# Mallee Prescribed Wells Area Murray Group Limestone aquifer 2018 Groundwater level and salinity status report



Department for Environment and Water

# 2018 Status summary Mallee PWA Murray Group Limestone aquifer

Murray Group Limestone aquifer The Murray Group Limestone (MGL) aquifer of the Mallee Prescribed Wells Area (PWA) has been assigned a *yellow* status for 2018 because minor adverse trends have been observed over the past five years.

The status is based on five-year trends: over the period 2014–18, 47% of wells show declining groundwater levels and 16% of wells show their lowest level on record.

The status is based on five-year trends. To view the *Mallee PWA groundwater level and salinity status report 2009–10*, 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 Mallee 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	Pinnaroo Bureau of Meteorology (BoM) rainfall station, number 25015, is located in the eastern part of the Mallee PWA.
Annual total <sup>1</sup>	286 mm
	56 mm (16%) less than the five-year average of 342 mm
	48 mm (14%) less than the long-term (1900–2018) average of 334 mm

#### Groundwater extraction

See Figure 3		
Allocated volume <sup>1,2</sup>	61 353 ML	
Licensed groundwater extractions <sup>1,3</sup>	35 338 ML	
Extraction volume comparison	36% greater than the previous year 11% greater than the five-year average	

 $<sup>^{\</sup>rm 1}$  For the water-use year 1 July 2017 to 30 June 2018

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<sup>&</sup>lt;sup>2</sup> Allocated volume does not include rollover, carry over or recharge allocations

<sup>&</sup>lt;sup>3</sup> Total licensed extractions are subject to change as extraction data have not yet been verified in full – see More information

## Groundwater level

See Figure 4	
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See rigure 4		
Five-year trend: 2014–18	33 out of 70 wells (47%) show a declining trend, at rates of 0.02–0.99 m/y (median of 0.11 m/y); 10 of these wells show their lowest level on record	
	12 wells (17%) are stable; 1 of these wells shows its lowest level on record	
	25 out of 70 wells (36%) show a rising trend, at rates of 0.03–1.70 m/y (median of 0.46 m/y)	
Groundwater salinity		
See Figures 5 and 6		
2018 salinity	605–3632 mg/L (25 wells; median of 1468 mg/L)	
Five-year trend: 2014–18	22 out of 23 wells (96%) show stable salinities	
	1 well (4%) shows a decreasing trend, at a rate of 14 mg/L/y	
Citizen science	Since 2014, irrigators in the Mallee PWA have submitted groundwater sample DEW have tested for salinity concentration. Data that have been validated are augmenting the existing DEW monitoring network. <sup>4</sup>	
Groundwater condition limits		
See Table 1		
Definition	The water allocation plan (WAP) for the Mallee PWA has identified resource condition indicators based on groundwater level and salinity thresholds—these designed to give early warning of adverse trends that may impact users of the resource.	
Groundwater level condition indicators For at least two consecutive years, water levels must recover to within t threshold of the previous year, in more than 50% of all monitoring born management zone.		
Groundwater levels in 2017–18	More than 50% of wells in the Parilla Red management area (78%) have failed to recover to the threshold groundwater levels in both 2017 and 2018.	
	Resource condition indicator limits were not exceeded in 2018 for the other management areas defined in the water allocation plan.	
Salinity condition indicators An increase in salinity of 2% or more per year, for five consecutive years than 50% of the monitoring bores in a management area.		
Salinities in 2017–18	Resource condition indicator limits have not been exceeded.	

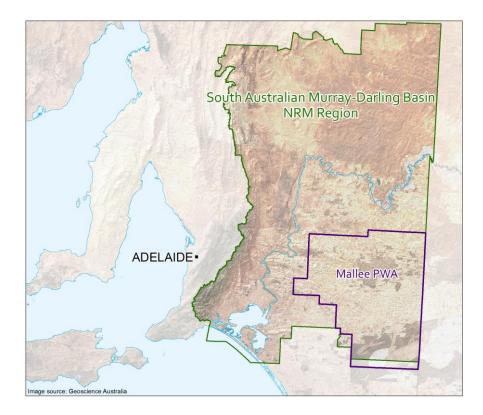
<sup>&</sup>lt;sup>4</sup> The salinity data collected from irrigation wells can be viewed at WaterConnect

### Table 1. Groundwater level resource condition indicators for the Mallee PWA for 2017 and 2018

Management Area	No. of obswells in 2018	2017 and 2018		
Management Area or Border Zone		Did not recover to within threshold	Recovered to within threshold	
9A North	1	0%	100%	
10A	20	5%	95%	
11A-McGorrery	8	0%	100%	
11A-Peebinga	9	22%	78%	
Parilla Red	9	78%	22%	
Yellow and Green <sup>5</sup>	19	11%	89%	

<sup>&</sup>lt;sup>5</sup> This does not include monitoring wells which are located in both the Green Management Zone and one of the Border Zones.

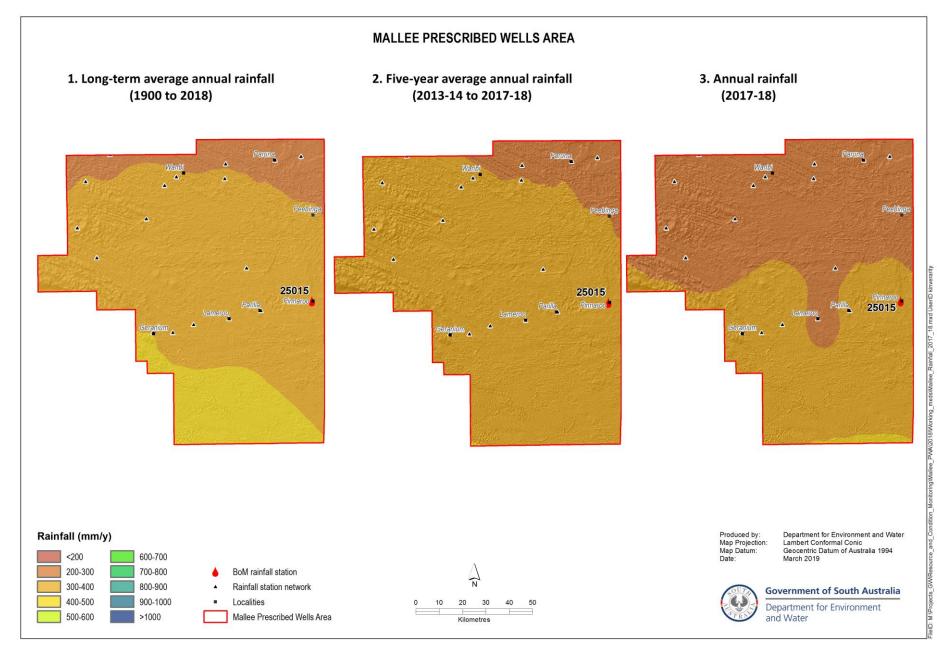
# **Regional setting**



The Mallee PWA is located around 150 km east of Adelaide in the South Australian Murray-Darling Basin Natural Resources Management Region, and is underlain by sediments of the Murray Basin. It is a regional-scale resource for which groundwater resources are prescribed under South Australia's *Natural Resources Management Act 2004* and a water allocation plan provides for their sustainable management.

There are three main aquifers in the Mallee PWA, namely the confined Renmark Group aquifer, the semi-confined MGL aquifer and the unconfined Pliocene sands aquifer. The MGL aquifer, which is the focus of this report, comprises a consolidated, highly fossiliferous, fine to coarse, bioclastic limestone that has an average thickness of around 100 m. The MGL aquifer is recharged in south-west Victoria (broadly to the south-east of the Mallee PWA), with groundwater movement away from the recharge area in directions towards the north, north-west and west of the Mallee PWA. All licensed groundwater extractions in the Mallee PWA are from the MGL aquifer, with most pumping occurring towards the north-east of the PWA where the aquifer is confined.

The intensity and timing of rainfall and subsequent extraction practices can have an effect on groundwater levels and salinity in the MGL aquifer. For example, if the area experiences above-average rainfall, this could result in less groundwater being extracted for irrigation, which can cause groundwater levels to rise and salinities to stabilise or decrease. Conversely, below-average rainfall may result in increased rates of groundwater extraction and groundwater levels may decline and salinities increase.



#### Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall<sup>6</sup>

<sup>6</sup> Data sources: SILO interpolated point and gridded datasets available at <u>https://legacy.longpaddock.gld.gov.au/silo/</u> – see <u>More information</u>

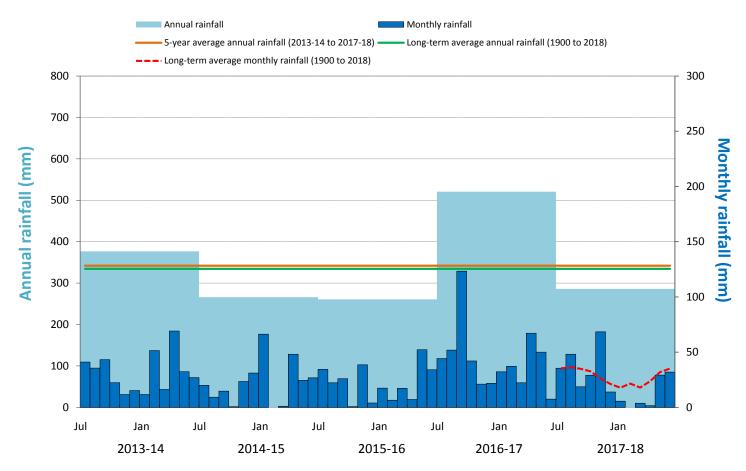


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Pinnaroo (BoM Station 25015)<sup>7</sup>

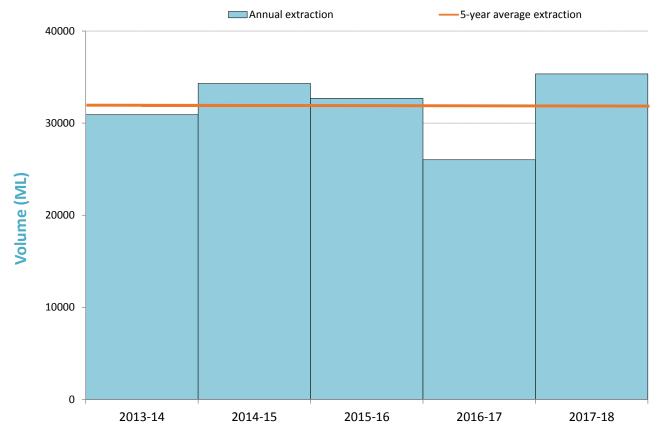
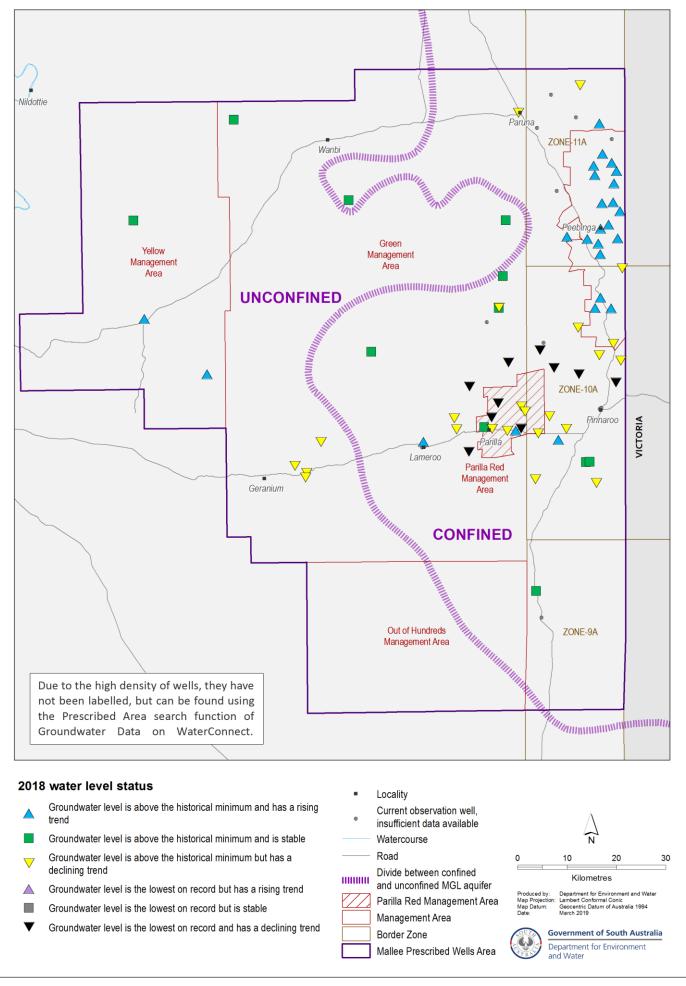


Figure 3. Licensed groundwater extraction volumes<sup>8</sup> for the past five water-use years

<sup>&</sup>lt;sup>7</sup> Data source: SILO Patched Point Dataset, available <u>https://legacy.longpaddock.qld.gov.au/silo/</u> – see <u>More information</u>

<sup>&</sup>lt;sup>8</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 (2014–18) in groundwater levels: Murray Group Limestone aquifer

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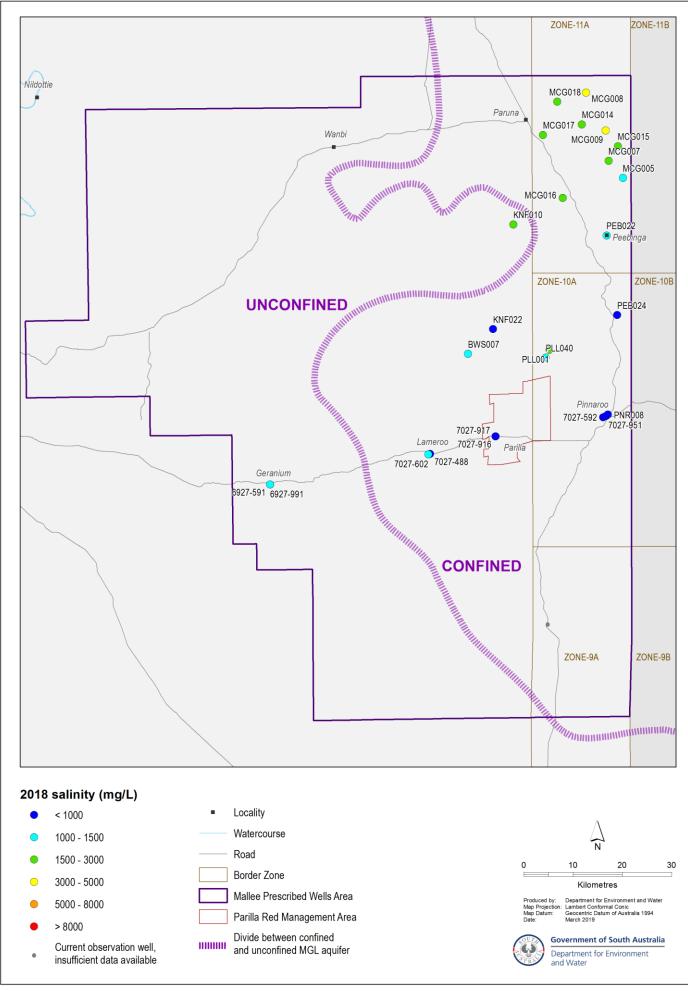


Figure 5. 2018 groundwater salinities: Murray Group Limestone aquifer

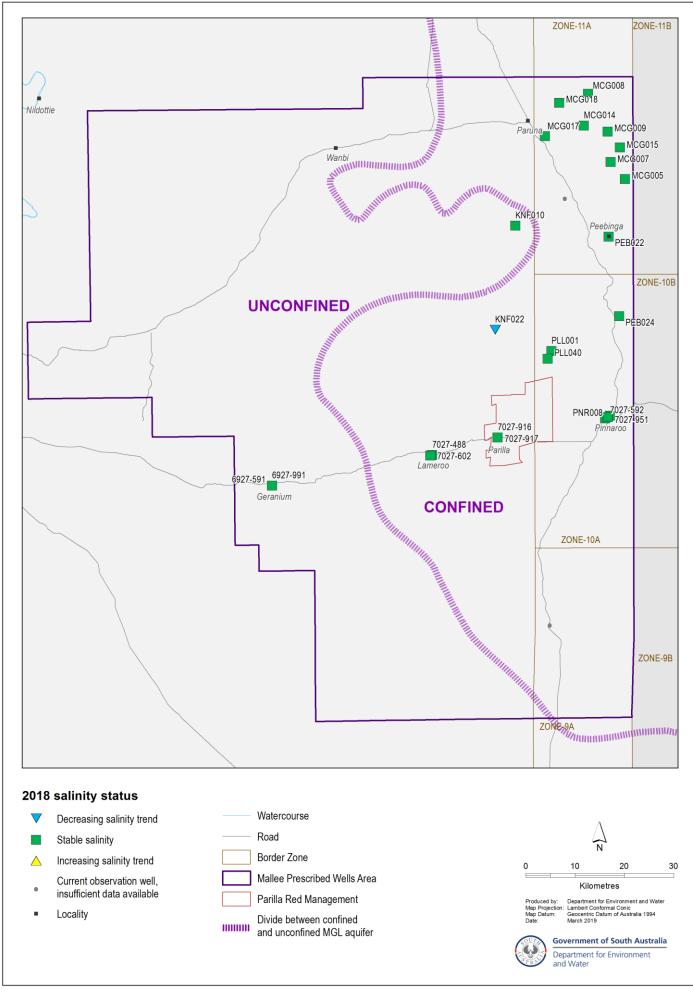


Figure 6. Five-year trends (2014–18) in groundwater salinities: Murray Group Limestone aquifer

# More information

To determine the status of the MGL 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>.

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 <a href="https://legacy.longpaddock.gld.gov.au/silo/">https://legacy.longpaddock.gld.gov.au/silo/</a>.

To view the *Mallee PWA groundwater level and salinity status report 2009–10*, 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 monitoring wells within the Mallee PWA, please visit the *Groundwater Data* page under the *Data Systems* tab on <u>WaterConnect</u>.

For further details on the Mallee PWA, please see the *Water Allocation Plan for the Mallee Prescribed Wells Area* on the Natural Resources SA Murray-Darling Basin <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

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