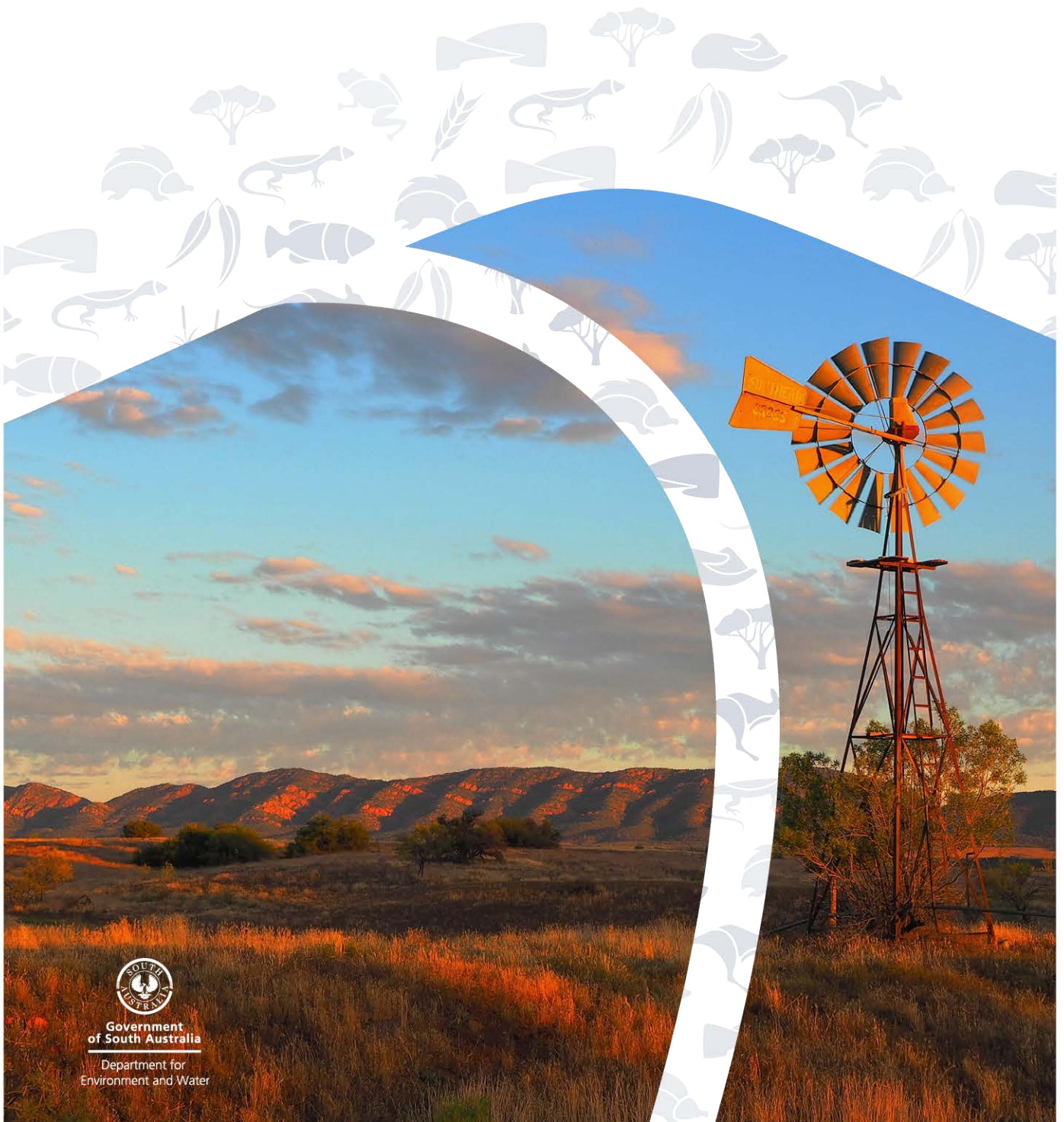


Central Adelaide PWA T1 aquifer

2017 Groundwater level and salinity status report



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		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.



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 978-1-925668-96-4

Preferred way to cite this publication

DEW (2018), *Central Adelaide PWA T1 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

2017 Status summary

Central Adelaide Plains PWA

T1 aquifer



The upper-most Tertiary (T1) aquifer of the Central Adelaide Plains Prescribed Wells Area (PWA) 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, 97% of wells show rising or stable groundwater pressure levels and all wells 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	North Adelaide Bureau of Meteorology (BoM) rainfall station 23011, located towards the central part of the PWA
Annual total ¹	670 mm 187 mm (39%) greater than the five-year average of 483 mm 126 mm (23%) greater than the long-term average of 544 mm
Monthly summary	Well-above average rainfall recorded in July, September, October, December and January Well-below average rainfall recorded in June
Spatial distribution	Rainfall in 2016–17 was above average across the entire PWA

Water use

Licensed groundwater extractions	Although the Central Adelaide PWA is prescribed, licences have not yet been issued and there is currently only limited metering of groundwater extractions
Managed aquifer recharge (MAR)	In 2016–17, MAR schemes operating in the T1 aquifer extracted approximately 390 ML and injected approximately 1150 ML ²

¹ For the water-use year 1 July 2016 to 30 June 2017

² MAR schemes extraction and injection volumes for 2016–17 have been submitted by the scheme operators to the DEW Water and Fauna Permits Program and to the Environment Protection Agency (EPA) as per requirement of their operating licences

Groundwater pressure level

See Figures 3 and 4

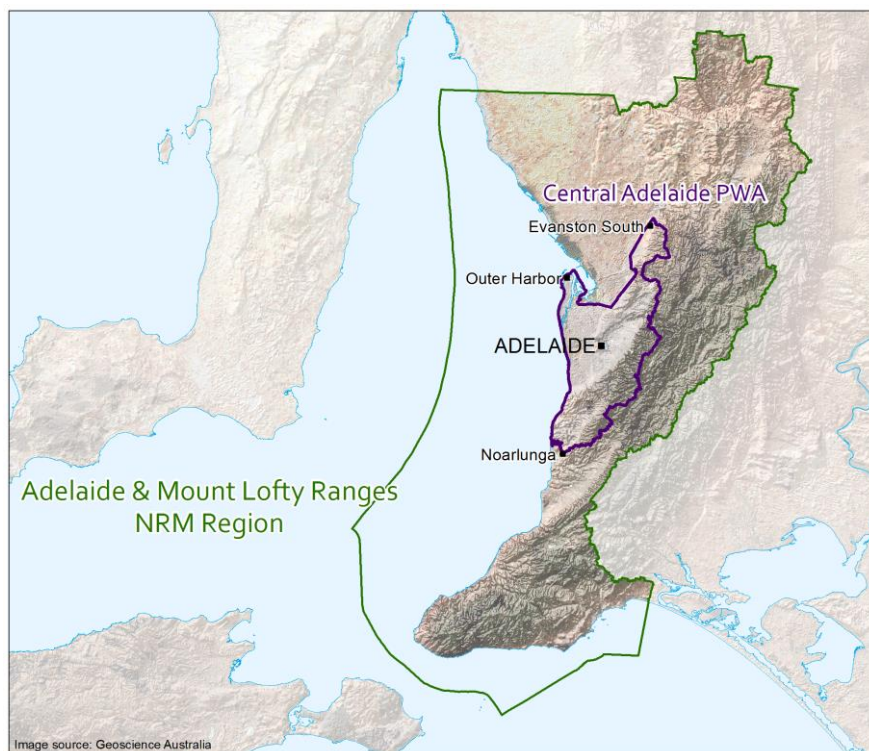
Five year trend: 2013–17	35 out of 36 wells (97%) show a rising trend, at rates of 0.19–2.59 m/y (median of 1.21 m/y) 1 well (3%) shows a declining trend at a rate of 0.12 m/y; this well also showing its lowest level on record
--------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Groundwater salinity

See Figures 5 and 6

2017 salinity	785–4066 mg/L 10 out of 15 wells (67%) show salinities less than 1500 mg/L
Five year trend: 2013–17	All 10 wells show stable salinity

Regional setting



The Central Adelaide PWA lies within the Adelaide and Mount Lofty Ranges Natural Resources Management Region. It encompasses the Adelaide metropolitan region, extending from Outer Harbor and Evanston South in the north, to Noarlunga in the south. The groundwater resources are prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan (WAP) is currently in development.

The Central Adelaide PWA comprises several sedimentary and fractured rock aquifers. Most groundwater extractions in the PWA occur from the T1 aquifer, the shallowest sedimentary aquifer of Tertiary age, and this aquifer is the focus of this report. Due to low rates of extraction from other aquifers in the PWA, they are omitted from this report.

The T1 aquifer primarily comprises Hallett Cove Sandstone, Dry Creek Sand and limestone of the upper Port Willunga Formation. The direction of groundwater flow is from the Adelaide Hills to Gulf St Vincent. The main source of recharge was thought to be from lateral throughflow from fractured rock aquifers of the Mount Lofty Ranges. However, recent research suggests that recharge to the aquifer primarily occurs from infiltration of surface water from streams that flow onto the plains from the ranges.

The T1 aquifer can be divided into two main areas and these are separated by the Para Fault: the Adelaide Plains Sub-basin and the Golden Grove Embayment. The T1 aquifer differs significantly in thickness and extent between these two provinces. In the Golden Grove Embayment (east of the Para Fault), the T1 aquifer occurs as a semi-confined or unconfined aquifer and is relatively thin. In the Adelaide Plains sub-basin (west of the Para Fault), the aquifer is thicker, but also more uniform and continuous in terms of thickness and spatial distribution and consequently, most groundwater extraction from the T1 aquifer occurs from this province. The T1 aquifer is generally confined, except where it becomes shallow or outcrops in the Golden Grove Embayment, particularly south and north of the River Torrens, and near the Eden–Burnside Fault.

Despite the generally confined nature of the T1 aquifer, the intensity and timing of rainfall (and related variations in rates of groundwater extraction) can have an effect on groundwater pressure levels and salinities. For example, if the Central Adelaide PWA experienced above-average rainfall, this could result in less groundwater being extracted from the T1 aquifer for irrigation purposes, and rises in groundwater pressure levels might result.

Fluctuations in T1 groundwater pressure levels can be divided into summer irrigation extraction and year-round industrial extraction. Summer irrigation extraction causes major seasonal fluctuations, while industrial extractions occur all year round and, although seasonal fluctuations are smaller than those resulting from summer irrigation, there is no opportunity for groundwater pressure levels to fully recover. Consequently, two long-standing cones of depression have developed near Thebarton and Grange (Fig. 3).

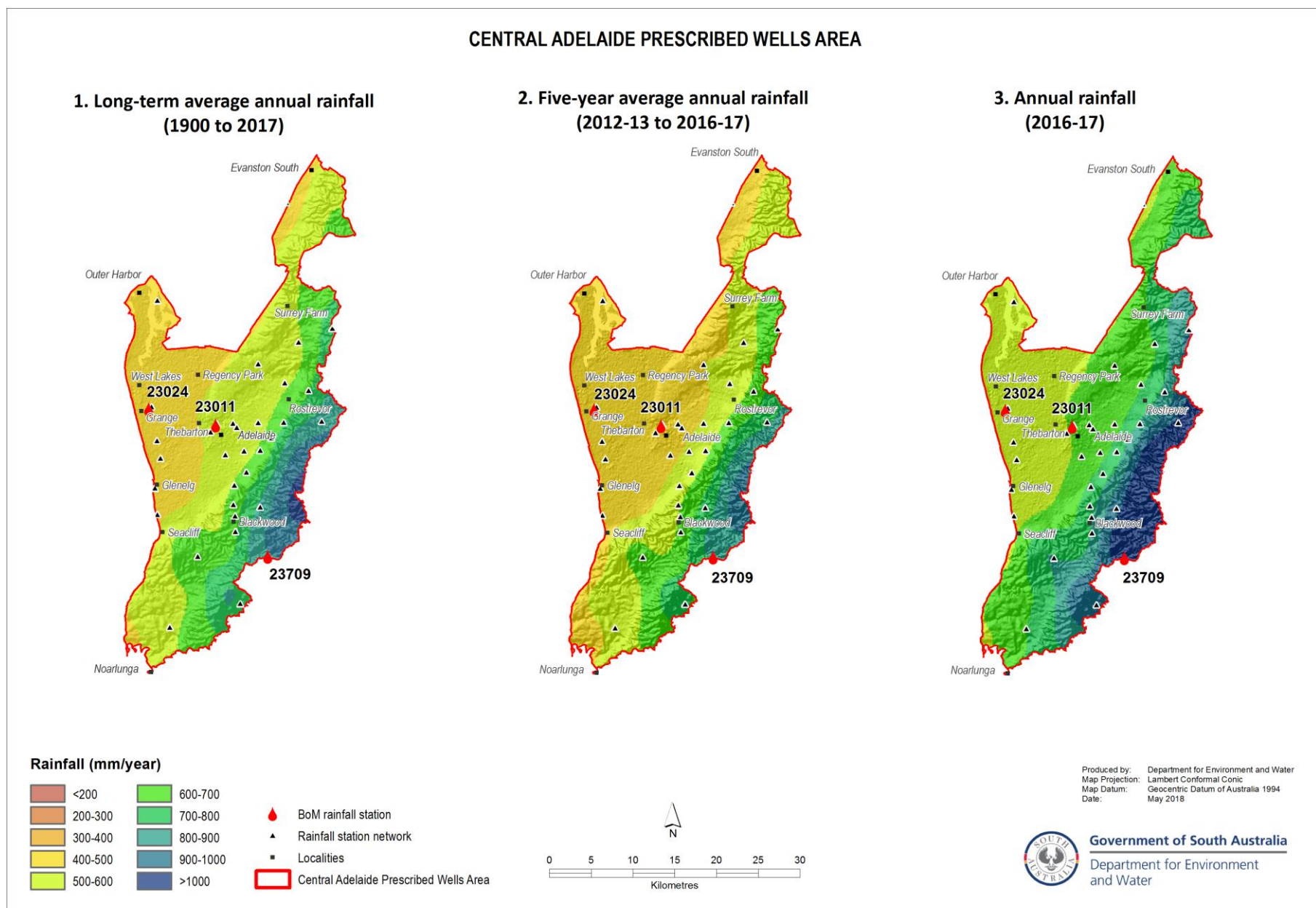


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall³

³ 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](#)

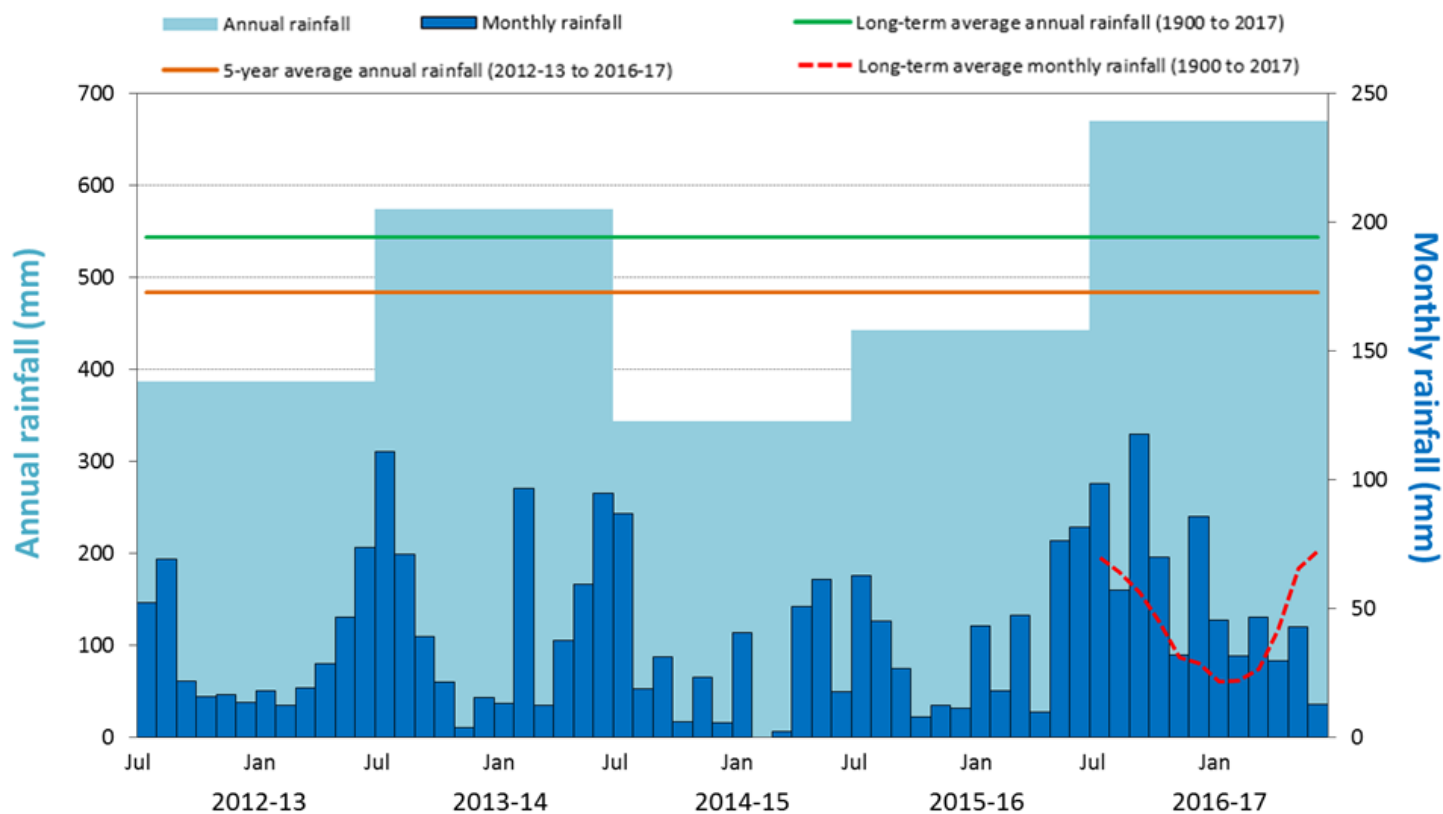
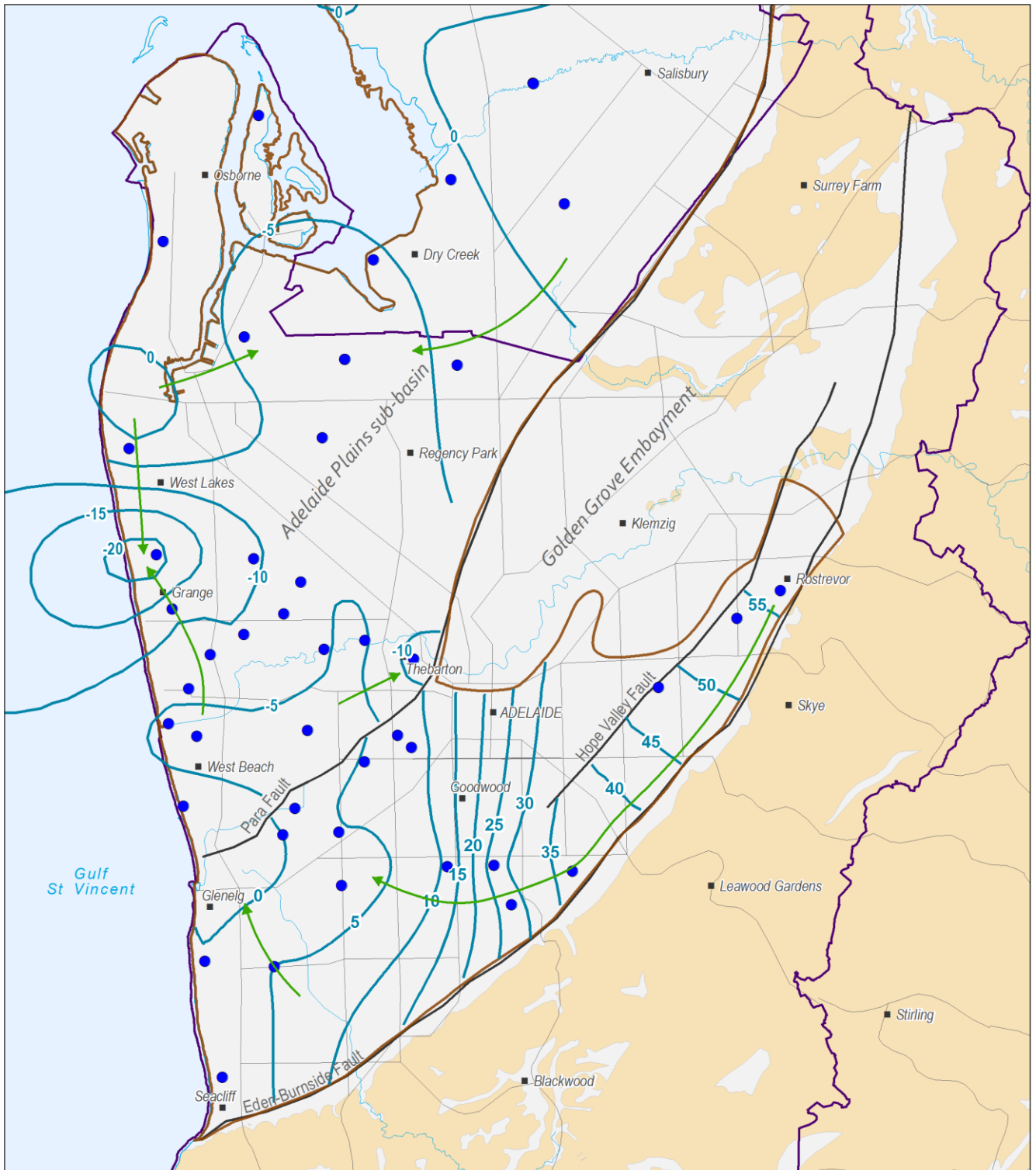


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at North Adelaide (BoM Station 23011)⁴

⁴ Data source: SILO Patched Point Dataset, available <https://silo.longpaddock.qld.gov.au/> – see [More information](#)



Potentiometric surface March 2017

- Monitoring well
- Localities
- Groundwater pressure elevation (m AHD)
- Basement outcrop
- ← Groundwater flow direction
- Extent of T1 aquifer
- Watercourse
- Central Adelaide Prescribed Wells Area
- Road
- Fault

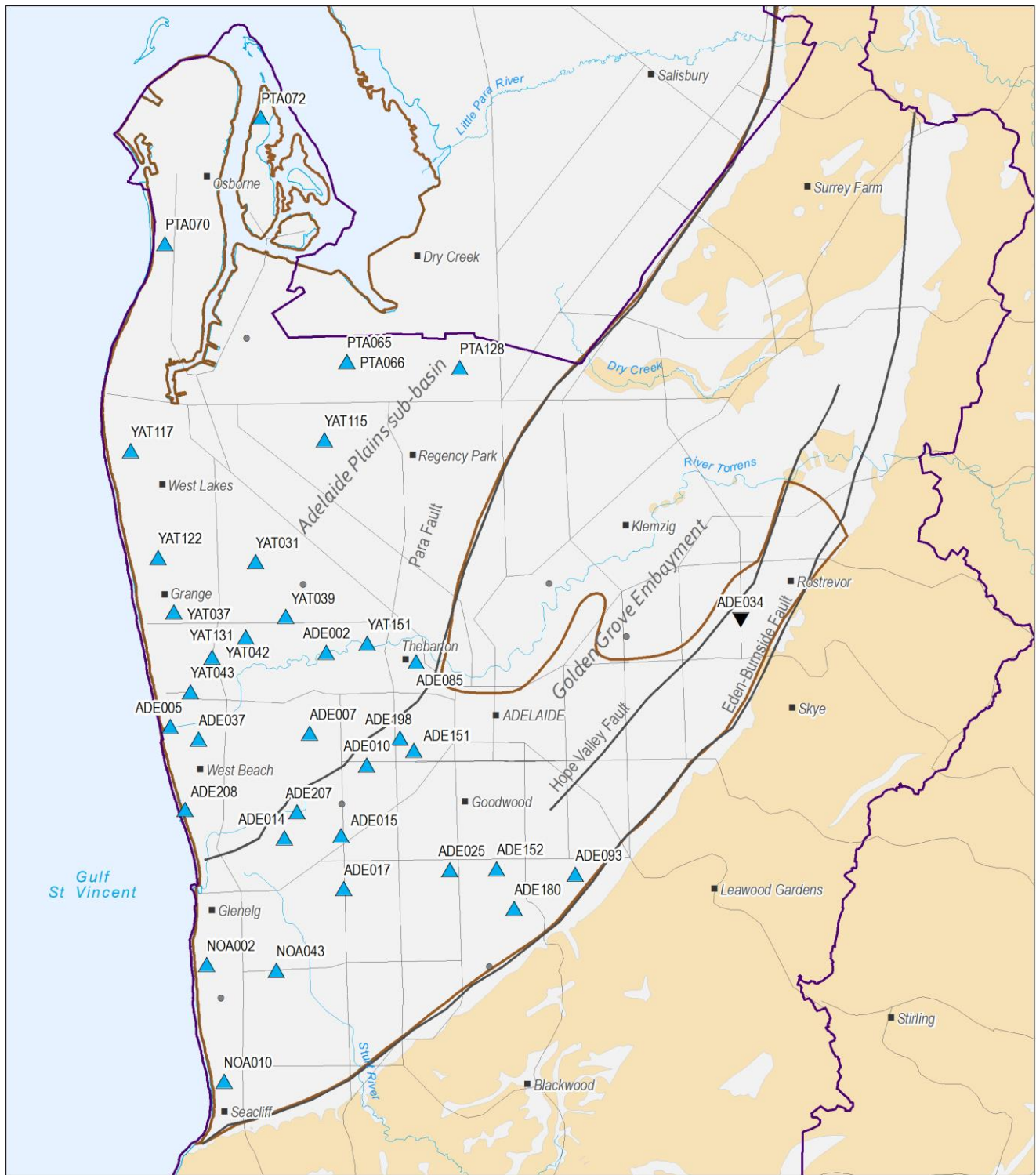
0 2 4 6
Kilometres

Produced by: Department for Environment and Water
Map Projection: Lambert Conformal Conic
Map Datum: Geocentric Datum of Australia 1994
Date: May 2018



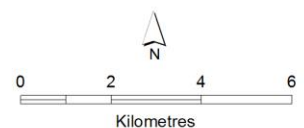
Government of South Australia
Department for Environment and Water

Figure 3. Potentiometric surface and direction of groundwater flow: T1 aquifer (March 2017)



2017 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 but is stable
 - ▼ Groundwater level is the lowest on record and has a declining trend
 - Current monitoring well, insufficient data available
- Localities
 - Watercourse
 - Road
 - Fault
 - Basement outcrop
 - Extent of T1 aquifer
 - Central Adelaide Prescribed Wells Area

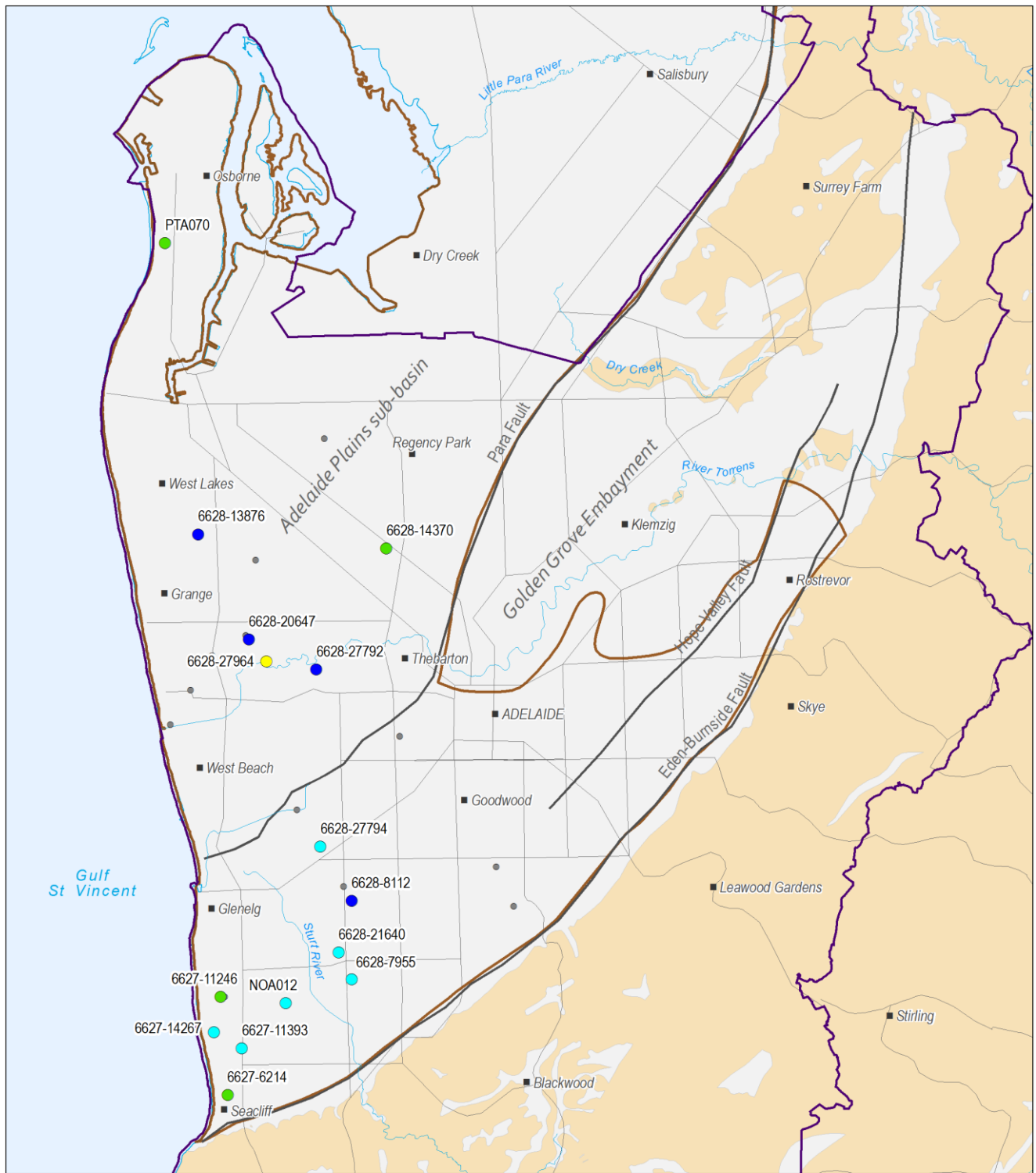


Produced by: Department for Environment and Water
 Map Projection: Lambert Conformal Conic
 Map Datum: Geocentric Datum of Australia 1994
 Date: May 2018



Government of South Australia
 Department for Environment and Water

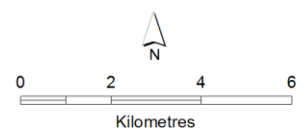
Figure 4. Five-year trends (2013–17) in groundwater pressure levels: T1 aquifer



2017 salinity (mg/L)

- <1000
- 1000 - 1500
- 1500 - 3000
- 3000 - 5000
- 5000 - 8000
- >8000
- Current monitoring well, insufficient data available

- Localities
- Watercourse
- Road
- Fault
- Basement outcrop
- Extent of T1 aquifer
- Central Adelaide Prescribed Wells Area



Produced by: Department for Environment and Water
 Map Projection: Lambert Conformal Conic
 Map Datum: Geocentric Datum of Australia 1994
 Date: May 2018



Government of South Australia
 Department for Environment and Water

Figure 5. 2017 groundwater salinities: T1 aquifer

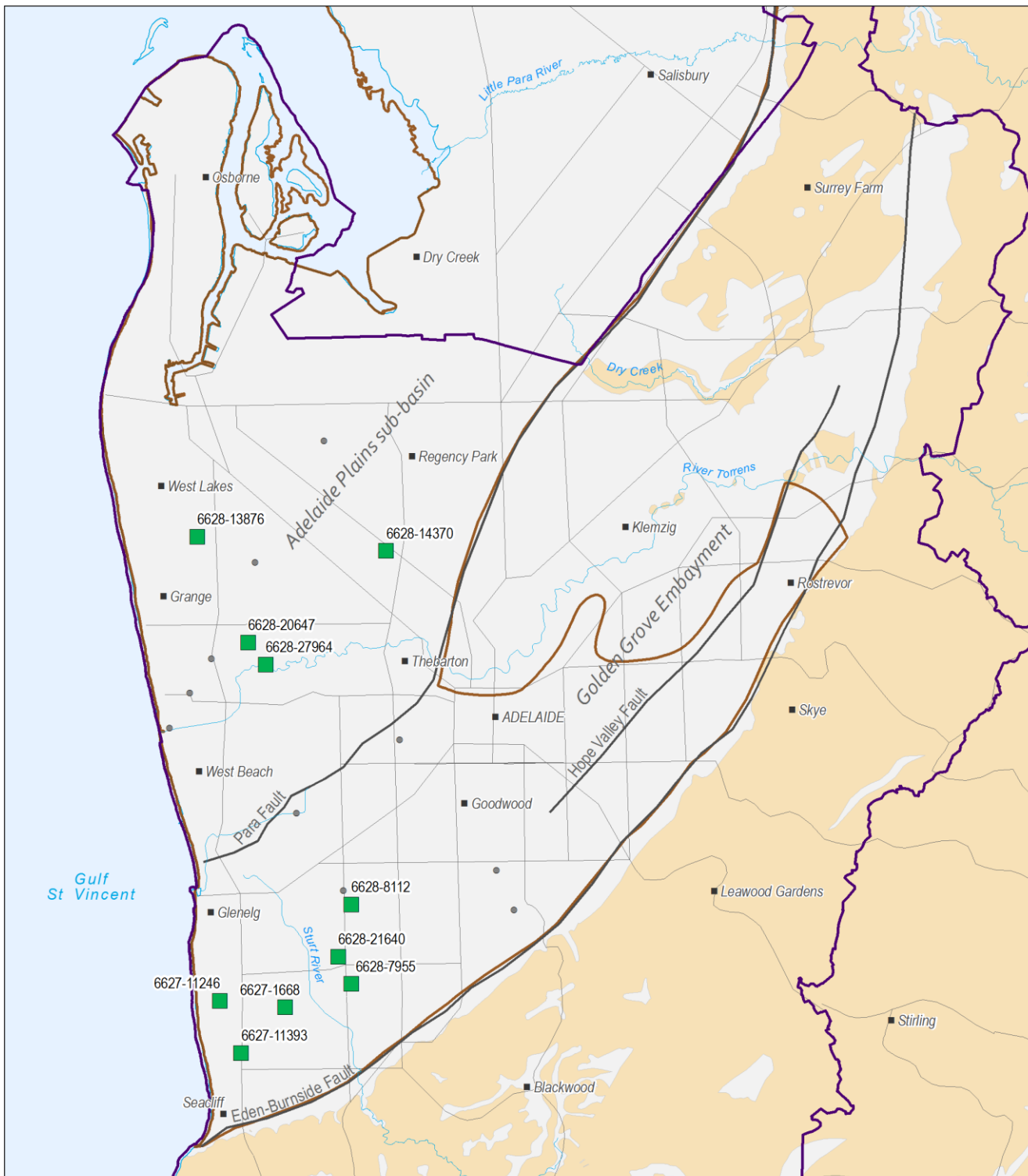


Figure 6. Five-year trends (2013–17) in groundwater salinities: T1 aquifer

More information

To determine the status of the T1 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 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/).

To view the *Central Adelaide PWA 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 wells within the Central Adelaide PWA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details about the Central Adelaide PWA, please see the Natural Resources Adelaide and Mount Lofty Ranges [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