

Marne Saunders

Prescribed Water Resources Area

Fractured rock aquifers

2018 Groundwater level and salinity status report



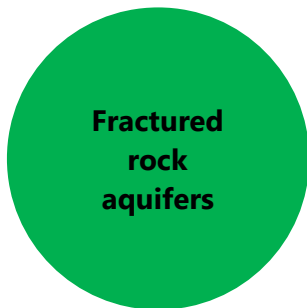
**Government
of South Australia**

Department for
Environment and Water

2018 Status summary

Marne Saunders PWRA

Fractured rock aquifers



The fractured rock aquifers (FRAs) of the Marne Saunders Prescribed Water Resources Area (PWRA) have been assigned a **green** status for 2018 because positive trends have been observed over the past five years.

The status is based on five-year trends: over the period 2014–18, 70% of wells show rising or stable groundwater levels and 93% show decreasing or stable salinities.

The status is based on five-year trends. To view the *Marne Saunders PWRA groundwater level and salinity status report 2011*, which includes long-term trends in rainfall, groundwater levels and salinity, please visit the [Water Resource Assessments](#) page on WaterConnect. To download the full record of groundwater level and salinity data for the Marne Saunders PWRA, please visit the *Groundwater Data* page on [WaterConnect](#).

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 | The Mount Pleasant Bureau of Meteorology (BoM) rainfall station, number 23737, located west of the Marne Saunders PWRA is representative of rainfall conditions in the fractured rock management zone. |
| Annual total ¹ | 672 mm 4 mm (1%) less than the five-year average of 676 mm 13 mm (2%) greater than the long-term (1900-2018) average of 659 mm |

Groundwater extraction

See Figure 3

| | |
|---|---|
| Allocated volume ^{1,2} | 1936 ML |
| Licensed groundwater extractions ^{1,3} | 404 ML |
| Extraction volume comparison | 60% greater than the previous year 7% greater than the five-year average |

¹ For the water-use year 1 July 2017 to 30 June 2018

² Allocated volume does not include rollover, carry over or recharge allocations

³ Total licensed extractions are subject to change as data have not yet been verified in full – see [More information](#)

Groundwater level

See Figure 4

| | |
|--------------------------|--|
| Five-year trend: 2014–18 | 6 out of 10 wells (60%) show rising trends, at rates of 0.05–0.33 m/y (median of 0.11 m/y) 1 well (10%) is stable 3 wells (30%) show declining trends, at rates of 0.16–0.37 m/y (median of 0.17 m/y); 2 of these wells show their lowest level on record |
|--------------------------|--|

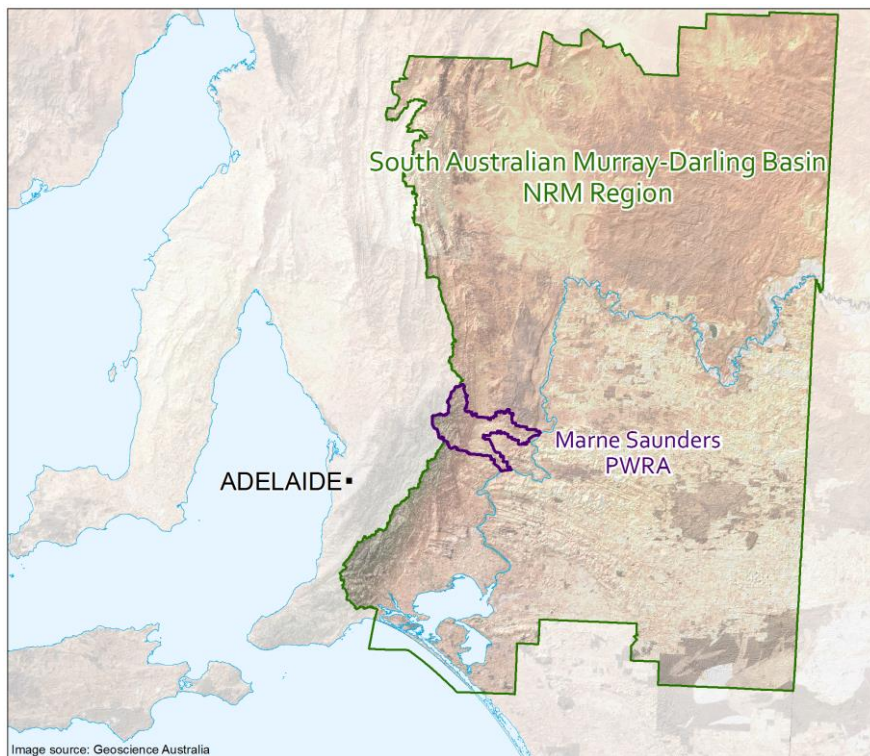
Groundwater salinity

See Figures 5 and 6

| | |
|--------------------------|--|
| 2018 salinity | 240–5234 mg/L (34 wells; median of 1707 mg/L) |
| Five-year trend: 2014–18 | 9 out of 15 wells (60%) show stable salinities 5 wells (33%) show decreasing trends, at rates of 38–130 mg/L/y (median of 61 mg/L/y) 1 well (7%) shows an increasing trend, at a rate of 71 mg/L/y |
| Citizen science | Since 2014, irrigators in the Marne Saunders PWRA have submitted groundwater samples that DEW have tested for salinity concentration. Data that have been validated are augmenting the existing DEW monitoring network. ⁴ |

⁴ The salinity data collected from irrigation wells can be viewed at [Groundwater Data](#) or via [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* and a water allocation plan provides for their sustainable management.

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 (Fig. 4). 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 FRAs that are 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 FRAs of the hills zone occurs by rainfall percolation through the soil profile or exposed bedrock.

Trends in groundwater level and salinity within the FRAs are primarily climate-driven: below-average rainfall can result in a reduction in recharge to the aquifer. Below-average summer rainfall can also result in increased extractions for irrigation, and both these elements can cause the groundwater levels to decline and salinities to increase. Conversely, above-average rainfall may result in increased recharge and decreases in irrigation extractions, which can cause groundwater levels to rise and salinities to stabilise or decrease.

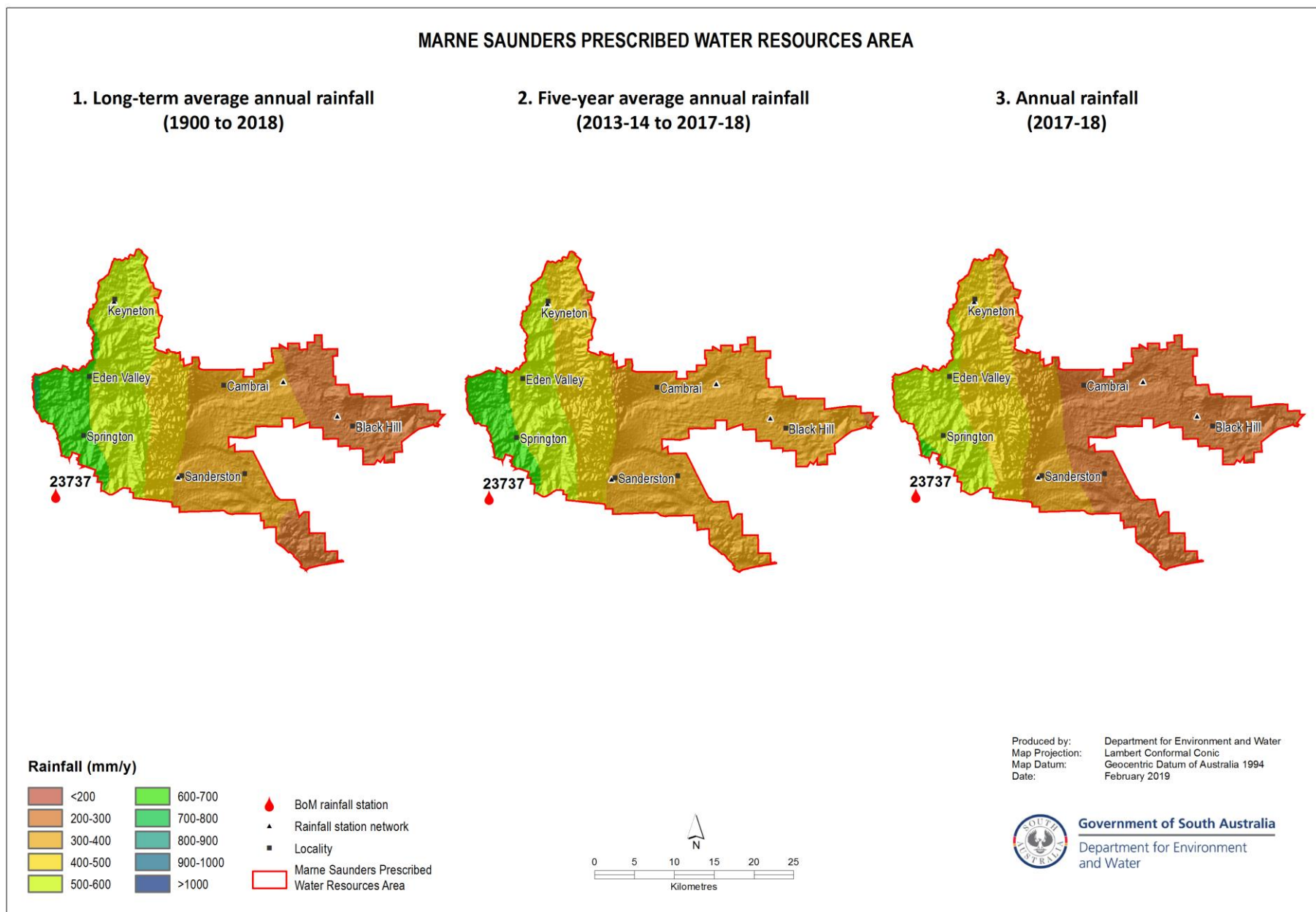


Figure 1. Spatial distribution of (1) long-term and (2) five-year average annual rainfall, and (3) annual rainfall⁵. The fractured rock aquifers management zone is shown in Figure 4

⁵ Data sources: SILO interpolated point and gridded datasets available at <https://legacy.longpaddock.qld.gov.au/silo/> – see [More information](#)

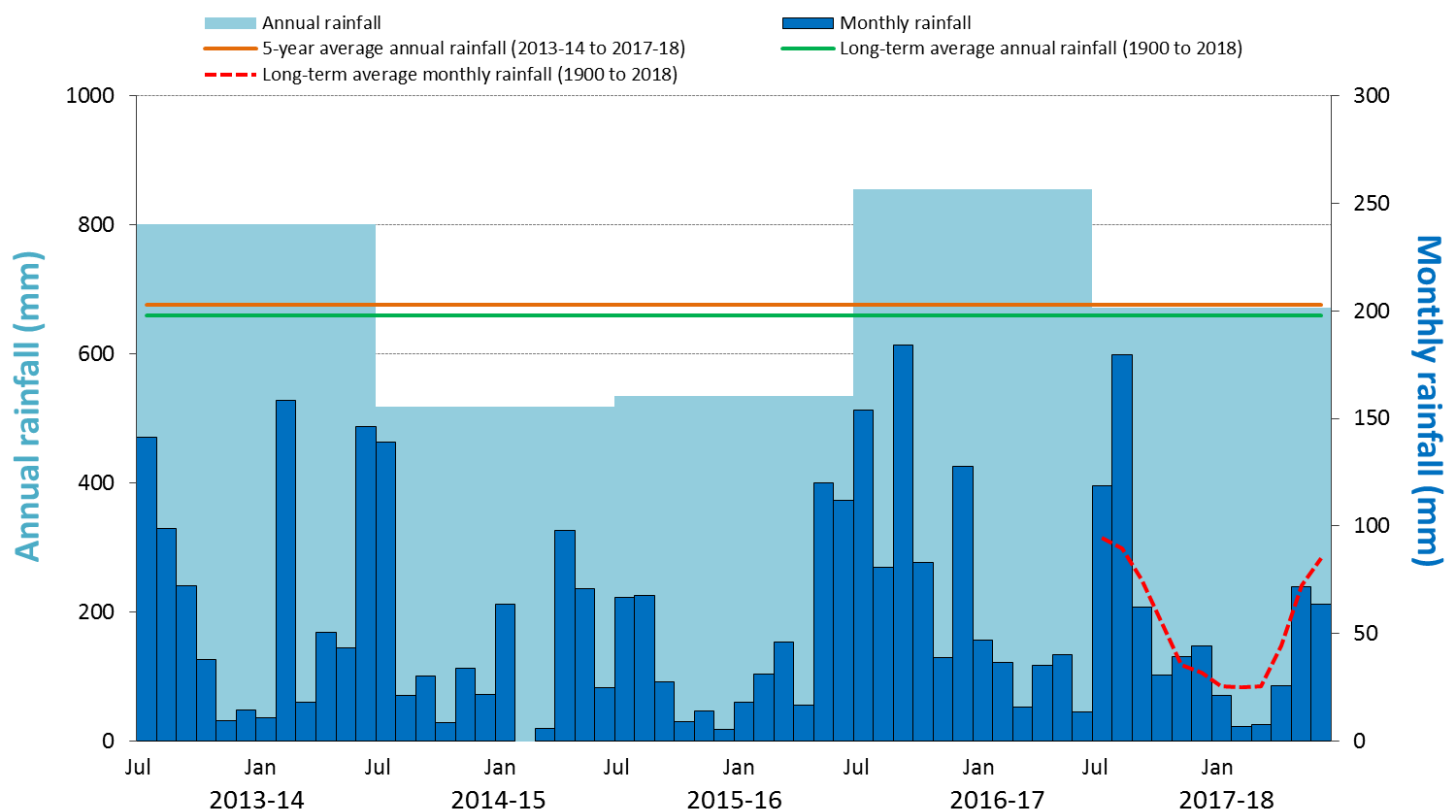


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Mount Pleasant (BoM Station 23737)⁶

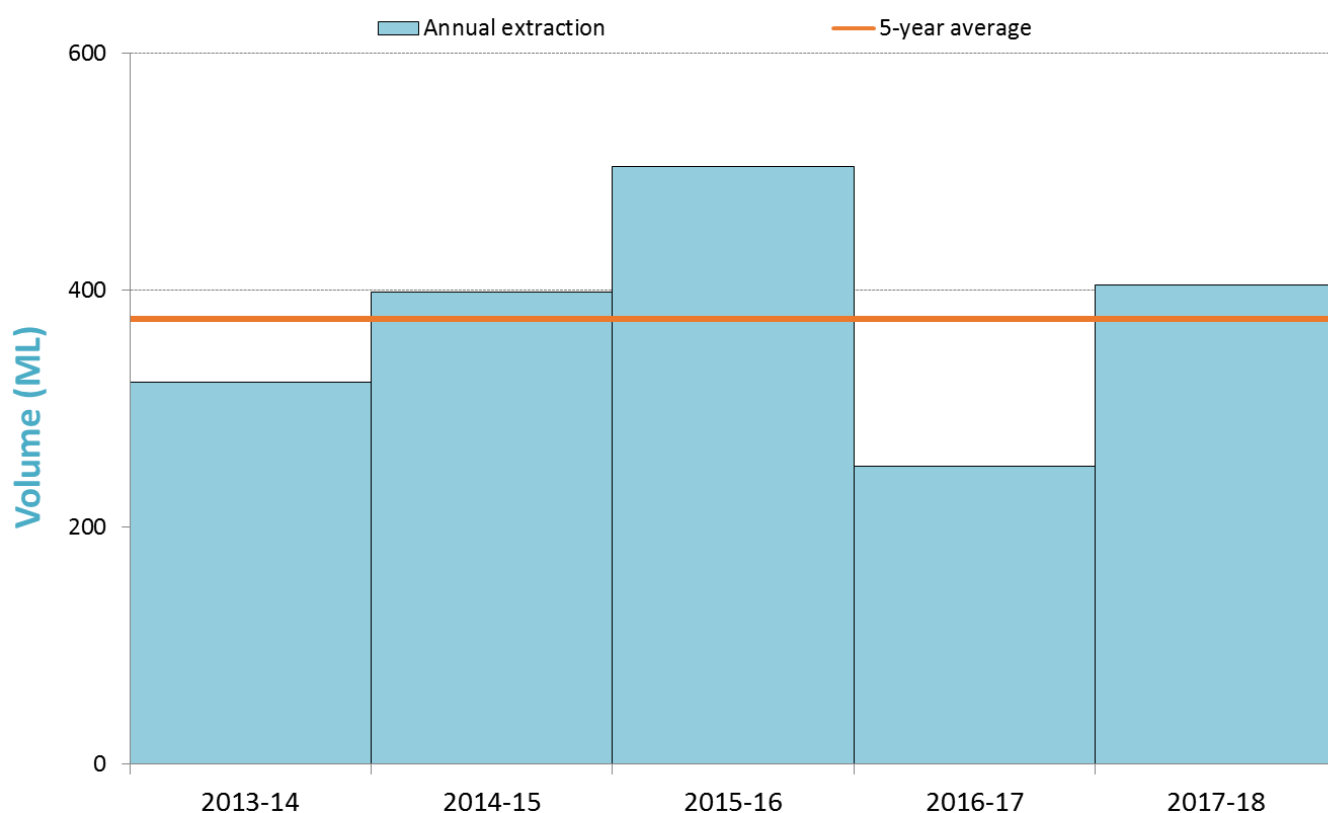


Figure 3. Licensed groundwater extraction volumes⁷ for the past five water-use years

⁶ Data source: SILO Patched Point Dataset, available <https://legacy.longpaddock.qld.gov.au/silo/> – see [More information](#)

⁷ Total licensed extractions are subject to change as extraction data have not yet been verified in full – see [More information](#)

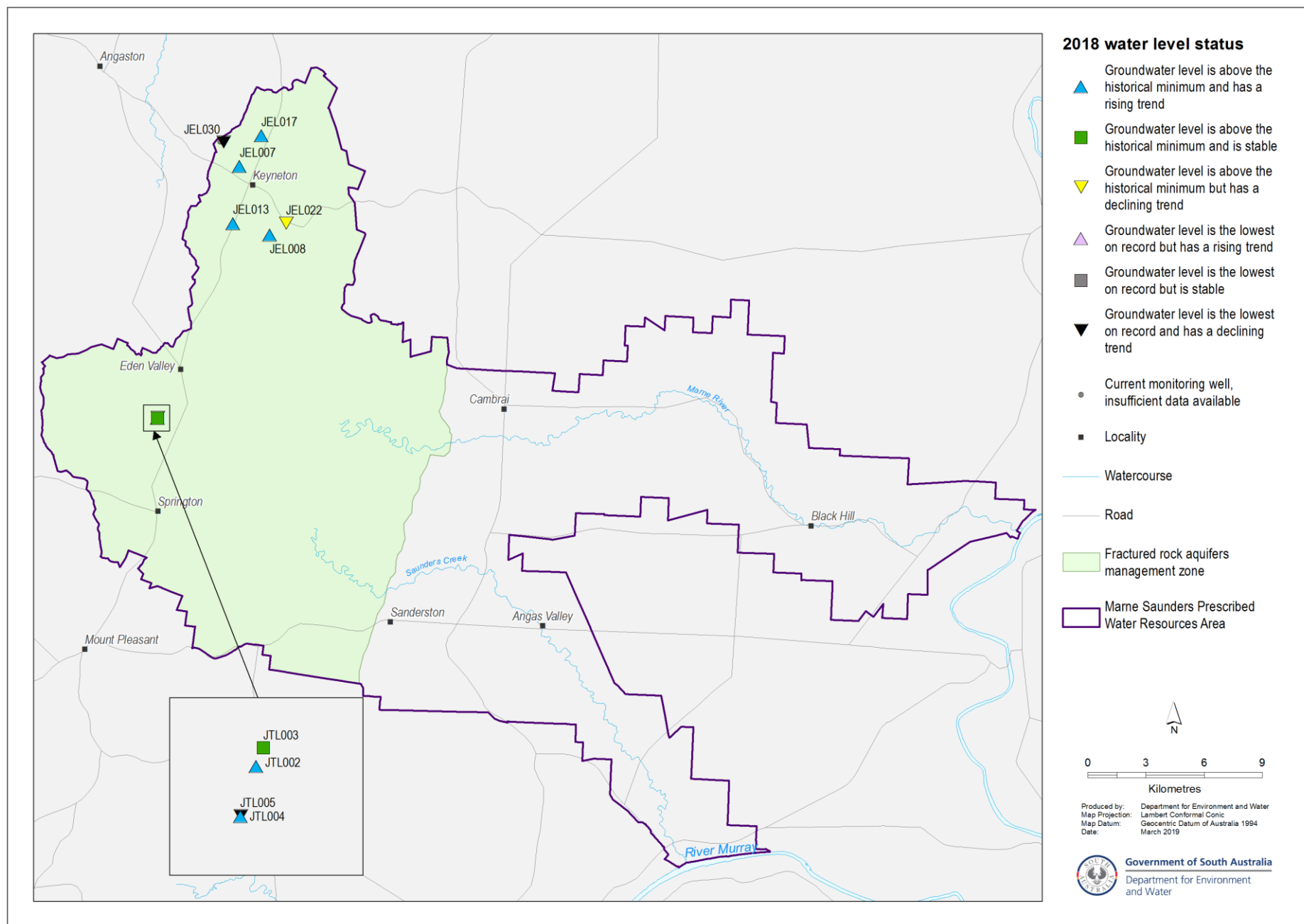


Figure 4. Five-year trends (2014–18) in groundwater pressure levels: fractured rock aquifers

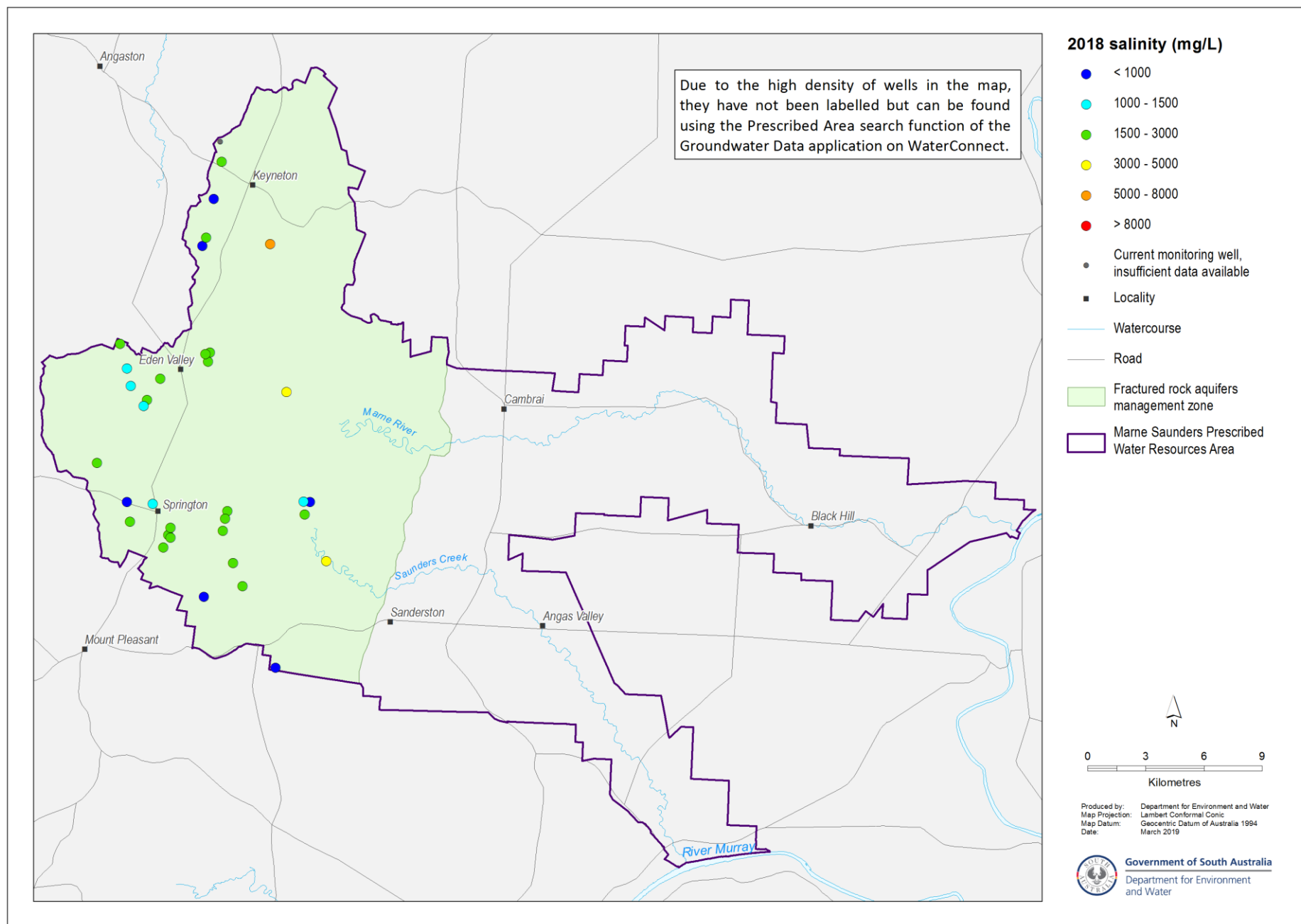


Figure 5. 2018 groundwater salinities: fractured rock aquifers

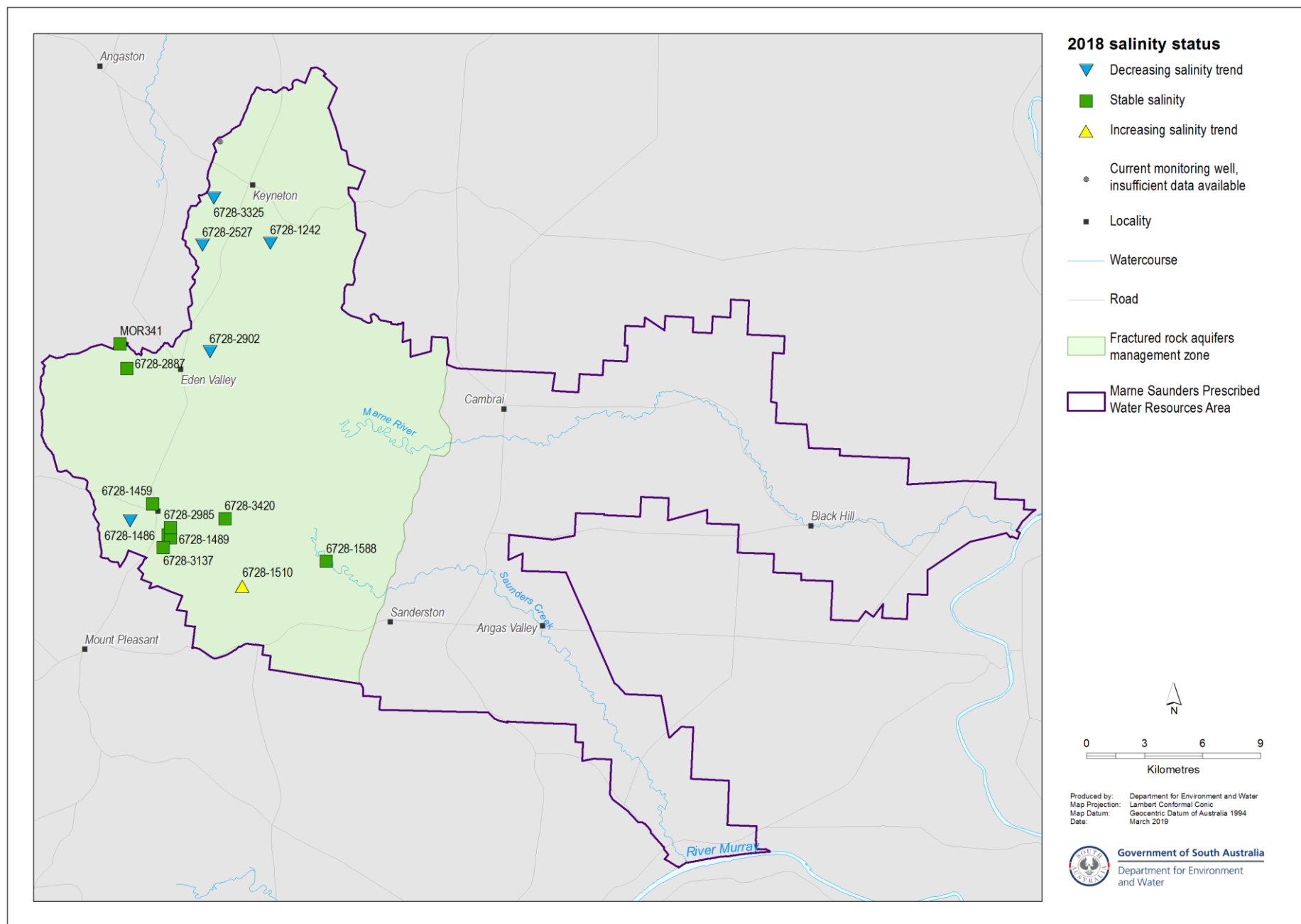


Figure 6. Five-year trends (2014–18) in groundwater salinities: fractured rock aquifers

More information

To determine the status of the FRAs for 2018, the trends in groundwater levels and salinities over the past five years (2014 to 2018, 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, 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 extraction for the 2017–18 water-use year is based on the best data available as of February 2019 and could 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 are sourced from the SILO interpolated point and gridded datasets, which are calculated from BoM daily and monthly rainfall measurements and are available online at <https://legacy.longpaddock.qld.gov.au/silo/>.

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 |

Published by the Department for Environment and Water.
Government of South Australia
16 July 2019

Head Office
81-95 Waymouth St
ADELAIDE SA 5000

Telephone +61 (8) 8463 6946
Facsimile +61 (8) 8463 6999

ABN 36702093234
ISBN 978-1-925805-80-2

Report prepared by:
Department for Environment and Water
Water Science and Monitoring Branch
Strategy, Science and Corporate Services Directorate

www.environment.sa.gov.au

Disclaimer

The Department for Environment and Water 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 for Environment and Water 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.



With the exception of the Piping Shrike emblem, other material or devices protected by Aboriginal rights or a trademark, and subject to review by the Government of South Australia at all times, the content of this document is licensed under the Creative Commons Attribution 4.0 Licence. All other rights are reserved.

Preferred way to cite this publication

DEW 2019. *Marne Saunders PWRA fractured rock aquifers 2018 groundwater level and salinity status report*, Government of South Australia, Department for Environment and Water, Adelaide.

Download this document at www.waterconnect.sa.gov.au

© Crown in right of the State of South Australia | 2019



**Government
of South Australia**

Department for
Environment and Water