs for 2015, the trends in groundwater level over the past five years (2011 to 2015, inclusive) are analysed. This is a new approach, 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 a detailed explanation of the new method of status assessment.

The fractured rock aquifers of the Barossa PWRA have been assigned a yellow status for 2015:

## 2015 Status



Minor adverse trends have been observed over the past five years

The 2015 status for the fractured rock aquifers is based on:

- most monitoring wells (83%) showing a five-year trend of declining groundwater levels.

To view 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, rainfall and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view or download groundwater level and salinity data from monitoring wells within the Barossa PWRA, please visit [Groundwater Data](#) 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](#).

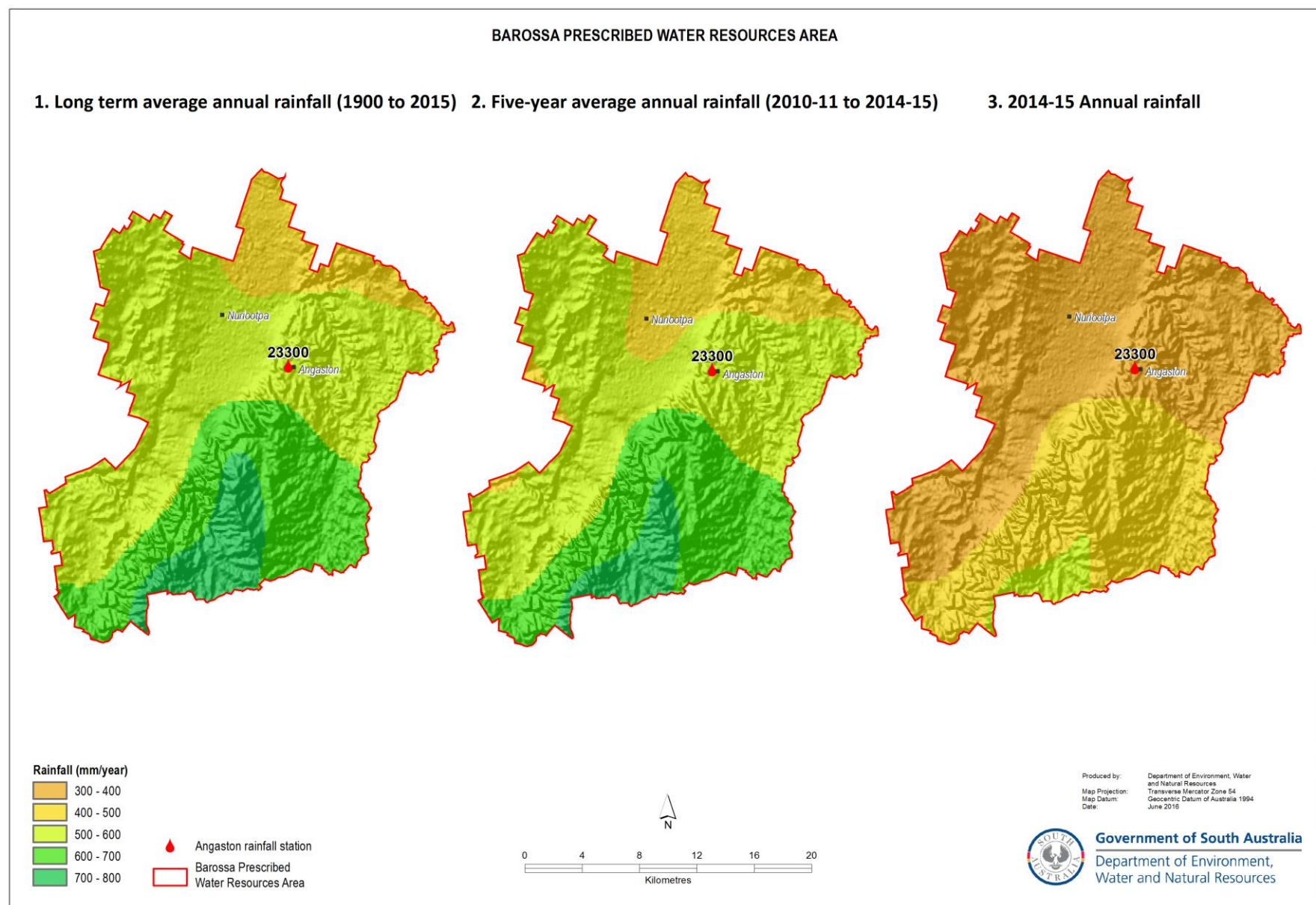


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2014–15 water-use year in the Barossa Prescribed Water Resources Area<sup>2</sup>

<sup>2</sup> 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](http://www.longpaddock.qld.gov.au/silo).

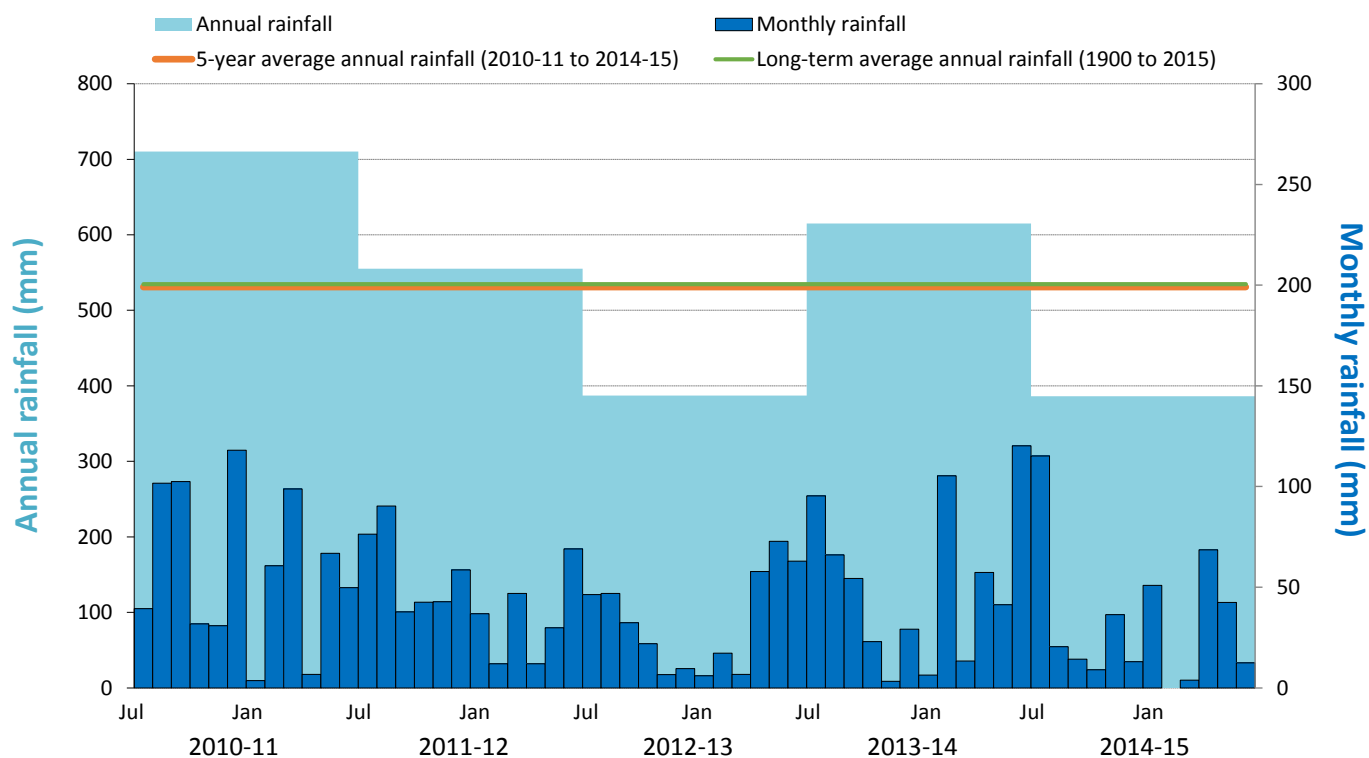


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Angaston (BoM Station 23300)<sup>3</sup>

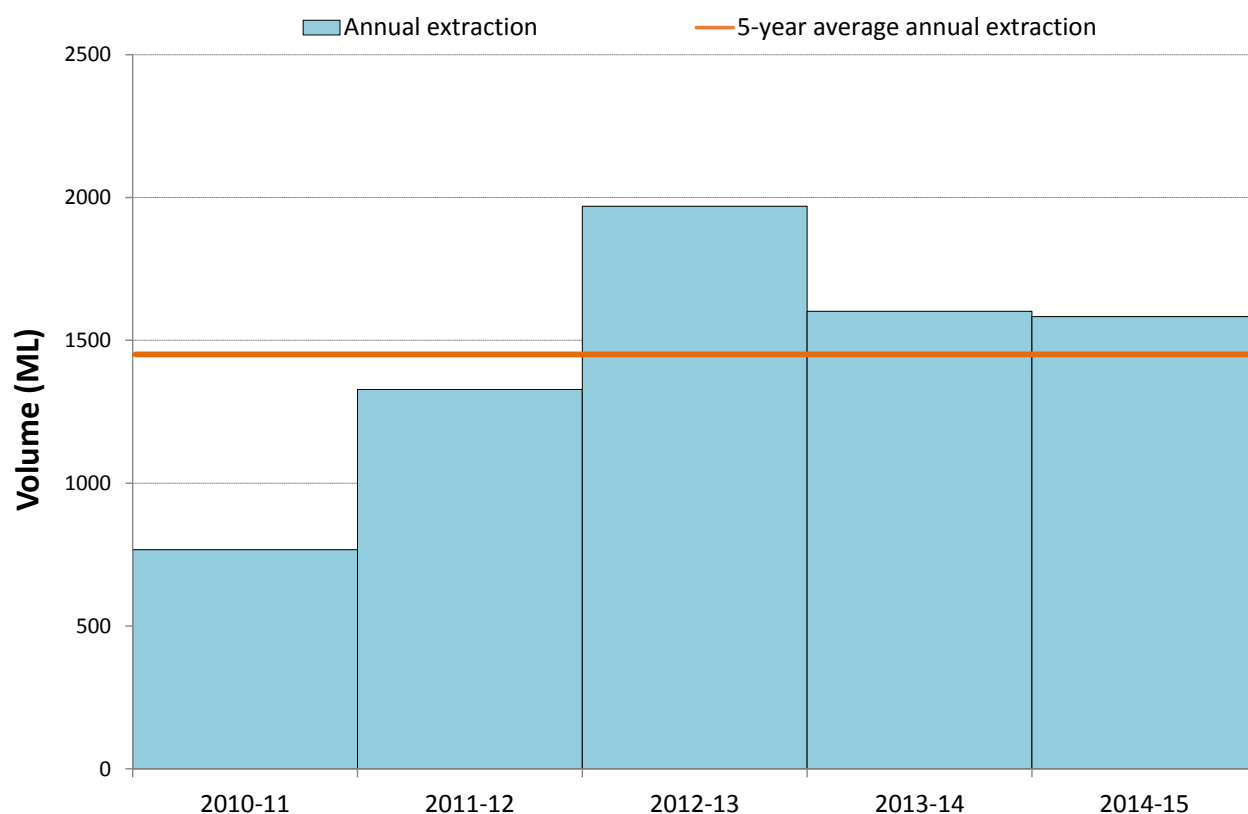
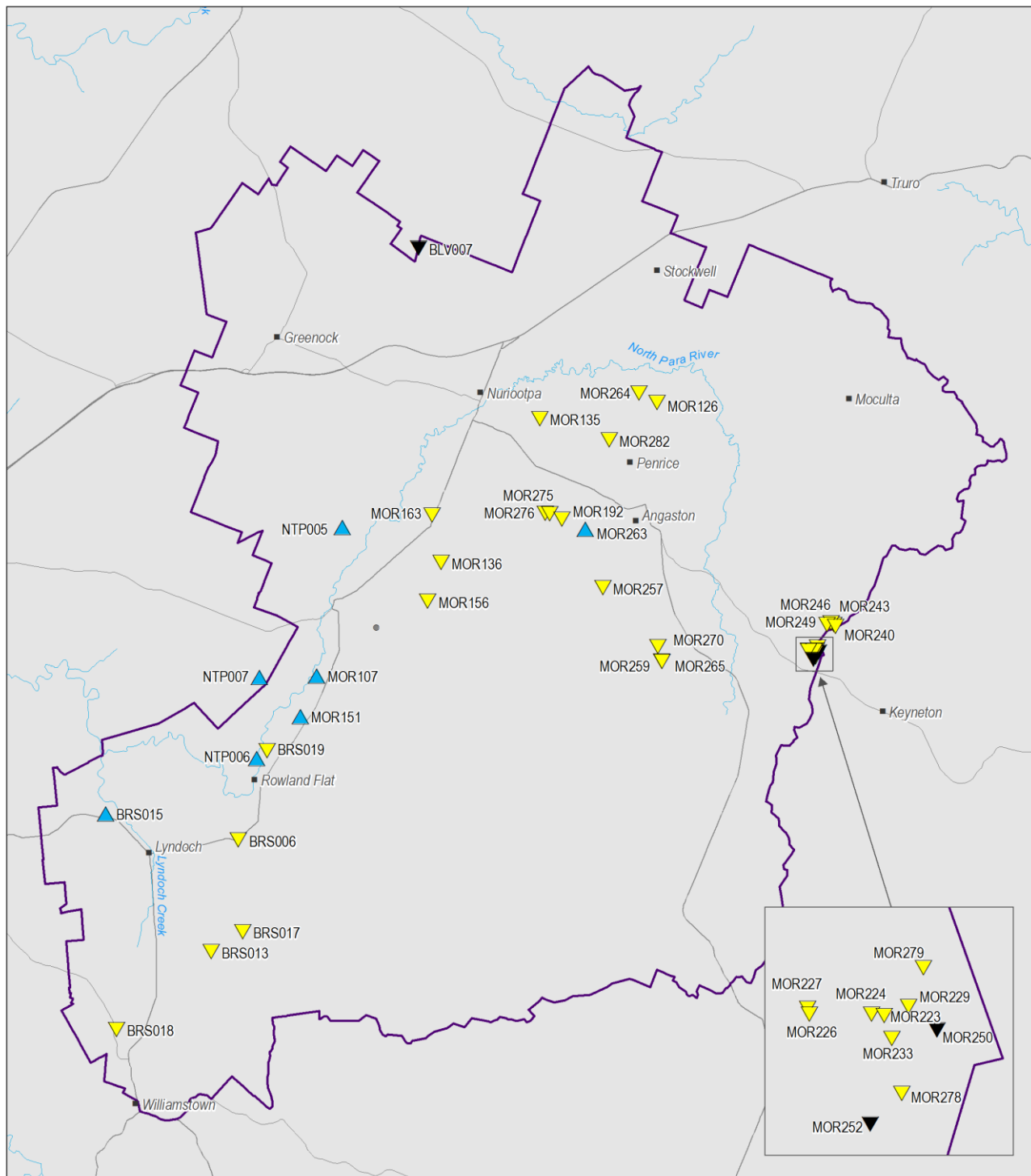


Figure 3. Licensed groundwater extraction volumes<sup>4</sup> for the past five water-use years, from the fractured rock aquifers

<sup>3</sup> 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](http://www.longpaddock.qld.gov.au/silo)

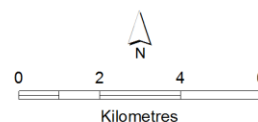
<sup>4</sup> The licenced groundwater use for the 2014–15 water-use year is based on the best data available as of March 2016 and could be subject to change, as some extraction volumes may be in the process of being verified.





#### 2015 water level status

- ▲ Groundwater level is above the historical minimum and has a rising trend
- Groundwater level is above the historical minimum and is stable
- ▼ Groundwater level is above the historical minimum but has a declining trend
- ▼ Groundwater level is the lowest on record but has a rising trend
- Groundwater level is the lowest on record and is stable
- ▼ Groundwater level is the lowest on record and has a declining trend
- Current monitoring well, insufficient data available
- Watercourse
- Road
- Barossa Prescribed Water Resources Area



Produced by: Science, Monitoring and Knowledge Branch  
 Map Projection: Lambert Conformal Conic  
 Map Datum: Geocentric Datum of Australia 1994  
 Date: June 2016



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

Figure 4. 2015 status of groundwater levels in the fractured rock aquifers of the Barossa Prescribed Water Resources Area, based on five-year trends from 2011 to 2015

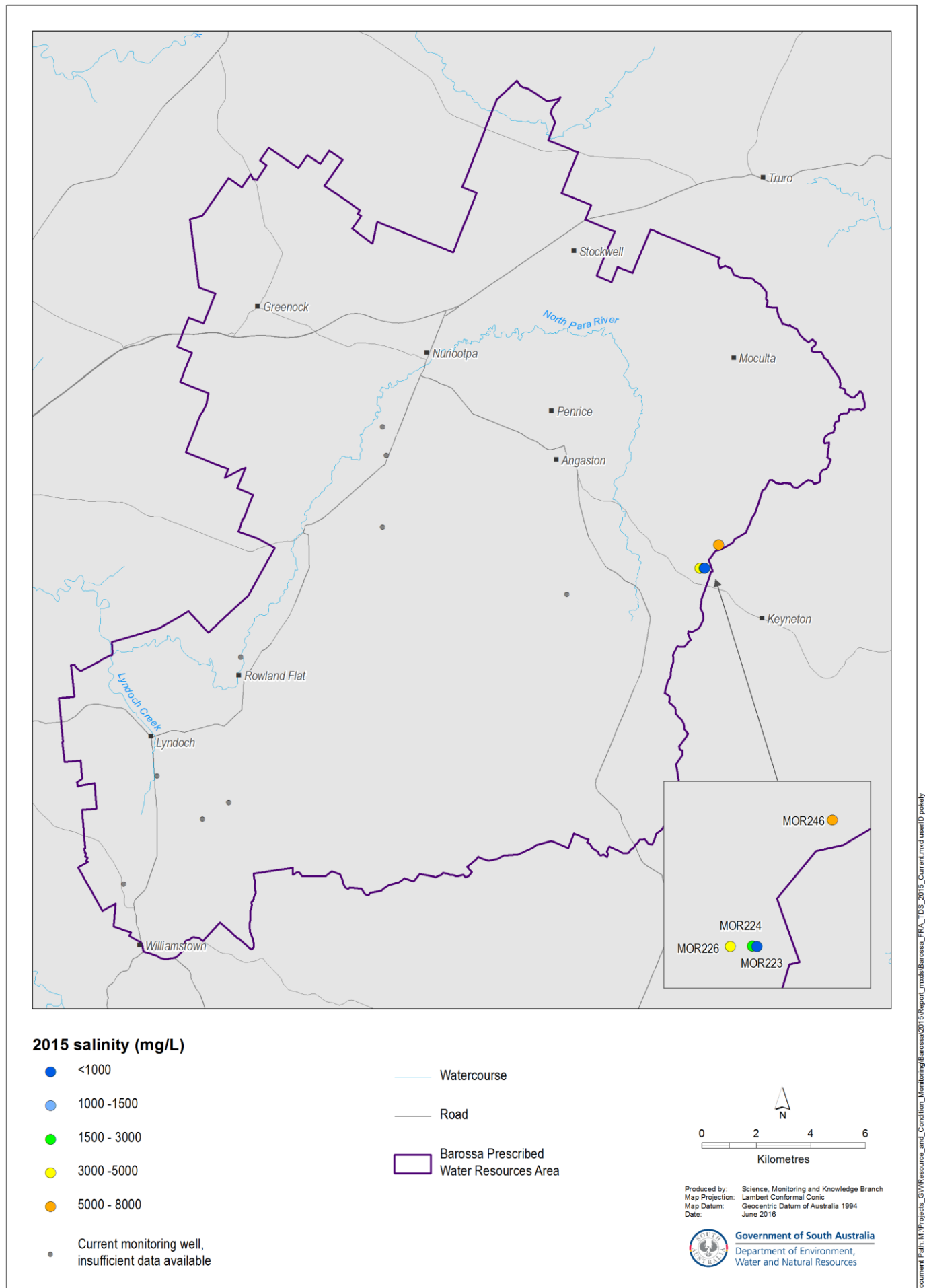
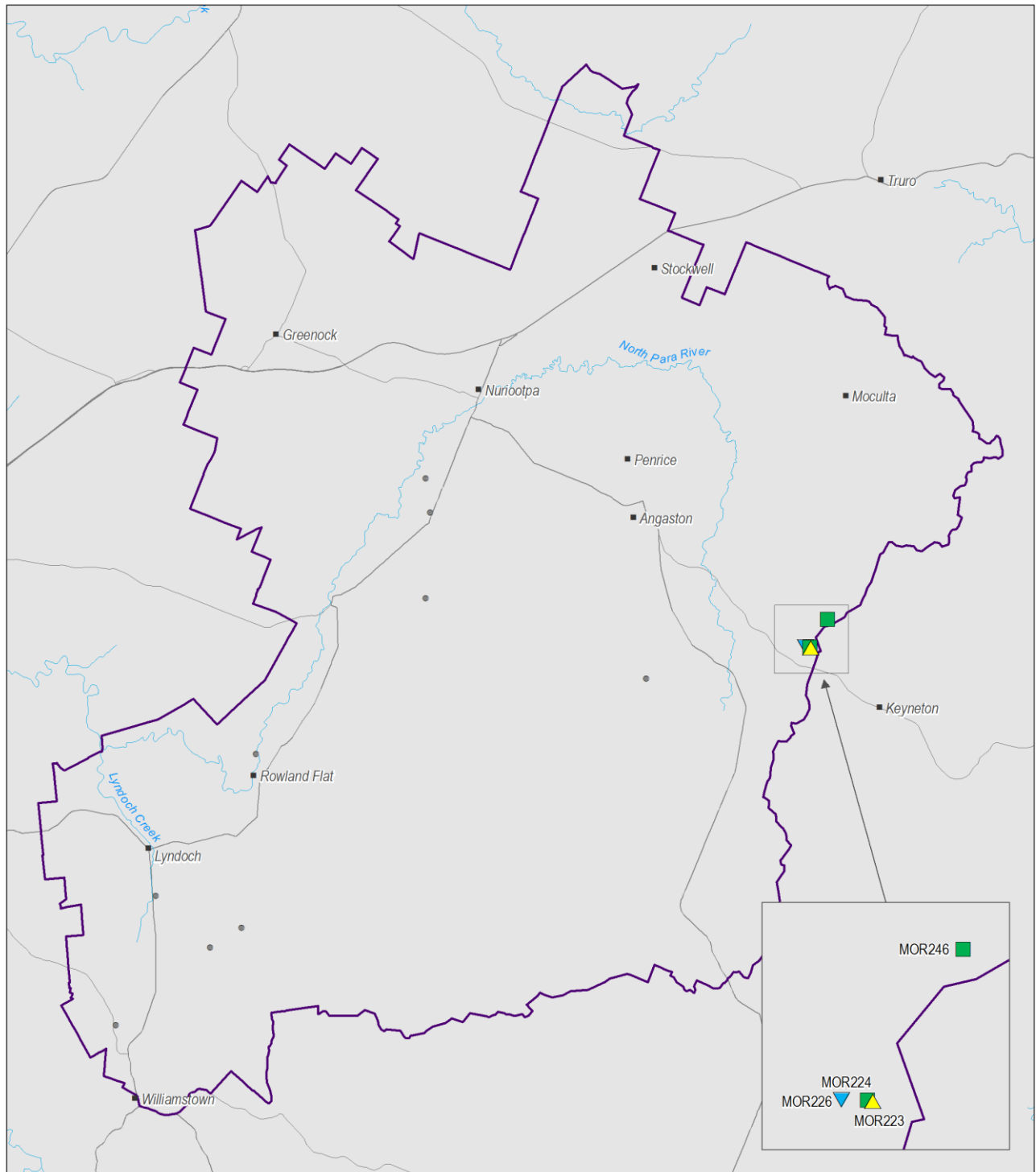


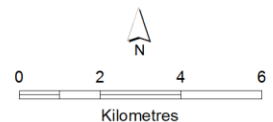
Figure 5. 2015 groundwater salinity of the fractured rock aquifers in the Barossa Prescribed Water Resources Area





#### 2015 salinity status

- ▼ Decreasing salinity trend
- Stable salinity
- ▲ Rising salinity trend
- Current monitoring well, insufficient data available
- Watercourse
- Road
- Barossa Prescribed Water Resources Area



Produced by: Science, Monitoring and Knowledge Branch  
 Map Projection: Lambert Conformal Conic  
 Map Datum: Geocentric Datum of Australia 1994  
 Date: June 2016



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

Figure 6. 2015 status of groundwater salinity in the fractured rock aquifers of the Barossa Prescribed Water Resources Area, based on five-year trends from 2011 to 2015

