Barossa PWRA

Lower Aquifer

2014 Groundwater level and salinity status report

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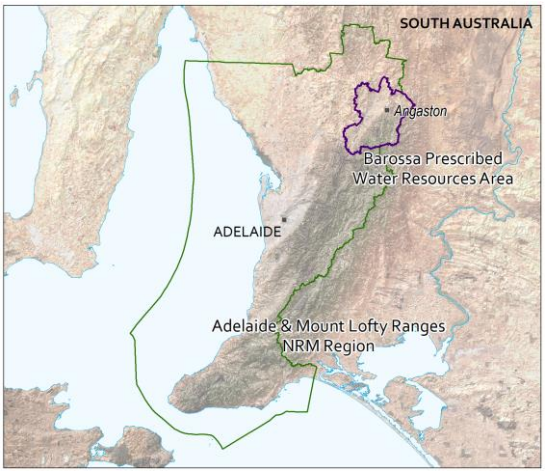
2014 Summary



The Barossa Prescribed Water Resources Area (PWRA) encompasses both the highland areas of the Mount Lofty Ranges (MLR) and the Barossa Valley. It is located approximately 60 km north-east of Adelaide, within the Adelaide and Mount Lofty Ranges NRM Region. It 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 contains 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 Lower Aquifer of the Barossa PWRA.

Groundwater flow within the Lower Aquifer is in a south-westerly direction in the valley. Although the aquifer experiences large seasonal fluctuations in water levels due to extraction, the direction of groundwater flow does not change. Groundwater salinities are variable and range from 460 to 3000 mg/L. The more saline groundwater is observed in wells located in the northern extent of the aquifer.

Despite being a confined aquifer that does not receive direct recharge from rainfall, the intensity and timing of rainfall and subsequent extraction practises can have an effect on groundwater levels and salinity in the Lower Aquifer. For example, if the region experienced above-average rainfall during typically dry summer months, this could result in less groundwater being extracted from the MGL aquifer for irrigation purposes and therefore smaller declines in groundwater levels and stable or improving salinity.

The climate of the Barossa PWRA is characterised as Mediterranean, with hot, dry summers and cool, wet winters. Data from the Angaston rainfall station (number 23300) were chosen for analysis of rainfall in 2014 (Fig. 1). The long-term average monthly rainfall is graphed in orange against the total monthly rainfall recorded in blue. In 2014, generally above average rainfall was evident in the first half of the year, with mostly below average rainfall occurring during the remainder. The total rainfall in 2014 was 552 mm, slightly above the long-term (1889–2014) annual average of 535 mm and 36 mm more than 2013 annual rainfall.

Metered extractions from the Lower Aquifer totalled 789 ML[1] for 2013–14, which is a 16% decrease compared to the previous water-use year (Fig. 2). This volume forms 28% of the total extraction from the Barossa PWRA.

The groundwater level trends for the Lower Aquifer indicate that in areas of intensive groundwater extraction for irrigation, there are large seasonal drawdowns of up to 20 m due to the pressure response to pumping in the confined aquifer. Although there is no direct rainfall recharge to the deep confined aquifer, there may be an indirect correlation between groundwater levels and rainfall because dry years will result in increased groundwater pumping that will lead to a lowering of groundwater levels. In particular, a dry winter may lead to an earlier start to pumping for the irrigation season which may prevent water levels from recovering to their normal levels in spring. Conversely, a wet spring may delay the start of irrigation, leading to a higher than normal recovery in water levels.

There were 22 observation wells monitoring the Lower Aquifer that had sufficient data for comparison of groundwater levels. In 2014, 14 of the observation wells recorded a decline in the maximum recovered groundwater level when compared to the maximum recovered water level observed in 2013, the decline in water levels ranging from 0.12 to 2.09 m, with a median of 0.32 m. Five wells recorded an increase in water level of up to 1.35 m, with a median of 0.27 m (Fig. 3). Negligible change in water level was recorded in three of the observation wells, where the change in maximum recovered water level between 2013 and 2014 was less than 0.1 m.

Groundwater salinity of the Lower Aquifer was not monitored in 2014 and as such, salinity was not used in the assessment of status for the Lower Aquifer.

[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.

The Lower Aquifer of the Barossa PWRA has been assigned a yellow status for 2014:

2014 Status "Gradual adverse changes, indicating a low risk to the resource in the medium term"

This means that minor adverse changes in the resource status have been observed over the 12-month reporting period. If these conditions were to continue, they are unlikely to negatively impact the beneficial uses of the resource (e.g. drinking water, irrigation or stock watering) for at least 15 years.

The 2014 status for the Lower Aquifer is supported by:

- an overall decline in the maximum recovered groundwater level when compared to 2013 water level 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 W*ater Allocation Plan for the Barossa Prescribed Water Resources Area* on the Natural Resources Adelaide and Mount Lofty Ranges website.

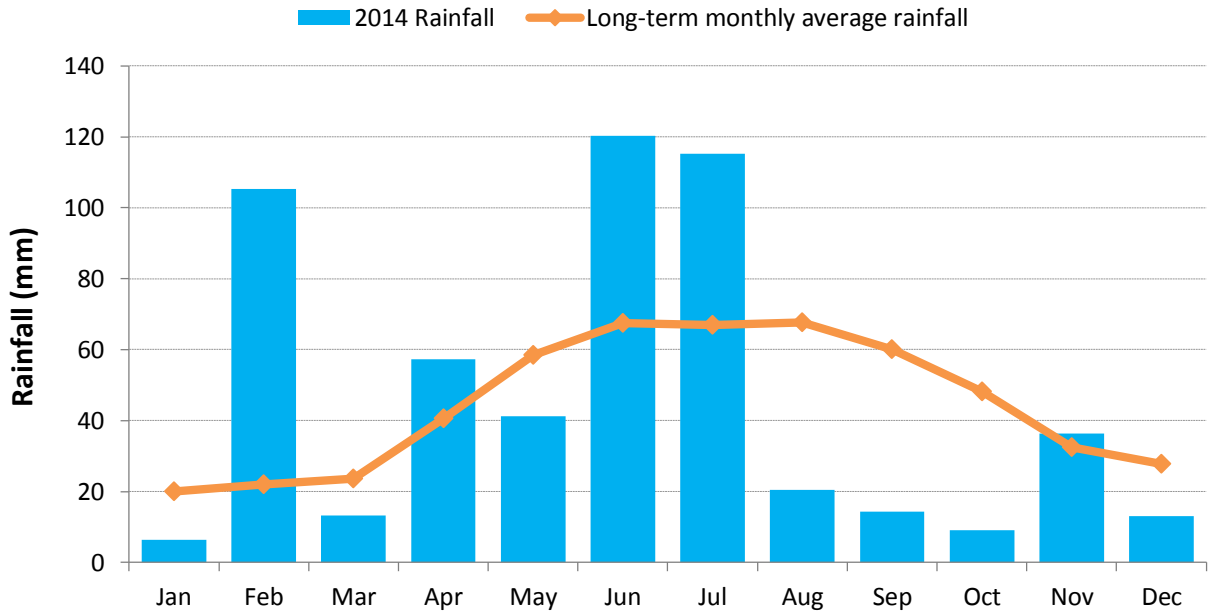


Figure 1. Monthly rainfall (mm) for 2014 and the long-term average monthly rainfall (mm) at the Angaston rainfall station[2] (number 23300) in the Barossa Prescribed Water Resources Area

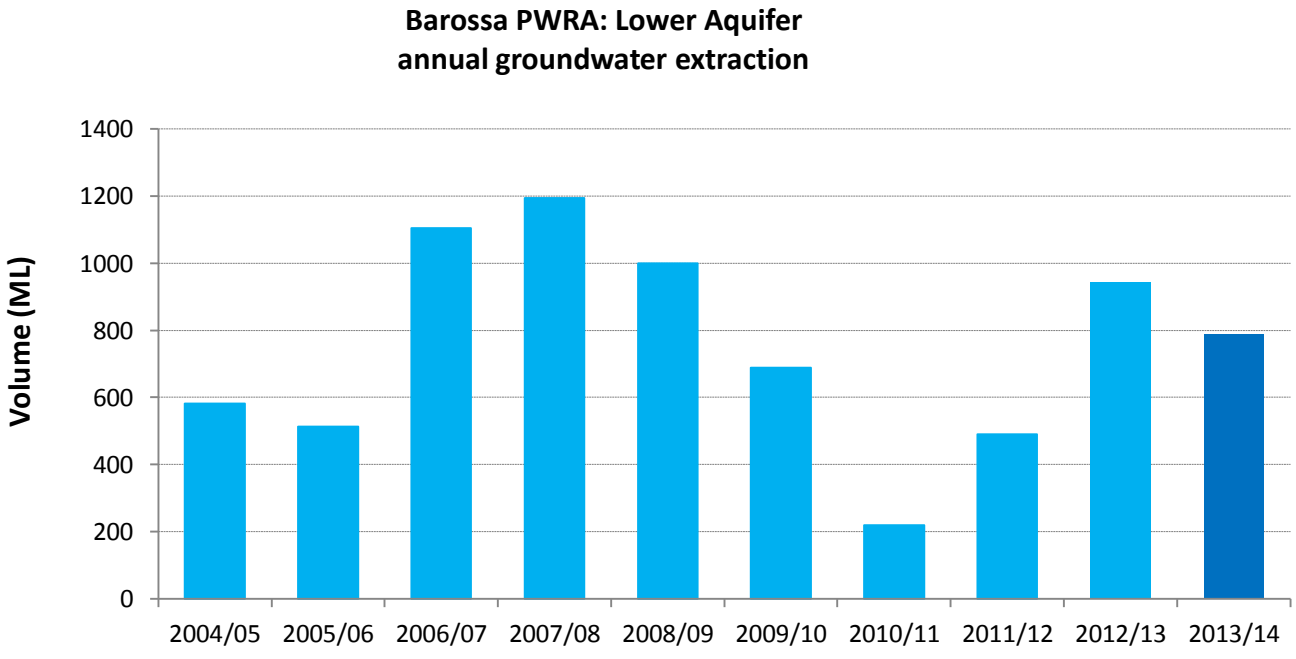


Figure 2. Historical licensed groundwater use for the Lower Aquifer in the Barossa Prescribed Water Resources Area

[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.

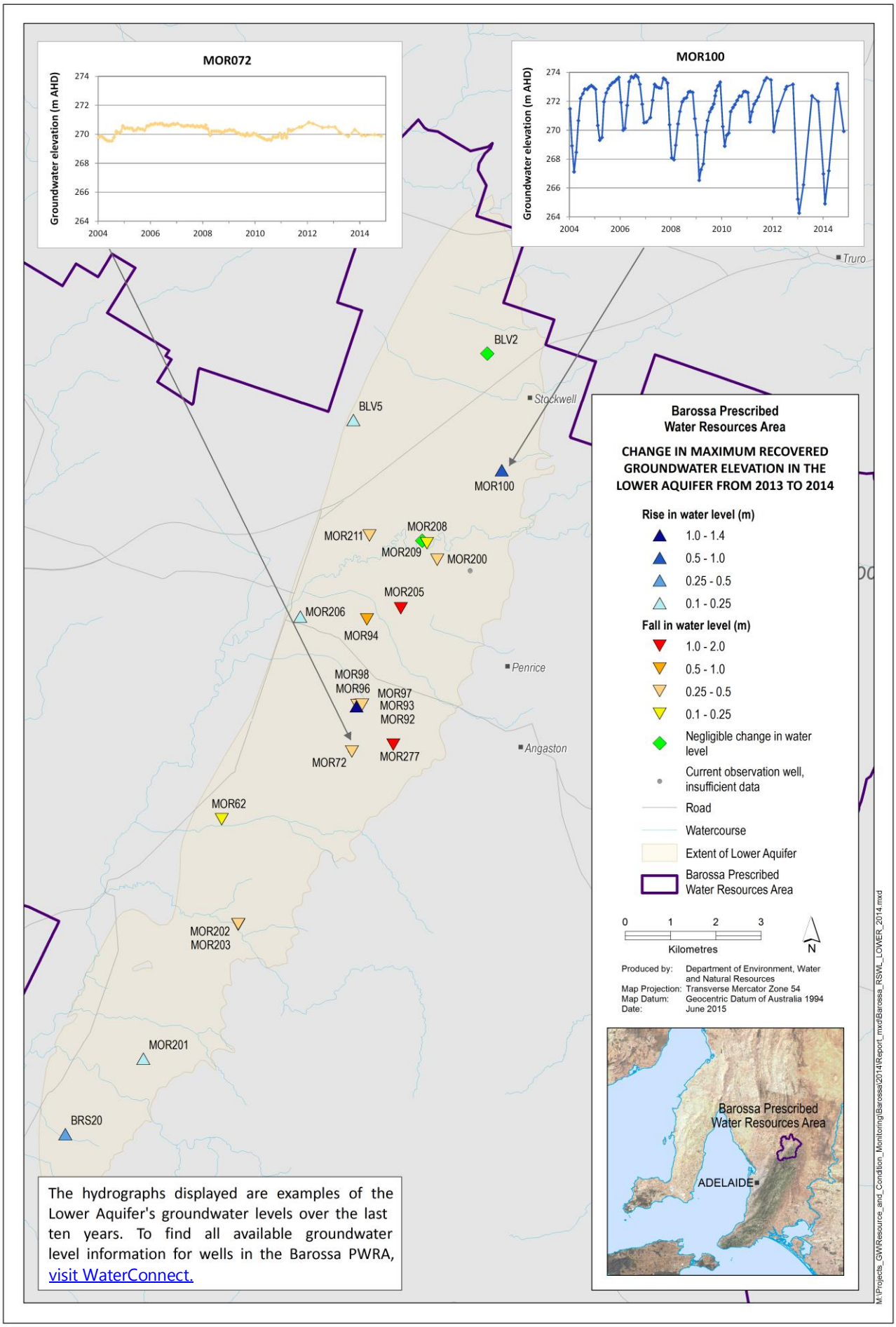


Figure 3. Overall changes in maximum groundwater levels in the Lower Aquifer of the Barossa Prescribed Water Resources Area from 2013 to 2014