Central Adelaide Prescribed Wells Area T1 aquifer

2018 Groundwater level and salinity status report



Department for Environment and Water

2018 Status summary Central Adelaide PWA T1 aquifer



The T1 aquifer of the Central Adelaide Prescribed Wells Area (PWA) has 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, 97% of wells show rising or stable groundwater levels and 90% of wells show stable salinities.

The status is based on five-year trends. To view the *Central Adelaide PWA groundwater level and salinity status report 2011*, which includes long-term trends in rainfall, groundwater levels and salinity, please visit the <u>Water Resource Assessments</u> page on WaterConnect. To download the full record of groundwater level and salinity data for the Central Adelaide PWA, please visit the *Groundwater Data* page on <u>WaterConnect</u>.

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, number 23011, is located towards the central part of the Central Adelaide PWA.
Annual total ¹	422 mm
	69 mm (14%) less than the five-year average of 491 mm
	120 mm (22%) less than the long-term (1900–2018) average of 542 mm
Groundwater extraction	
Licensed groundwater extractions	There is currently only limited metering of groundwater extractions; some licences have been issued, and the remainder are being issued in 2019.
Managed aquifer recharge (MAR) ²	In 2017–18, MAR schemes operating in the T1 aquifer extracted approximately 601 ML and injected approximately 720 ML.

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

² MAR scheme extraction and injection volumes for 2017–18 have been submitted by scheme operators to DEW Water and Fauna Permits Program and to the Environment Protection Agency as a requirement of their operating licences

Groundwater level

See Figures 3 and 4

Five year trend: 2014–18	34 out of 35 wells (97%) show a rising trend, at rates of 0.11–2.90 m/y (median of 1.17 m/y); 1 of these wells shows its lowest level on record
	1 well (3%) shows a declining trend at a rate of 0.04 m/y; this well shows its lowest level on record
Groundwater salinity	
See Figures 5 and 6	
2018 salinity	179–3840 mg/L (19 wells; median of 1250 mg/L)
Five year trend: 2014–18	All 9 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 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 two main sources of recharge are thought to be lateral throughflow from fractured rock aquifers of the Mount Lofty Ranges and 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 markedly 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 crops out in the Golden Grove Embayment, particularly south and north of the River Torrens, and near the Eden–Burnside Fault (Fig. 3).

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 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 levels might result.

Fluctuations in T1 groundwater levels can be divided into summer irrigation extraction and year-round industrial extraction. Summer irrigation extraction causes major seasonal fluctuations, while industrial extractions are continual throughout the year. A long-standing cone of depression has developed at Grange due to extraction for irrigation, while the cone of depression that previously existed at Thebarton due to industrial extraction has now largely recovered (Fig. 4).



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

³ Data sources: SILO interpolated point and gridded datasets, available at <u>https://legacy.longpaddock.qld.gov.au/silo/</u> – 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 sources: SILO interpolated point datasets, available at <u>https://legacy.longpaddock.qld.gov.au/silo/</u> – see <u>More information</u>



Figure 3. Five-year trends (2014–18) in groundwater levels: T1 aquifer



Figure 4. Potentiometric surface and direction of groundwater flow: T1 aquifer (March 2018)



Figure 5. 2018 groundwater salinities: T1 aquifer





More information

To determine the status of the T1 aquifer 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 <u>Frequently Asked Questions</u> 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 <u>WaterConnect</u>.

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 SILO interpolated point and gridded datasets, which use original BoM daily and monthly rainfall measurements and are available online at https://silo.longpaddock.qld.gov.au/legacy/.

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 <u>WaterConnect</u>. To view all past published *Groundwater level and salinity status reports*, please visit the <u>Water Resource Assessments</u> 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 <u>WaterConnect</u>.

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

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