## McLaren Vale PWA Port Willunga Formation aquifer

2017 Groundwater level and salinity status report



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ISBN 978-1-925805-09-3

Preferred way to cite this publication

DEW (2018). McLaren Vale PWA Port Willunga Formation 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 McLaren Vale PWA Port Willunga Formation aquifer



The Port Willunga Formation aquifer of the McLaren Vale Prescribed Wells Area (PWA) has been assigned a *yellow* status for 2017 because minor adverse trends have been observed over the past five years.

The status is based on five-year trends: over the period 2013–17, 64% of wells show declining 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	Willunga Bureau of Meteorology (BoM) rainfall station 23753, located in the south-east of the McLaren Vale PWA
Annual total <sup>1</sup>	800 mm 209 mm (35%) greater than the five-year average of 591 mm 159 mm (25%) greater than the long-term average of 641 mm
Monthly summary	Well-above average rainfall in July, September, October, December and January Well-below average rainfall in March, May and June
Spatial distribution	Rainfall in 2016–17 was well above average across the entire PWA

#### Water use

#### See Figure 3

Total allocated volume: 2016–17	3617 ML <sup>2</sup>
Licensed groundwater extractions*	1906 ML <sup>2</sup> (53% of total allocation)
Extraction volume comparison	40% less than the previous year 27% less than the five-year average

<sup>\*</sup>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>&</sup>lt;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

Five-year trend: 2013–17	14 out of 22 wells (64%) show declining trends, at rates of 0.05–0.22 m/y (median of 0.13 m/y); five of these wells showing their lowest level on record
	4 wells (18%) are stable
	4 wells (18%) show rising trends, at rates of 0.04–0.26 m/y (median of 0.10 m/y)

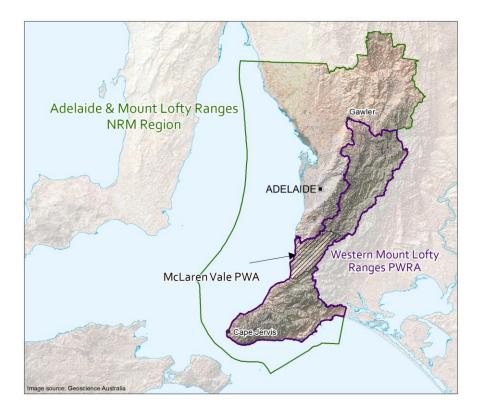
#### **Groundwater salinity**

#### See Figure 5

2017 salinity	515–1810 mg/L
	50 out of 54 wells (93%) show salinities less than 1500 mg/L, which is the salinity threshold for most crop types
Five-year trend: 2013–17	Data not available
Citizen science	Since 2017, irrigators in the McLaren Vale PWA have submitted salinity samples and once validated, these will augment the existing DEW monitoring network <sup>3</sup>

 $<sup>^{\</sup>rm 3}$  The salinity data collected from irrigation wells can be viewed at  $\underline{\text{WaterConnect}}$ 

## Regional setting



The McLaren Vale PWA is located approximately 35 km south of Adelaide within the Adelaide and Mount Lofty Ranges NRM Region. It is a regional-scale resource for which groundwater has been prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan (WAP) provides for sustainable management of the water resources.

The McLaren Vale PWA is located within the boundary of the Western Mount Lofty Ranges Prescribed Water Resources Area (WMLR PWRA). For those groundwater resources located within the WMLR PWRA, but outside the McLaren Vale PWA, separate groundwater level and salinity status reports have been prepared. These reports can be found on the *Water Resource Assessments* page of <u>WaterConnect</u>.

Underlying the McLaren Vale PWA is the Willunga Embayment, a structurally-controlled trough containing sedimentary groundwater systems of Quaternary and Tertiary age that is bounded in the south-east by the Willunga Fault, and to the north by basement outcrop. This report focuses on the Port Willunga Formation aquifer, which is a coarse-grained sandy limestone overlain by younger Quaternary aquifers and underlain by the Tertiary Maslin Sands aquifer and the older fractured rock aquifers. Groundwater within the Port Willunga Formation aquifer typically flows from the higher elevations in the north-east in a south-westerly direction toward the coast. Recharge to the aquifer occurs from direct recharge from local rainfall where it is unconfined in its northern extent near McLaren Vale and McLaren Flat, and from streamflow recharge in drainage lines at or near the Willunga Fault. Lateral throughflow from the fractured rock aquifer, across the Willunga Fault, may also provide recharge to the aquifer.

Groundwater level and salinity trends within the Port Willunga Formation are primarily climate driven: below-average rainfall results in reduced recharge to the aquifer. Below-average rainfall can also lead to increased extractions for irrigation, which can cause groundwater levels to decline and salinities to increase. Conversely, higher rainfall may result in increased recharge and decreased irrigation extraction. This may cause the groundwater levels to rise and salinities may stabilise or decrease.

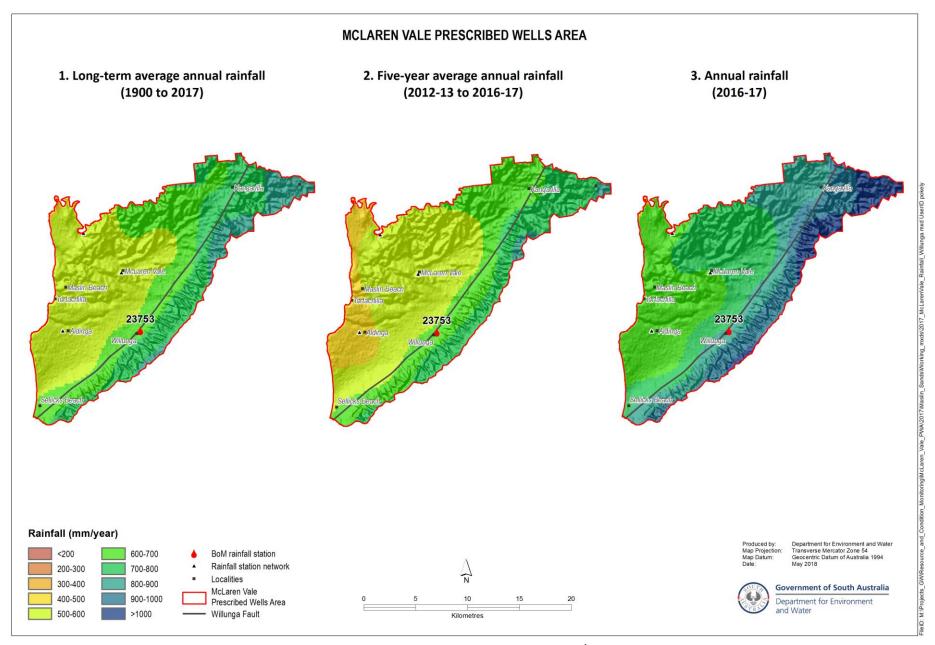


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall<sup>4</sup>

<sup>&</sup>lt;sup>4</sup> Data sources: SILO Patched Point Dataset https://silo.longpaddock.qld.qov.au/ and BoM Australian Water Availability Project (http://www.bom.qov.au/isp/awap/) – see More information

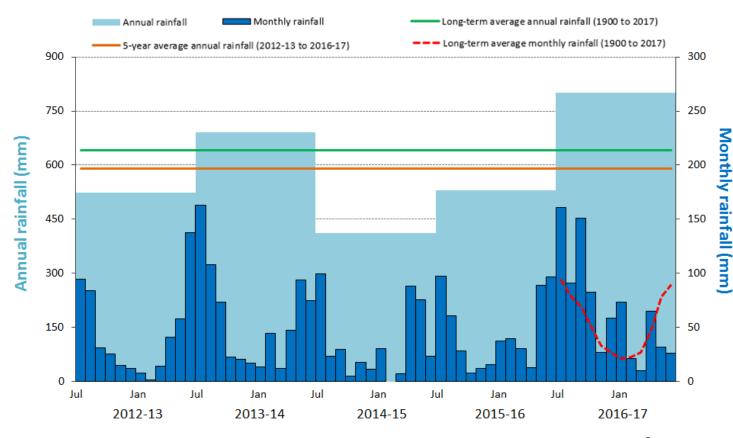


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Willunga (BoM Station 23753)<sup>5</sup>

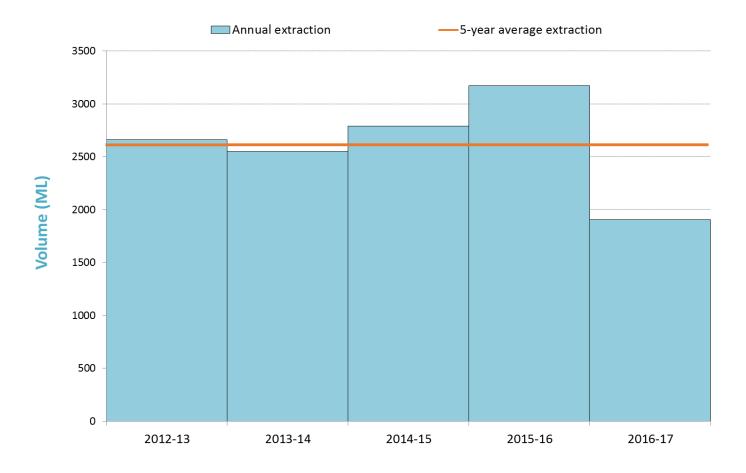


Figure 3. Licensed groundwater extraction volumes<sup>6</sup> for the past five water-use years

<sup>&</sup>lt;sup>5</sup> Data source: SILO Patched Point Dataset, available <a href="https://silo.longpaddock.qld.gov.au/">https://silo.longpaddock.qld.gov.au/</a> – see <a href="https://silo.longpaddock.qld.gov.au/">More information</a>

<sup>&</sup>lt;sup>6</sup> Total licensed extractions are subject to change as extraction data have not yet been verified in full – see More information

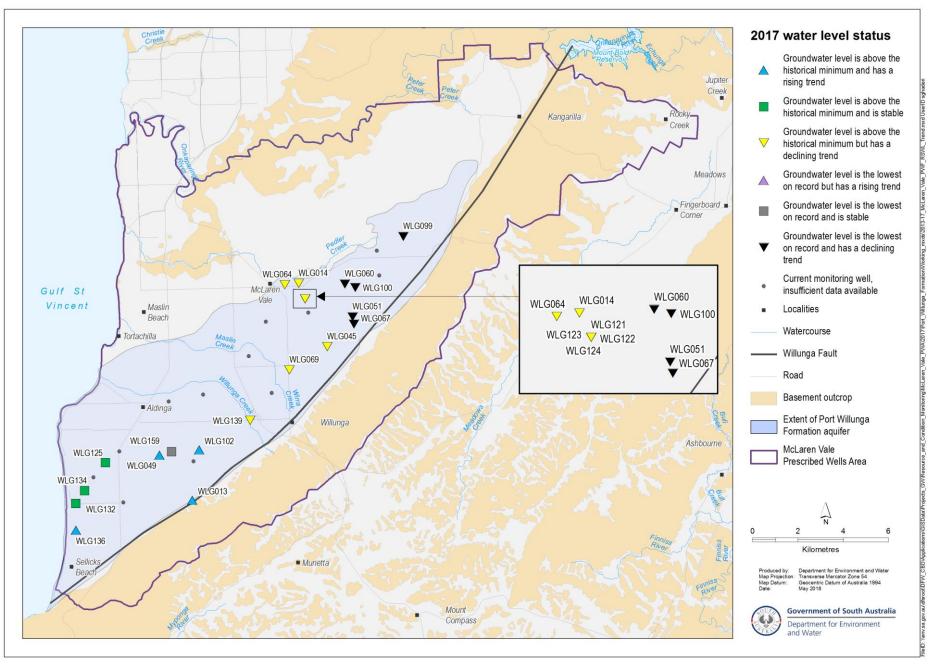


Figure 4. Five-year trends (2013–17) in groundwater levels: Port Willunga Formation aquifer

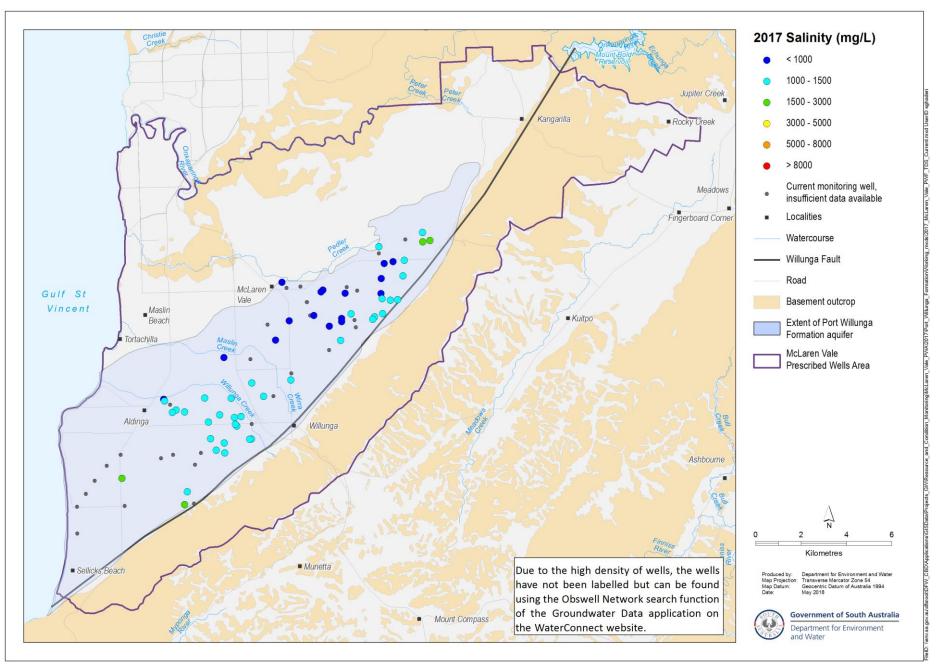


Figure 5. 2017 groundwater salinities: Port Willunga Formation aquifer

### More information

To determine the status of the Port Willunga Formation 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 <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, and to review the full historical record of the monitoring wells, please visit the *Water Resource Assessments* page on <u>WaterConnect</u>.

For additional information related to monitoring wells nomenclature, please refer to the *Well Details* page on <u>WaterConnect</u>.

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 <a href="https://silo.longpaddock.qld.gov.au/">https://silo.longpaddock.qld.gov.au/</a>. Rainfall maps have been compiled using daily gridded data produced by the BoM Australian Water Availability Project (<a href="https://www.bom.gov.au/jsp/awap/">www.bom.gov.au/jsp/awap/</a>).

To view the *McLaren Vale PWA Groundwater Level and Salinity Status Report 2009–10*, which includes background information on hydrogeology, rainfall and relevant groundwater-dependent ecosystems, please visit <a href="WaterConnect"><u>WaterConnect</u></a>. To view all past published *Groundwater level and salinity status reports*, please visit the <a href="Water Resource Assessments"><u>Water Resource Assessments</u></a> page on WaterConnect.

To download groundwater level and salinity data from monitoring wells within the McLaren Vale PWA, please visit the *Groundwater Data* page under the Data Systems tab on <u>WaterConnect</u>.

For further details about the McLaren Vale PWA, please see the *Water Allocation Plan for the McLaren Vale Prescribed Wells Area* on the Natural Resources Adelaide and Mount Lofty Ranges <u>website</u>.

#### **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

