

# Marne Saunders PWRA Fractured Rock Aquifer

2017 Groundwater level and salinity status report



Government  
of South Australia

Department for  
Environment and Water

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ISBN 978-1-925805-05-5

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

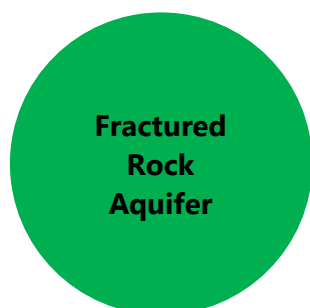
DEW (2018). *Marne Saunders PWRA Fractured Rock Aquifer 2017 Groundwater level and salinity status report*, Government of South Australia, Department for Environment and Water, Adelaide.

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# 2017 Status summary

## Marne Saunders PWRA

### Fractured Rock Aquifer



The Fractured Rock Aquifer (FRA) of the Marne Saunders Prescribed Water Resources Area (PWRA) has been assigned a **green** status for 2017 because positive trends have been observed over the past five years.

The status is based on five-year trends: over the period 2013–17, 82% of wells show rising groundwater levels and 86% show stable salinities.

This status report does not seek to evaluate the sustainable limits of the resource, nor does it make any recommendations on management or monitoring of the resource. These actions are important, but occur through separate processes such as prescription and water allocation planning.

#### Rainfall

See Figures 1 and 2

Rainfall station	Mount Pleasant Bureau of Meteorology (BoM) rainfall station 23737, located in the south-west outside boundary of Marne Saunders PWRA
Annual total <sup>1</sup>	868 mm 218 mm (33%) greater than the five-year average of 650 mm 206 mm (31%) greater than the long-term average of 662 mm
Monthly summary	Well-above average rainfall recorded in July, September, December and January Well-below average rainfall recorded in March and June
Spatial distribution	Rainfall in 2016–17 was above average across the entire PWRA

#### Water use

See Figure 3

Total allocated volume: 2016–17	1702 ML <sup>2</sup>
Licensed groundwater extractions*	252 ML <sup>2</sup> (15% of total allocation)
Extraction volume comparison	50% less than the previous year 34% less than the five-year average

\*Stock and domestic use is not included in licensed extractions

<sup>1</sup> For the water-use year 1 July 2016 to 30 June 2017

<sup>2</sup> Total licensed allocation and extractions are subject to change as data have not yet been verified in full – see [More information](#)

## Groundwater level

See Figure 4

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Five-year trend: 2013–17	9 out of 11 wells (82%) show rising trends, at rates of 0.10–0.50 m/y (median of 0.19 m/y) 2 wells (18%) show declining trends, at rates of 0.17 and 0.23 m/y; these wells also showing their lowest level on record
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## Groundwater salinity

See Figures 5 and 6

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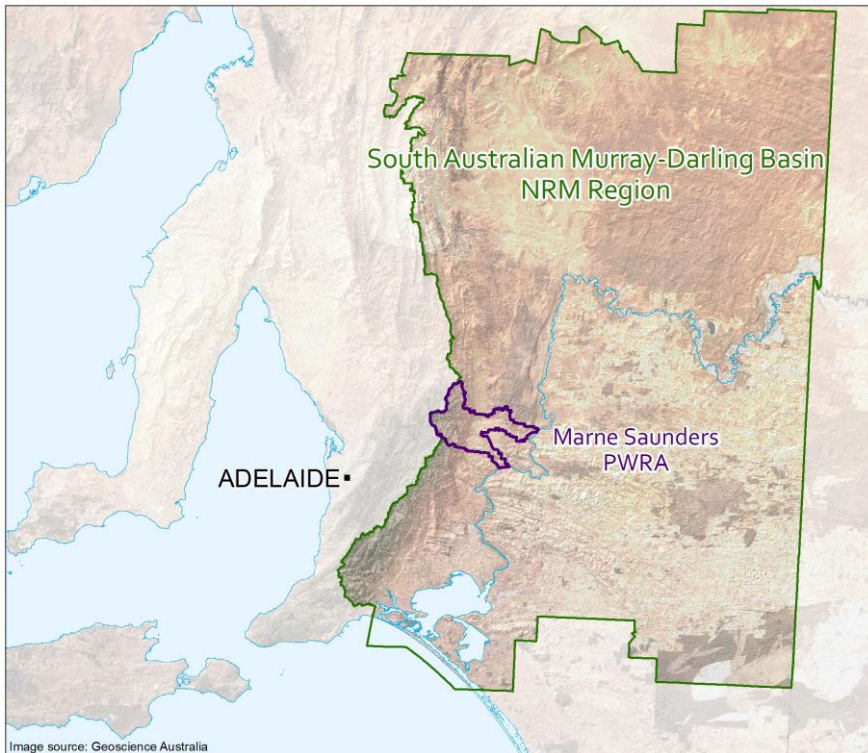
2017 salinity	287–6051 mg/L 11 out of 38 wells (29%) show salinities less than 1500 mg/L, which is the salinity threshold for most crop types
Five-year trend: 2013–17	6 out of 7 wells (86%) show stable salinities 1 well (14%) shows an increasing trend, at a rate of 53 mg/L/y
Citizen science	Since 2014, irrigators in the Marne Saunders PWRA have submitted salinity samples and once validated, these will augment the existing DEW monitoring network <sup>3</sup>

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<sup>3</sup> The salinity data collected from irrigation wells can be viewed at [WaterConnect](#)

# Regional setting



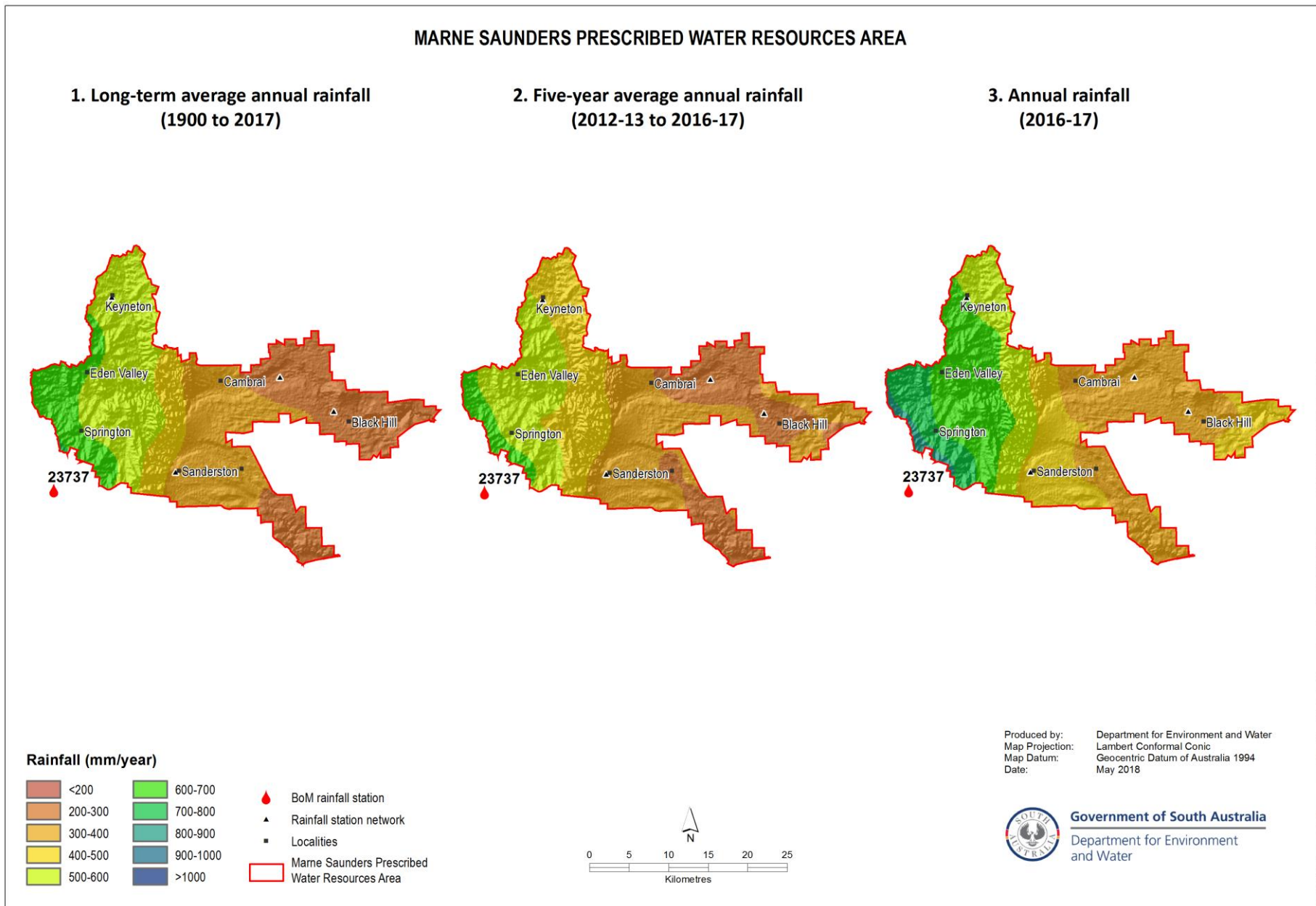
The Marne Saunders PWRA is located within the South Australian Murray-Darling Basin Natural Resources Management Region and lies on the eastern side of the Mount Lofty Ranges (MLR), approximately 60 km north-east of Adelaide. It is a regional-scale resource for which groundwater, surface water and watercourse water are prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan (WAP) provides for sustainable use of the water resources.

The Marne Saunders PWRA consists of two tributary catchments of the River Murray and can be divided into two distinct groundwater regions: the 'hills zone' to the west (the focus of this report), and the 'plains zone' in the east. The hills zone comprises the consolidated basement rock of the MLR, which is comprised of micaceous and feldspathic sandstones and siltstones of the Cambrian-aged Kanmantoo Group. The metamorphic rocks form a fractured rock aquifer that is generally tight and impermeable with few fractures and joints, within which groundwater is stored and transmitted; consequently, wells are typically low yielding (around 2 L/s).

The movement of groundwater within the catchment generally follows topographic contours, recharging at high elevation before discharging to streams that are situated lower in the landscape. Groundwater flows eastward from recharge zones in the MLR before discharging to the lower-lying sedimentary aquifers of the plains zone. Recharge to the elevated Fractured Rock Aquifer of the hills zone occurs by rainfall percolation through the soil profile or exposed bedrock.

Trends in groundwater levels and salinities in the FRA of the Marne Saunders PWRA are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifer. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause the groundwater levels to decline and salinities to increase. Conversely, increases in rainfall may result in increases in recharge, decreases in irrigation extractions and groundwater levels may rise and salinities may stabilise or decrease.





**Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall<sup>4</sup>**

<sup>4</sup> Data sources: SILO Patched Point Dataset <https://silo.longpaddock.qld.gov.au/> and BoM Australian Water Availability Project (<http://www.bom.gov.au/jsp/awap/>) – see [More information](#)

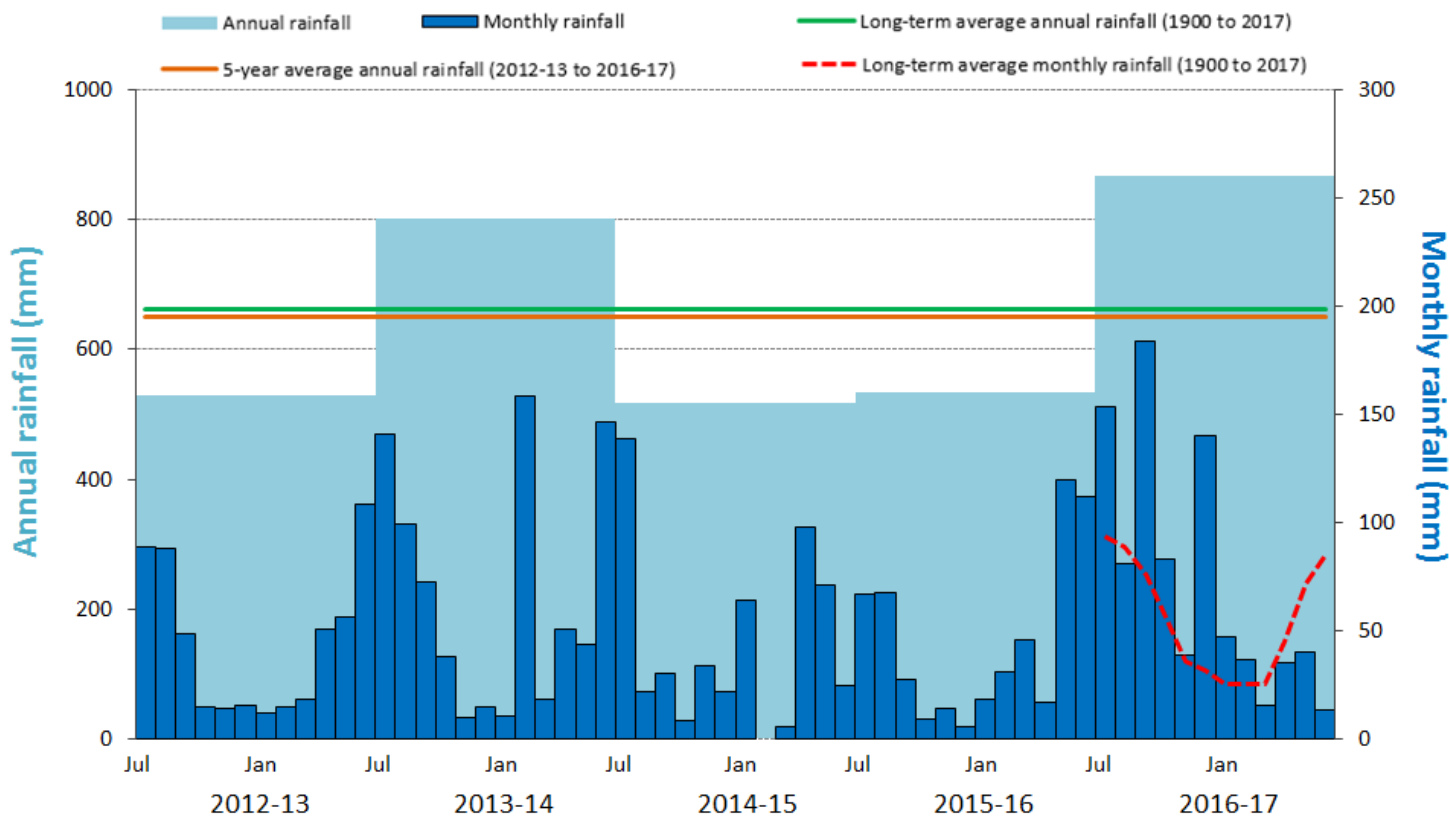


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Mount Pleasant (BoM Station 23737)<sup>5</sup>

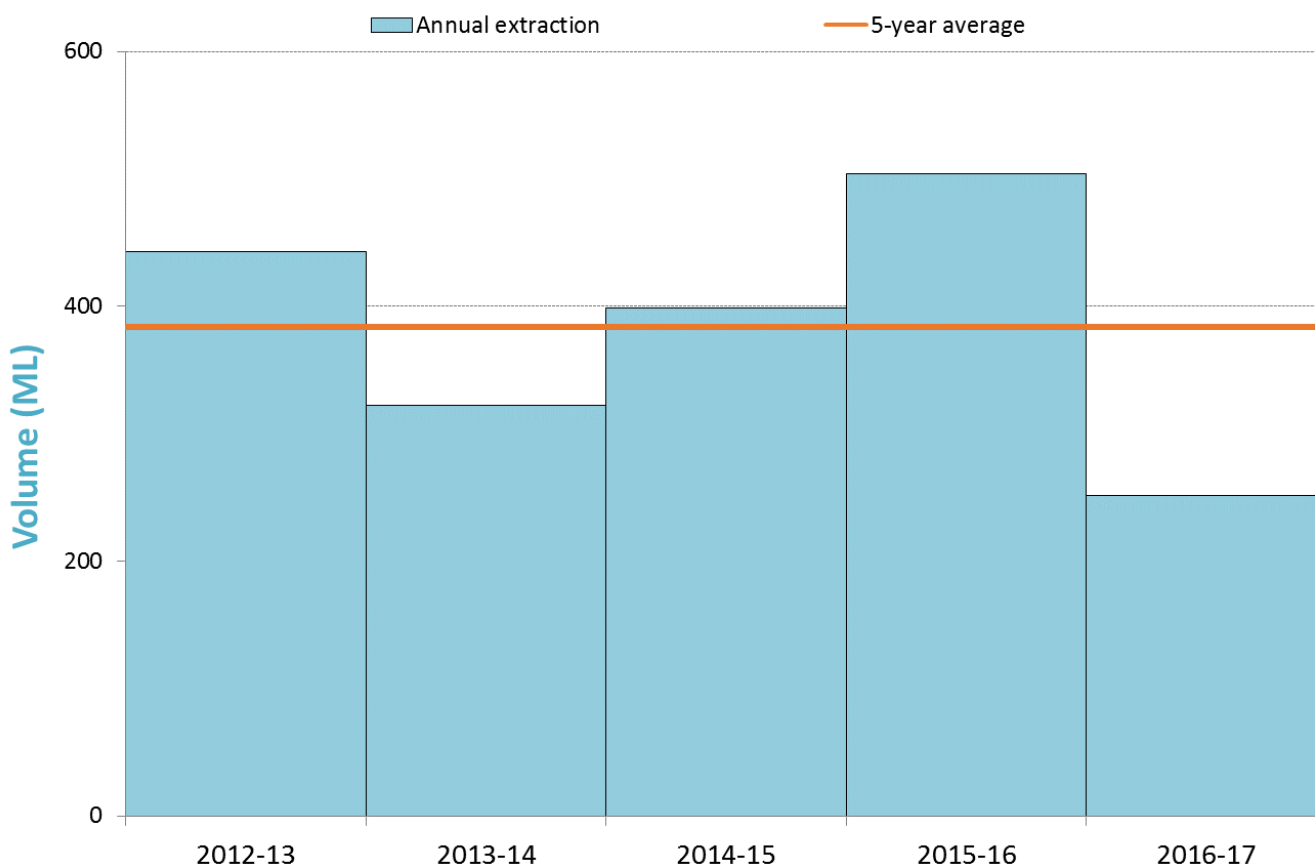
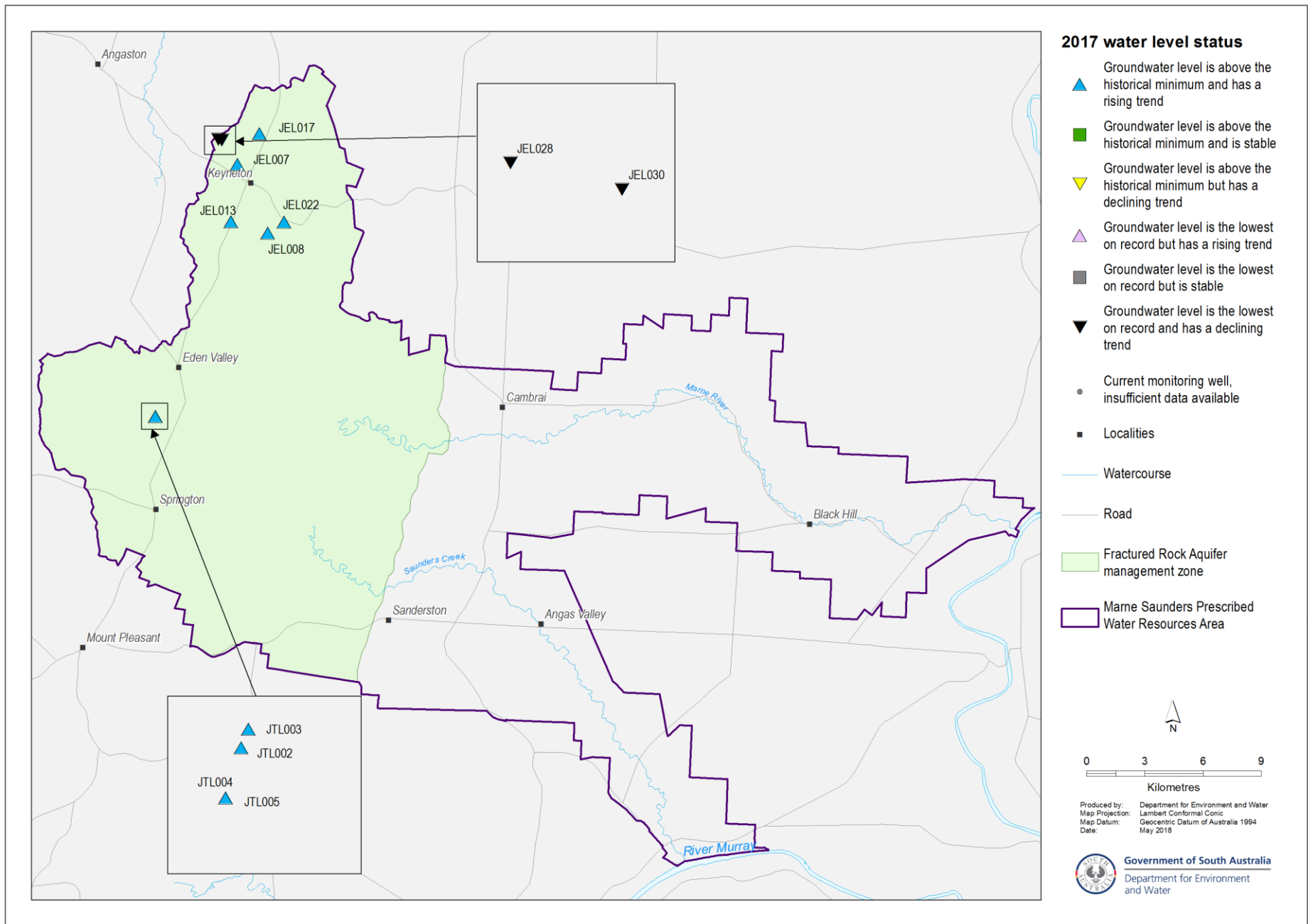


Figure 3. Licensed groundwater extraction volumes<sup>6</sup> for the past five water-use years

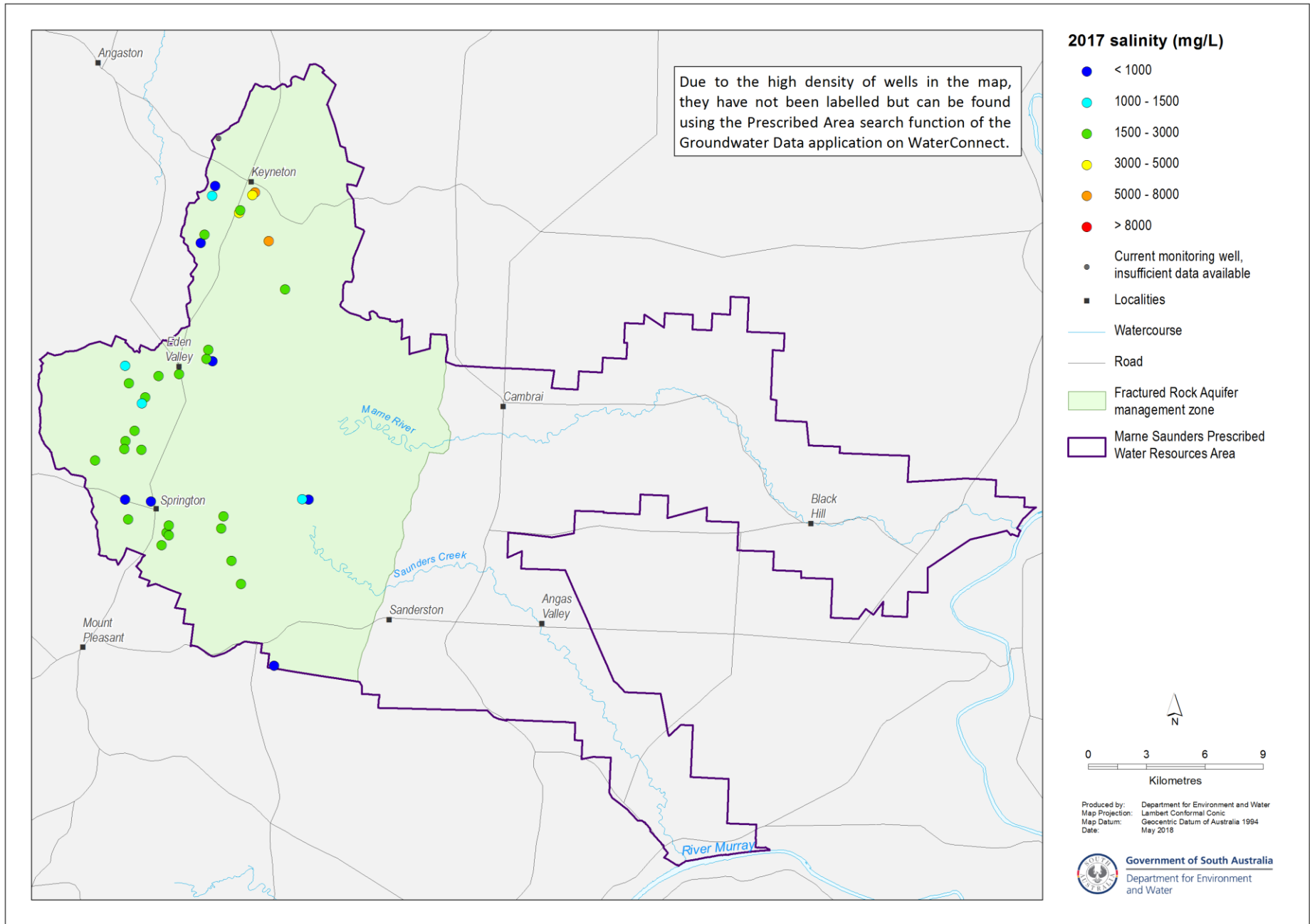
<sup>5</sup> Data source: SILO Patched Point Dataset, available <https://silo.longpaddock.qld.gov.au/> – see [More information](#)

<sup>6</sup> Total licensed extractions are subject to change as extraction data have not yet been verified in full – see [More information](#)

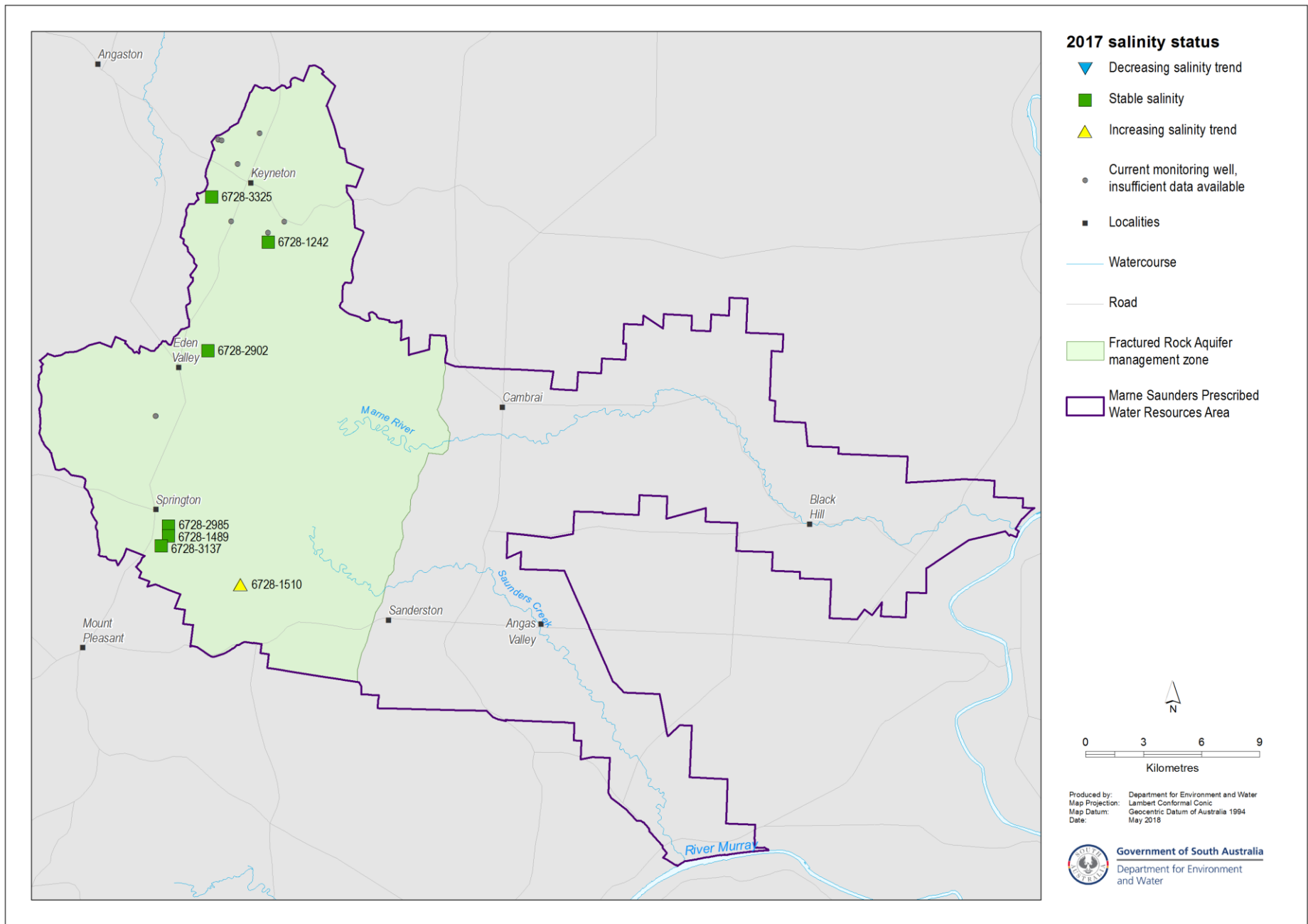


**Figure 4. Five-year trends (2013–17) in groundwater pressure levels: Fractured Rock Aquifer**





**Figure 5. 2017 groundwater salinities: Fractured Rock Aquifer**



**Figure 6. Five-year trends (2013–17) in groundwater salinities: Fractured Rock Aquifer**

# More information

To determine the status of the FRA aquifer for 2017, the trends in groundwater levels and salinities over the past five years (2013 to 2017, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in *Groundwater level and salinity status reports* published prior to 2015. 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, and to review the full historical record of the monitoring wells, please visit the *Water Resource Assessments* page on [WaterConnect](#).

For additional information related to monitoring wells nomenclature, please refer to the *Well Details* page on [WaterConnect](#).

The licensed groundwater allocation and use for the 2016–17 water-use year is based on the best data available as of January 2018 and may be subject to change, as some extraction volumes may be in the process of being verified.

For information completeness and consistency across all the groundwater and salinity status reports, the legend on each map herein shows the full range of water level and salinity status that could possibly be reported. However, the measured data that appear on each map may not span this full range.

Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original BoM daily rainfall measurements and is available online at <https://silo.longpaddock.qld.gov.au/>. Rainfall maps have been compiled using daily gridded data produced by the BoM Australian Water Availability Project ([www.bom.gov.au/jsp/awap/](http://www.bom.gov.au/jsp/awap/)).

To view the *Marne Saunders PWRA Groundwater Level and Salinity Status Report 2011*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit [WaterConnect](#). To view all past published *Groundwater level and salinity status reports*, please visit the [Water Resource Assessments](#) page on WaterConnect.

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

For further information about the Marne Saunders PWRA, please see the *Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area* on the Natural Resources SA Murray-Darling Basin [website](#).

## Units of Measurement

mm	millimetre
ML	megalitre
m/y	metres per year
mg/L	milligrams per litre
mg/L/y	milligrams per litre per year
mm/y	millimetres per year



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Front Cover © Graham Green, Principal Hydrogeologist, DEW

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Published 2018

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