

# Eastern Mount Lofty Ranges PWRA Permian Sand aquifer

2017 Groundwater level and salinity status report



Government  
of South Australia

Department for  
Environment and Water

Department for Environment and Water  
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 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.



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 for Environment and Water 2018

ISBN 978-1-925805-00-0

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

DEW (2018). *Eastern Mount Lofty Ranges PWRA Permian Sand aquifer 2017 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](http://www.waterconnect.sa.gov.au)

# 2017 Status summary

## Eastern Mount Lofty Ranges PWRA

### Permian Sand aquifer



The Permian Sand aquifer in the Tookayerta Permian Management Zone of the Eastern Mount Lofty Ranges (EMLR) 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, 90% of wells show rising or stable groundwater levels.



The Permian Sand aquifer in the Finniss Permian 1 Management Zone of the EMLR 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, 87% of wells show rising or stable groundwater levels.

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	Ashbourne Bureau of Meteorology (BoM) rainfall station 23701, located centrally among monitoring wells of the two management zones
Annual total <sup>1</sup>	777 mm 204 mm (36%) greater than the five-year average of 573 mm 130 mm (20%) greater than the long-term average of 647 mm
Monthly summary	Well-above average rainfall recorded in July, September, October, December and January Well-below average rainfall recorded in August, November, March, May and June
Spatial distribution	Rainfall in 2016–17 was well above average across the entire PWRA

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

## Water use

---

Total allocated volume: 2016–17	31 248 ML (all aquifers of the EMLR PWRA)
Licensed groundwater extractions*	1976 ML <sup>2</sup> (Tookayerta Permian and Finniss Permian 1 Management Zones)

---

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

## Groundwater level

See Figure 3

---

Management Zone	Tookayerta Permian
Five-year trend: 2013–17	17 out of 21 wells (80%) show rising trends, at rates of 0.05–0.93 m/y (median of 0.16 m/y) 2 wells (10%) are stable 2 wells (10%) show declining trends, at rates of 0.06 and 0.12 m/y, respectively
Management Zone	Finniss Permian 1
Five year trend: 2013–17	12 out of 16 wells (75%) show rising trends, at rates of 0.06–0.60 m/y (median of 0.24 m/y) 2 wells (12.5%) are stable 2 wells (12.5%) show declining trends, both at the rate of 0.04 m/y

---

## Groundwater salinity

See Figure 4

---

2017 salinity	69–1535 mg/L 41 out of 50 wells (82%) show salinities less than 1000 mg/L
Five-year trend: 2013–17	Insufficient data
Citizen science	Since 2014, irrigators in the EMLR PWRA have submitted salinity samples and once validated, these will augment the existing DEW monitoring network <sup>3</sup>

---

---

<sup>2</sup> Total licensed extractions are subject to change as extraction data have not yet been verified in full; installation of water meters by licensed users is still in progress across the EMLR PWRA (by 2016–17, 66% of licensees have installed their meters) – see [More information](#)

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



# Regional setting



The EMLR PWRA lies within the South Australian Murray-Darling Basin Natural Resources Management Region and is located about 50 km 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 (WAP) provides for the sustainable use of the region's water resources. The Angas Bremer Prescribed Wells Area is located within the boundaries of the EMLR PWRA and a stand-alone groundwater level and salinity status report has been prepared for this area (please visit the *Water Resource Assessments* page on [WaterConnect](#)).

There are three main sedimentary groundwater systems in the EMLR PWRA: the Permian Sand, Murray Group Limestone and Quaternary aquifers. This report focuses on the Permian Sand aquifer, in particular the Tookayerta and Finniss Permian 1 Management Zones (Fig. 1), which are defined in the WAP. The Permian Sand aquifer, also known as the Cape Jervis Formation, was deposited in several large U-shaped valleys that have been incised into basement rock (the Kanmantoo Group). It comprises glacial deposits of unconsolidated sands, silts and clays with occasional gravel beds. The Permian Sand aquifer forms part of the eastern slopes of the hills region and on the plains it underlies sediments of the Murray Basin. The Permian Sand aquifer is generally permeable, allowing high rates of rainfall recharge that results in high yields and low salinities. However, due to high clay content in some areas, the aquifer is instead low-yielding and higher in salinity. Despite this variability, the Permian Sand aquifer is widely developed for irrigation and the Mount Compass town water supply.

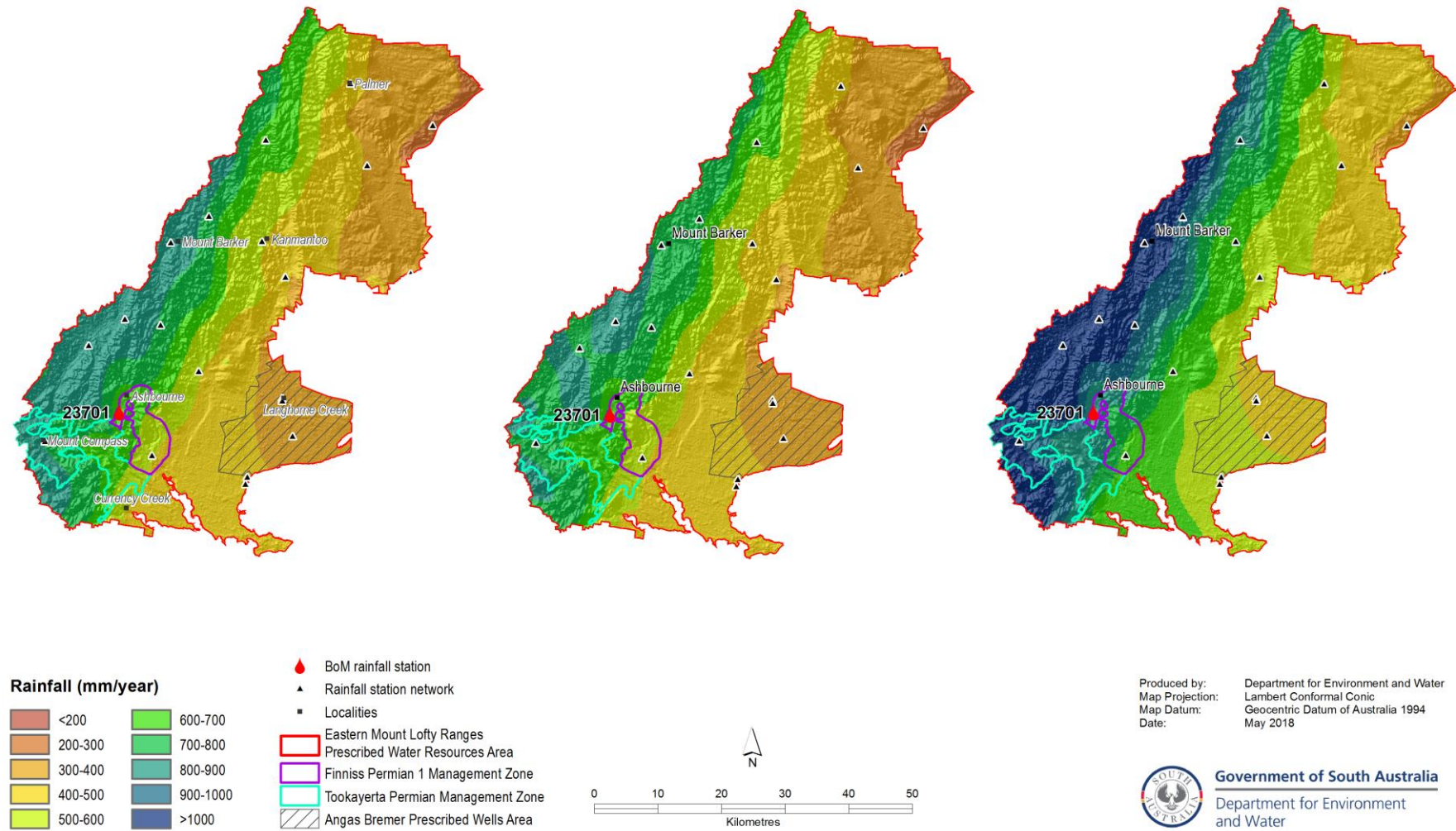
Trends in groundwater levels and salinity in the Permian Sand aquifer are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifer. Below-average summer rainfall can also result in increasing irrigation extractions, and these two elements can cause groundwater levels to fall and may cause 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.

## EASTERN MOUNT LOFTY RANGES PRESCRIBED WATER RESOURCES AREA

**1. Long-term average annual rainfall  
(1900 to 2017)**

**2. Five-year average annual rainfall  
(2012-13 to 2016-17)**

**3. Annual rainfall  
(2016-17)**



**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](#)

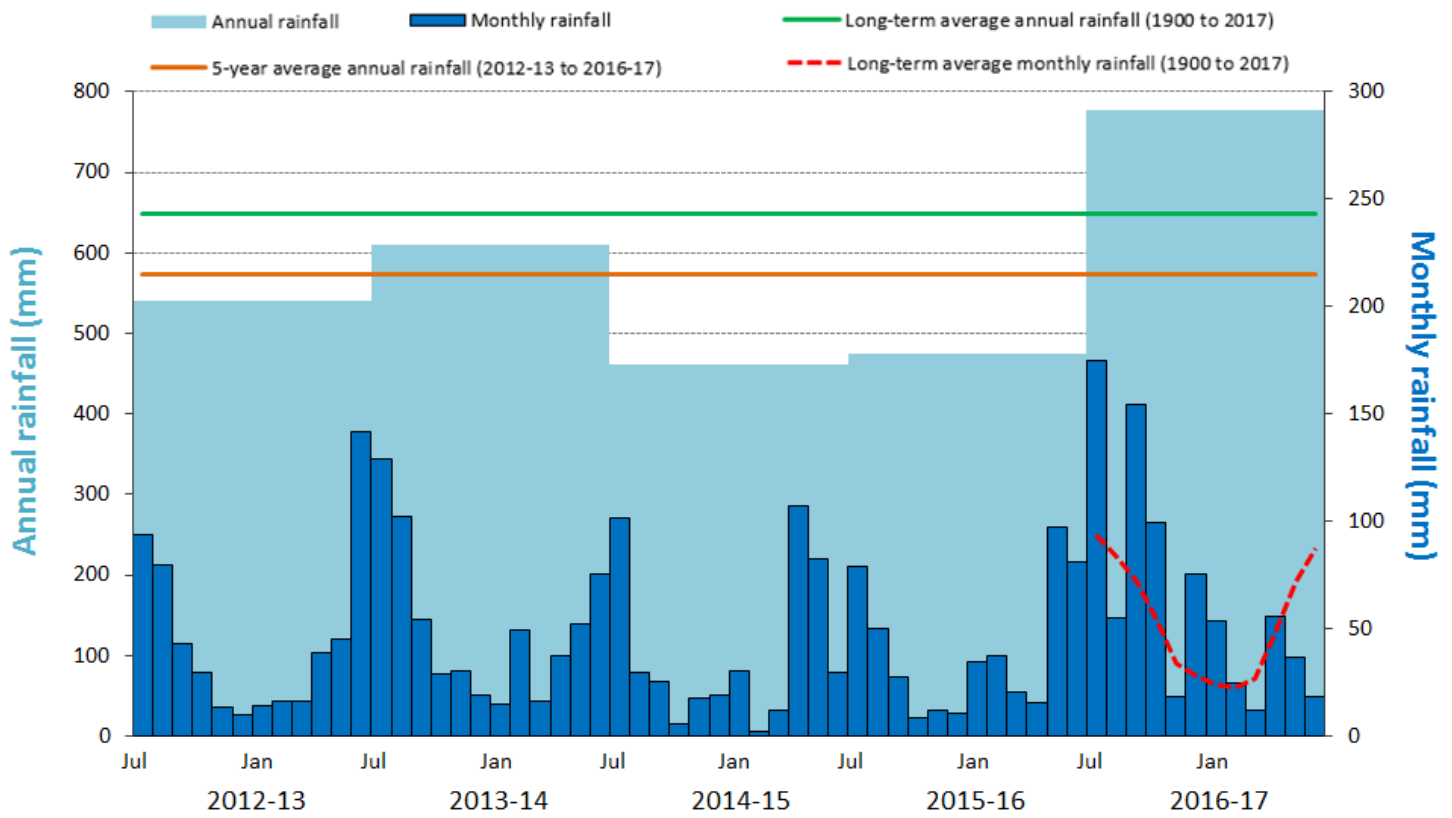
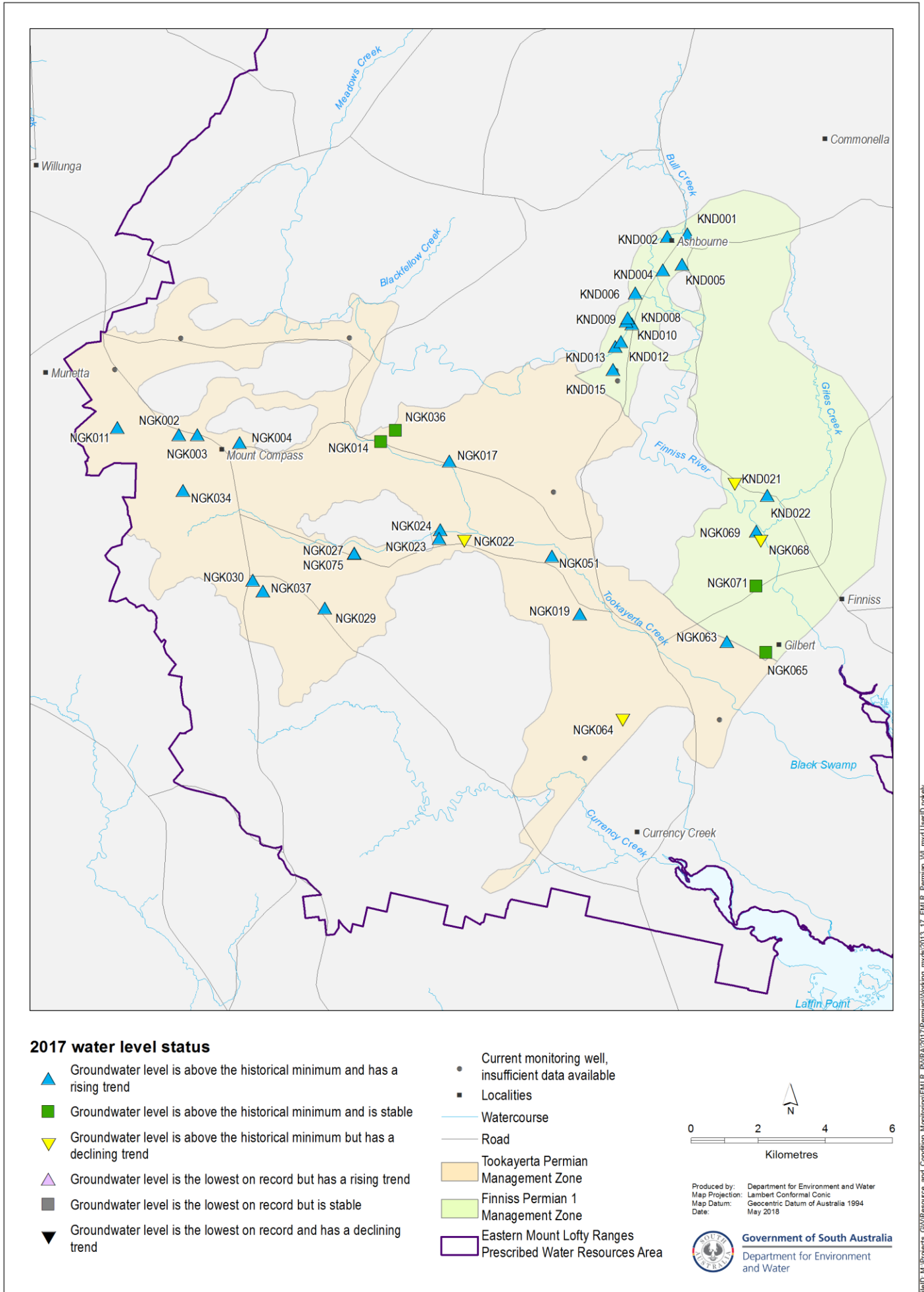


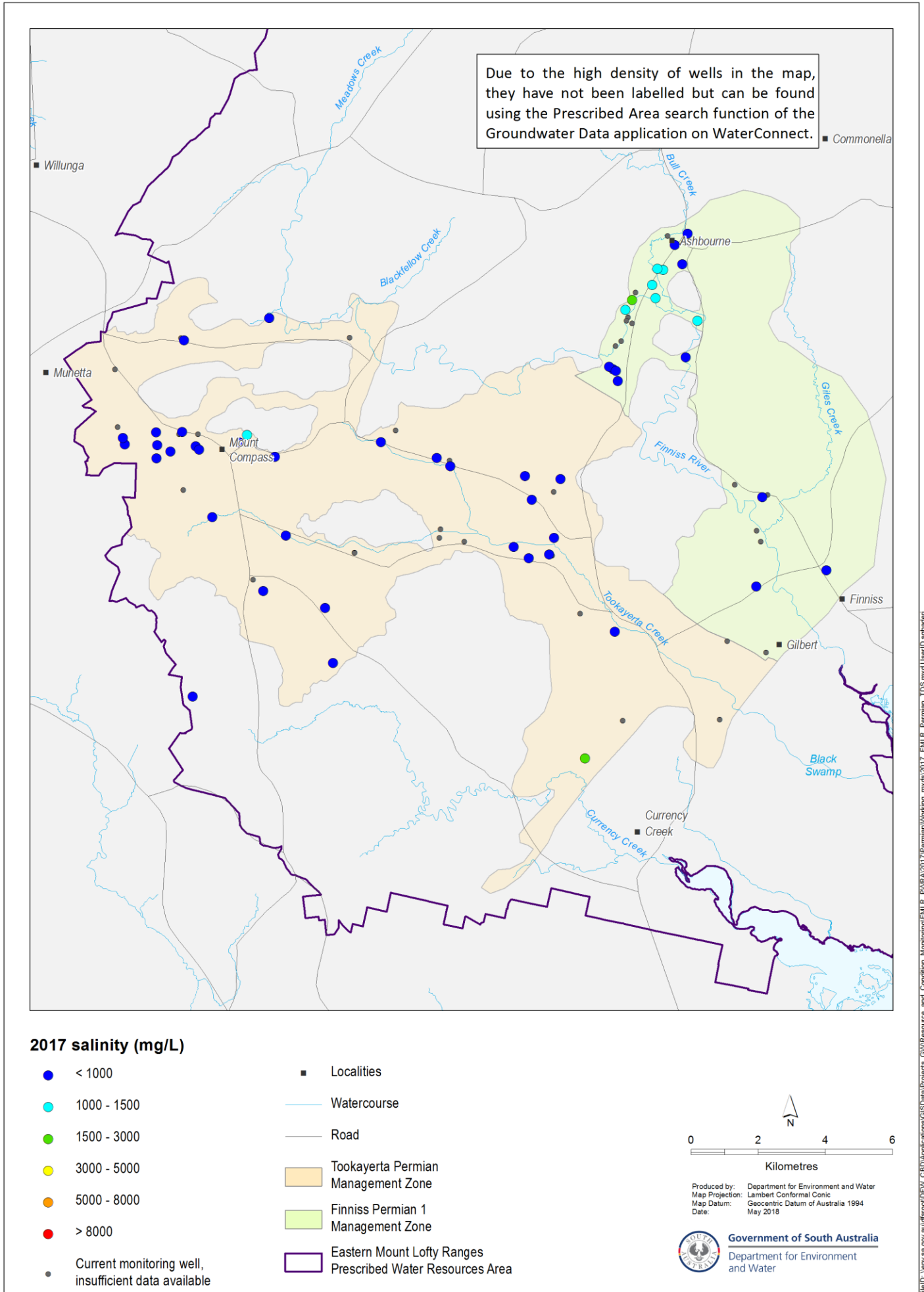
Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Ashbourne (BoM Station 23701)<sup>5</sup>

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



**Figure 3. Five-year trends (2013–17) in groundwater levels: Permian Sand aquifer**





**Figure 4. 2017 groundwater salinities: Permian Sand aquifer**

# More information

To determine the status of the Permian Sand aquifer in the Tookayerta Permian and Finniss Permian 1 Management Zones 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 *Wells Details* page on [WaterConnect](#).

The licensed groundwater use volumes 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; installation of water meters is still in progress across the EMLR PWRA.

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 *Eastern Mount Lofty Ranges 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 Eastern Mount Lofty Ranges PWRA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details about the Eastern Mount Lofty Ranges PWRA, please see the *Water Allocation Plan for the Eastern Mount Lofty Ranges* on the Natural Resources South Australian 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



Government  
of South Australia

Department for  
Environment and Water

Front Cover © Graham Green, Principal Hydrogeologist, DEW

2018 © Department for Environment and Water

Published 2018

[www.environment.sa.gov.au](http://www.environment.sa.gov.au)