

Barossa PWRA

Lower Aquifer

2015 Groundwater level and salinity status report



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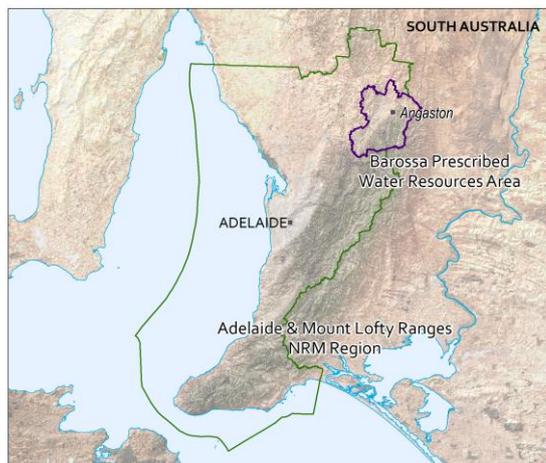
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2015 Summary



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. The sedimentary Lower Aquifer of the Barossa PWRA is the focus

of this report.

Groundwater flow within the Lower Aquifer is in a south-westerly direction. Although the aquifer experiences large seasonal fluctuations in groundwater pressure levels due to extraction, groundwater flow generally persists in a south-westerly direction.

Despite being a confined aquifer that does not receive direct recharge from local rainfall, the intensity and timing of rainfall, and variations in rates of groundwater extraction, can have an effect on groundwater pressure levels and salinity in the Lower Aquifer. Below-average summer rainfall can result in increasing irrigation extractions, and can cause groundwater pressure levels to fall and salinity to increase. Conversely, increases in rainfall results in decreases in irrigation extractions, and groundwater pressure levels may rise and salinity 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. 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.

In 2014–15, licenced groundwater extractions from the Lower Aquifer totalled 830 ML¹, a 5% increase from the previous water-use year and 27% greater than the five-year average annual extraction (Fig. 3). The Lower Aquifer supplied 30% of the total groundwater extracted from the Barossa PWRA in the 2014–15 water-use year.

Long-term monitoring data show that in irrigation areas where there is intensive groundwater extraction from the confined Lower Aquifer, there are large seasonal drawdowns of up to 20 m, due to the response of groundwater pressure levels to pumping. These data also show a general decline in the maximum-recovered pressure levels from the mid-1970s to about 1990, some by up to 6.5 m, but typically around 2 m. Between 1990 and 2010, pressure levels in many wells continued to decline, usually by around one metre, but some wells show declines of 2–3 m. After 1990, a smaller number of wells showed stable pressure levels or recorded rises of 6 to 10 m.

In the five years to 2015, almost all monitoring wells show a declining trend in groundwater pressure level (Fig. 4). Declines ranged between 0.06 and 3.5 m/y with a median decline of 0.4 m/y. Wells that show the greatest declines of between 2.7 and 3.5 m/y are found towards the centre of the valley, east and south-east of Nuriootpa. One well shows a rising trend and is located at the southern extent of the aquifer near Rowland Flat (Fig. 4).

¹ 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 verification.

Groundwater salinities in the Lower Aquifer typically range between 450 and 3000 mg/L, with the higher-salinity groundwater located in the northern part of the PWRA. Long-term monitoring data show a gradual rise in groundwater salinities since 1990. Due to the limited salinity data available for the Lower Aquifer in recent years, salinity has not been used when assessing the status of the resource in this report.

To determine the status of the Lower Aquifer for 2015, the trends in groundwater pressure levels 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 Lower Aquifer of the Barossa PWRA has been assigned a yellow status for 2015:

2015 Status



Minor adverse trends have been observed over the past five years

The 2015 status of the Lower Aquifer is based on:

- most monitoring wells (95%) showing a five-year declining trend in groundwater pressure 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, relevant groundwater-dependent ecosystems and location of rainfall stations, 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](#).

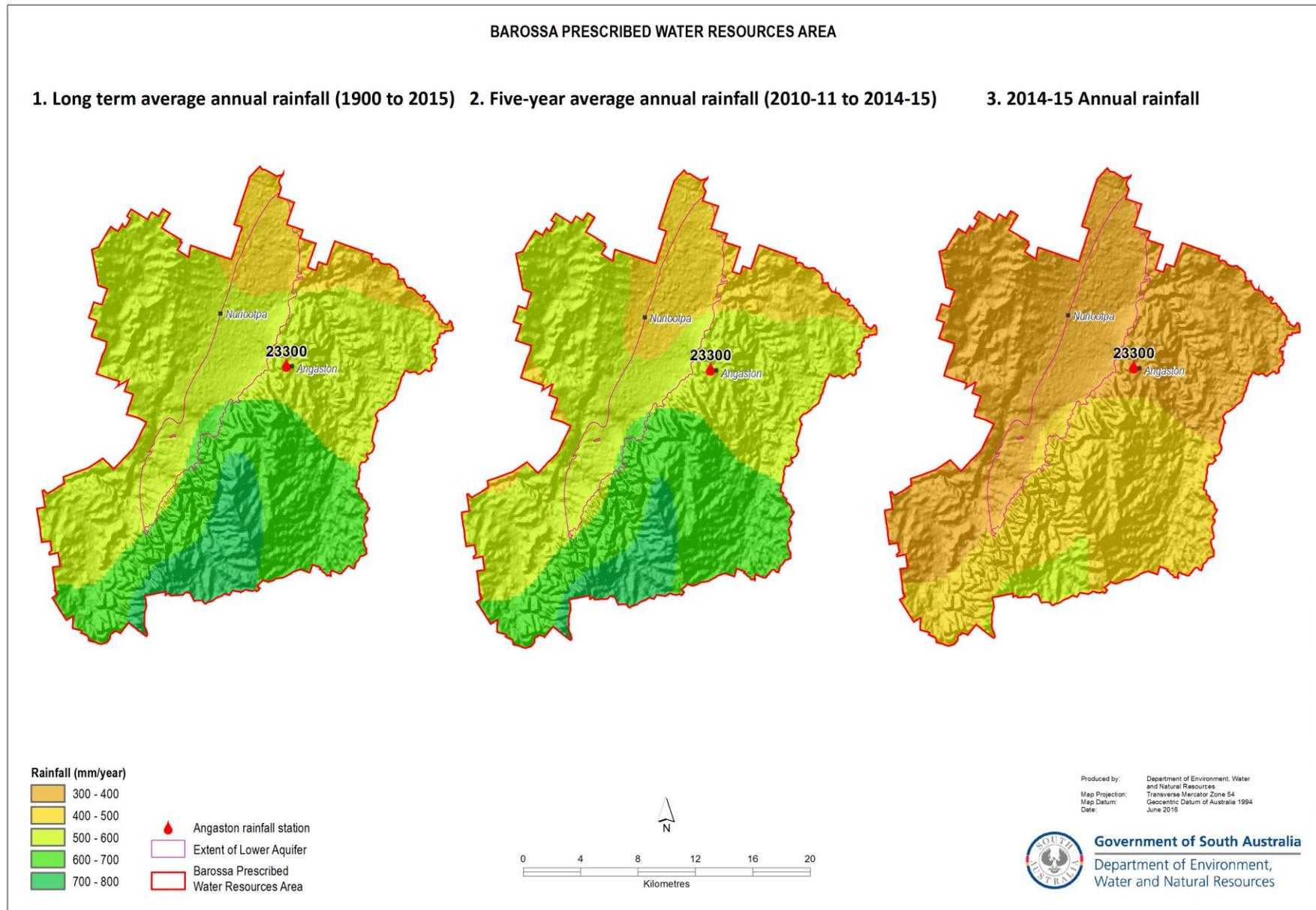


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2014–15 water-use year in the Barossa Prescribed Water Resources Area²

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.

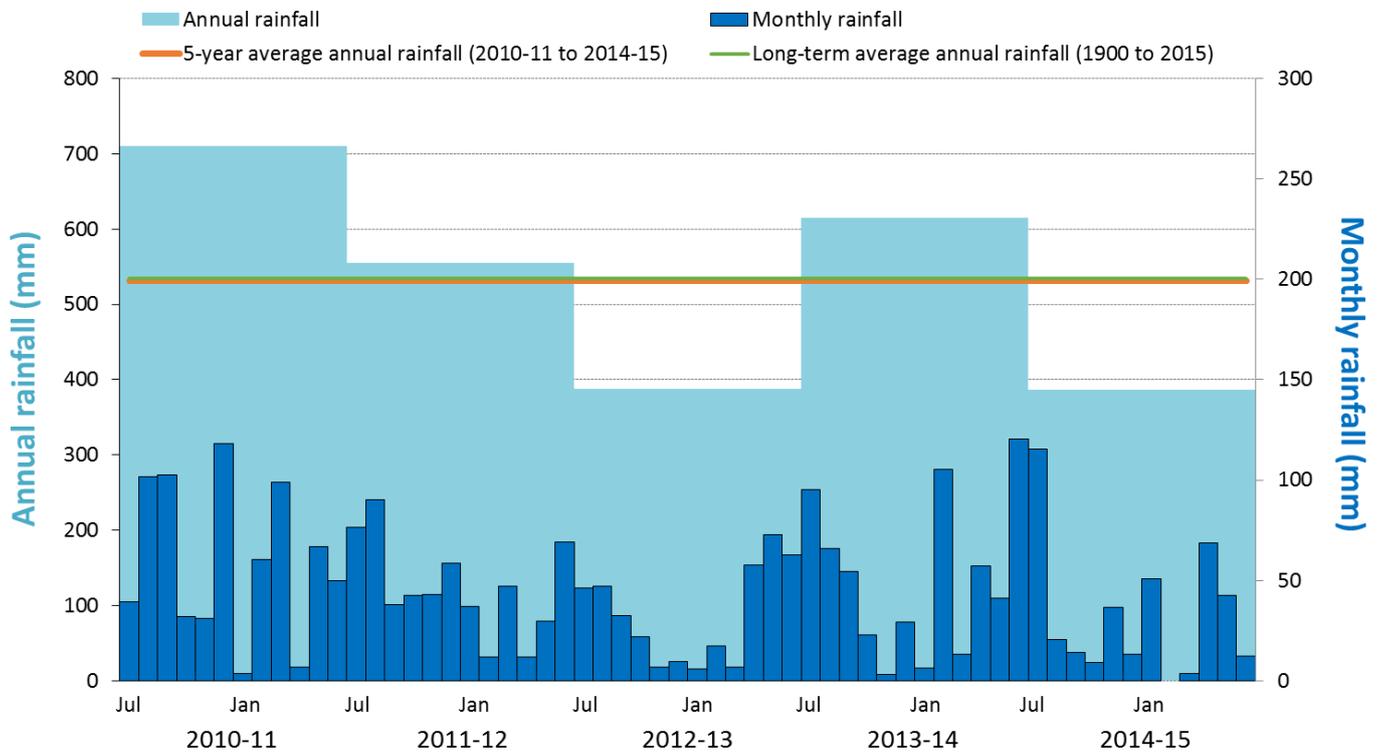


Figure 2. Annual (July–June) and monthly rainfall for the past five water-use years, and the five-year and long-term average annual rainfall recorded at Angaston (BoM Station 23300)³

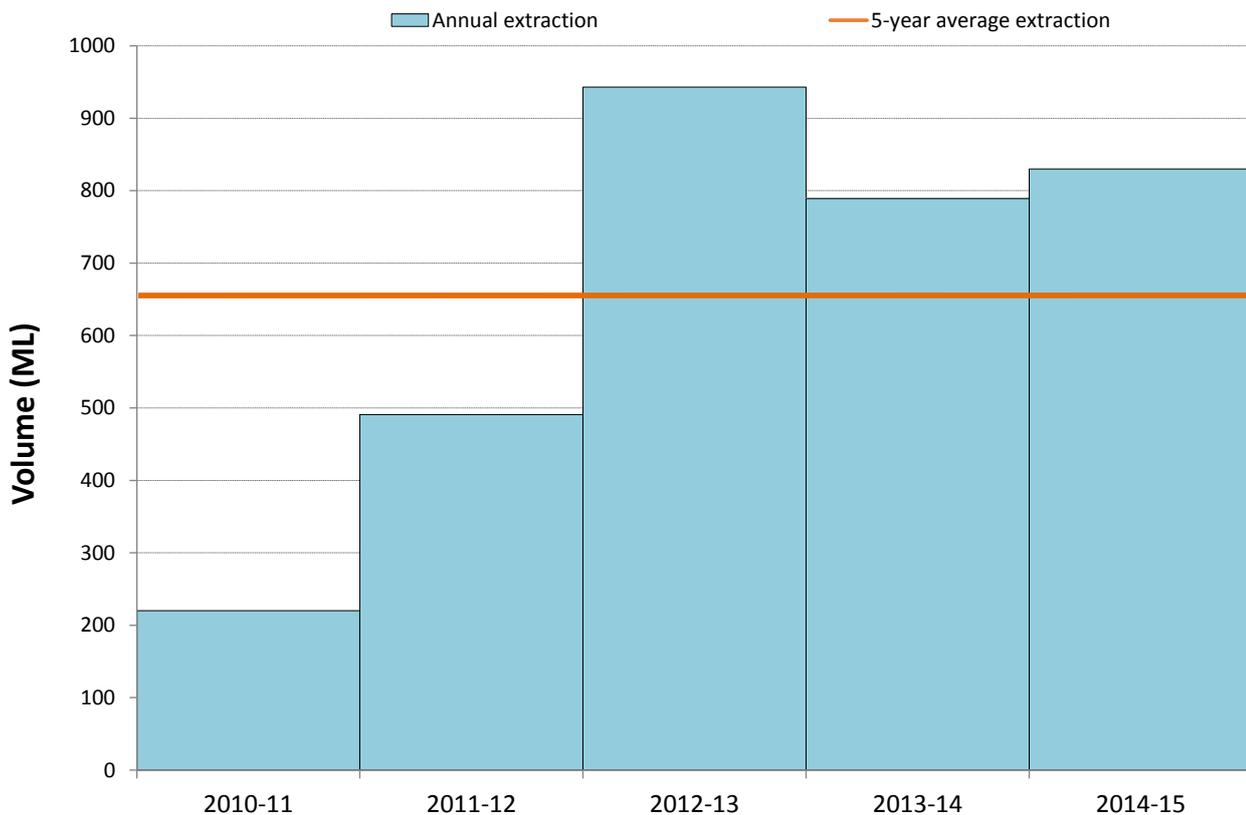
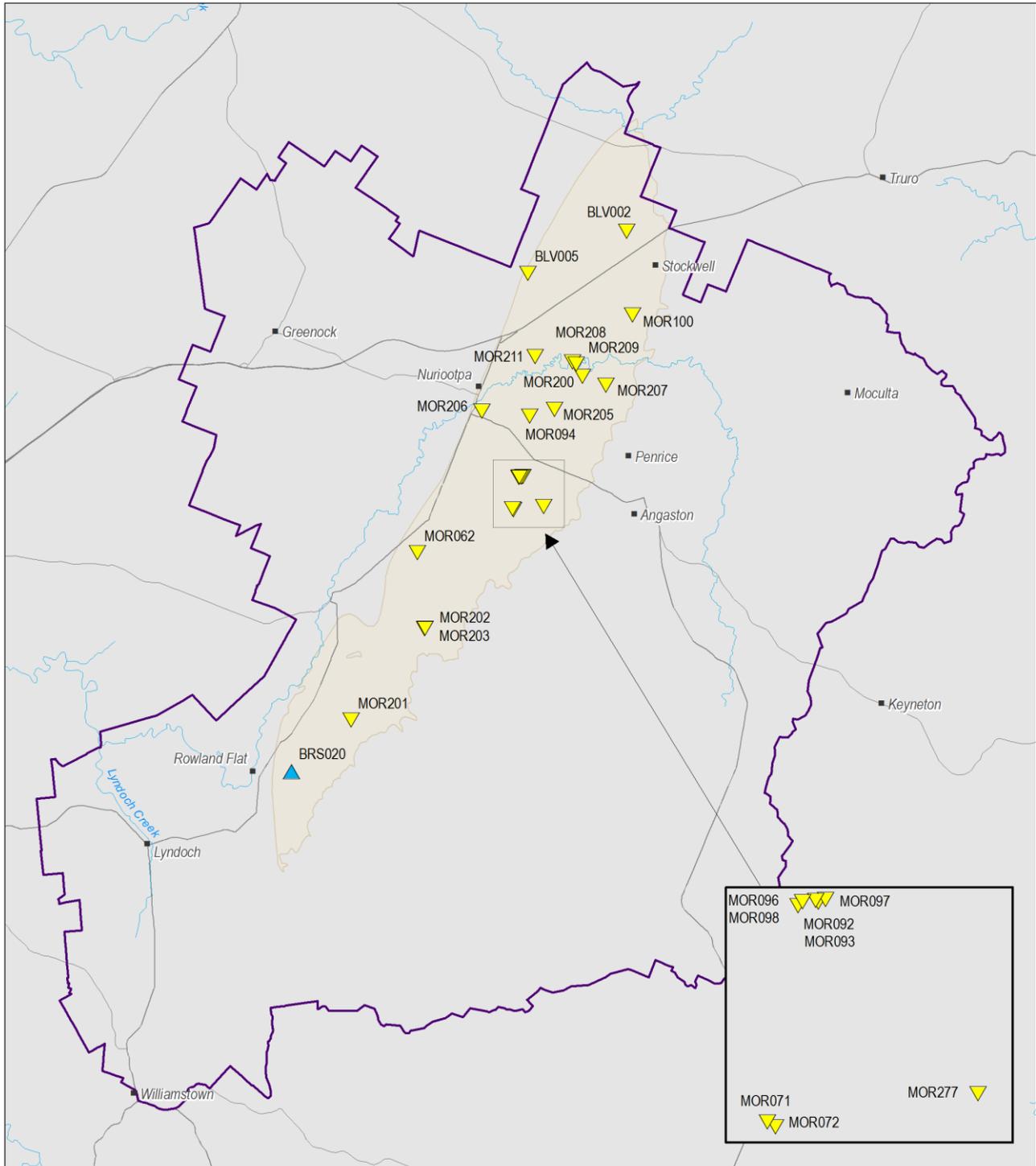


Figure 3. Licensed groundwater extraction volumes⁴ for the past five water-use years, for the Lower Aquifer

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.

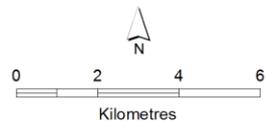
⁴ The licenced groundwater use for the 2014–15 water-use year is based on the best data available as of March 2016 and could be subject to change, as some extraction volumes may be in the process of verification.



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

- Watercourse
- Road
- Extent of Lower Aquifer
- 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



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Figure 4. 2015 status of the groundwater pressure levels in the Lower Aquifer of the Barossa Prescribed Water Resources Area, based on the five-year trend from 2011 to 2015

