

Eastern Mount Lofty Ranges Prescribed Water Resources Area Permian sand aquifer

2018 Groundwater level and salinity status
report



**Government
of South Australia**

Department for
Environment and Water

2018 Status summary

Eastern Mount Lofty Ranges PWRA

Permian sand aquifer

Tookayerta Permian Management Zone

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 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, all wells show rising or stable groundwater levels.

Finniss Permian 1 Management Zone

The Permian sand aquifer in the Finniss Permian 1 Management Zone of the EMLR PWRA 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, all wells show rising or stable groundwater levels.

The status is based on five-year trends. To view the *Eastern Mount Lofty Ranges PWRA groundwater level and salinity status report 2011*, which includes long-term trends in rainfall, groundwater levels and salinity, please visit the [Water Resource Assessments](#) page on WaterConnect. To download the full record of groundwater level and salinity data for the Eastern Mount Lofty Ranges PWRA, please visit the *Groundwater Data* page on [WaterConnect](#).

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, number 23701, is located between the Tookayerta Permian and Finniss Permian 1 management zones.
Annual total ¹	644 mm
	34 mm (5%) less than the five-year average of 678 mm
	36 mm (5%) less than the long-term (1900-2018) average of 680 mm

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

Groundwater extraction

Allocated volume ^{2,3}	31 835 ML (all aquifers of the EMLR PWRA)
Licensed groundwater extractions ^{2,4}	2749 ML (Tookayerta Permian and Finniss Permian 1 Management Zones)

Groundwater level

See Figure 3

Management Zone	Tookayerta Permian
Five-year trend: 2014–18	17 out of 18 wells (94%) show rising trends, at rates of 0.02–1.26 m/y (median of 0.16 m/y); 1 of these wells shows its lowest level on record 1 well (6%) is stable
Management Zone	Finniss Permian 1
Five year trend: 2014–18	All 13 wells show rising trends, at rates of 0.07–0.68 m/y (median of 0.15 m/y)

Groundwater salinity

See Figure 4

2018 salinity	51–2278 mg/L (87 wells; median of 373 mg/L)
Five-year trend: 2014–18	1 out of 2 wells (50%) shows a decreasing trend at a rate of 4 mg/L/y 1 well (50%) is stable
Citizen science	Since 2014, irrigators in the EMLR PWRA have submitted groundwater samples that DEW have tested for salinity concentration. Data that has been validated is augmenting the existing DEW monitoring network. ⁵

² For the water-use year 1 July 2017 to 30 June 2018

³ Allocated volume does not include rollover, carry over or recharge allocations

⁴ 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 – see [More information](#)

⁵ 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 provides for their sustainable management. 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 aquifers in the EMLR PWRA: the Permian sand, Murray Group Limestone (MGL) and Quaternary aquifers. Separate groundwater level and salinity status reports have been prepared on the MGL and the fractured rock aquifers of the EMLR PWRA. These reports can be found on the *Water Resource Assessments* page of [WaterConnect](#).

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 water allocation plan. 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 underlies sediments of the Murray Basin on the plains. 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 can be low-yielding and higher in salinity. Despite this variability, the Permian sand aquifer is used for the Mount Compass town water supply (Fig. 1) and is widely developed for irrigation.

Trends in groundwater level and salinity within the Permian sand aquifer are primarily climate driven: below-average rainfall can result in a reduction in recharge to the aquifer. Below-average summer rainfall can also result in increased extractions for irrigation, and both these elements can cause groundwater levels to decline and salinities to increase. Conversely, above-average rainfall may result in increased recharge and decreases in irrigation extractions, which can cause groundwater levels to rise and salinities to stabilise or decrease.

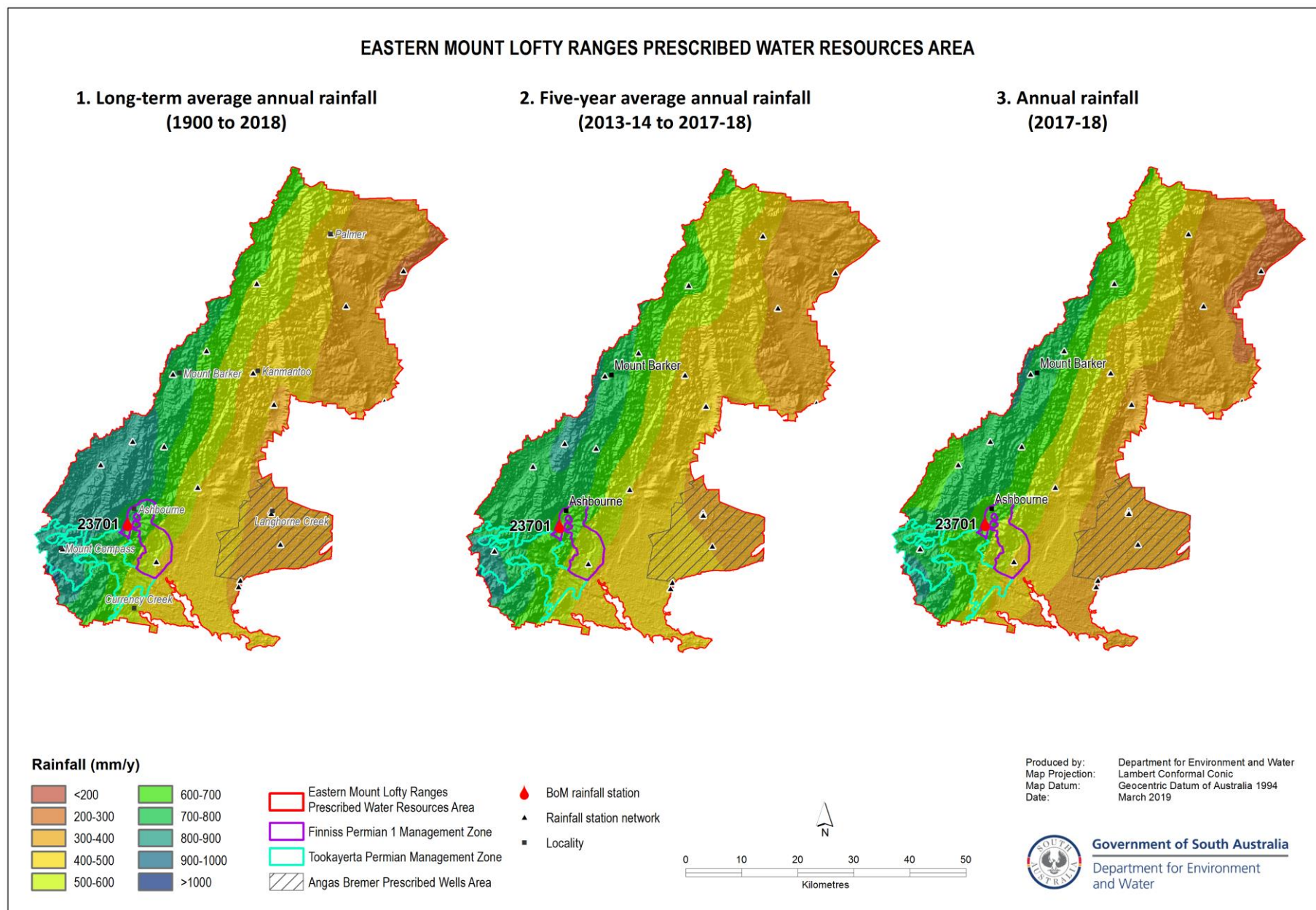


Figure 1. Spatial distribution of (1) long-term and (2) five-year average annual rainfall, and (3) annual rainfall⁶

⁶ Data sources: SILO interpolated point and gridded datasets available at <https://legacy.longpaddock.qld.gov.au/silo/> – see [More information](#)

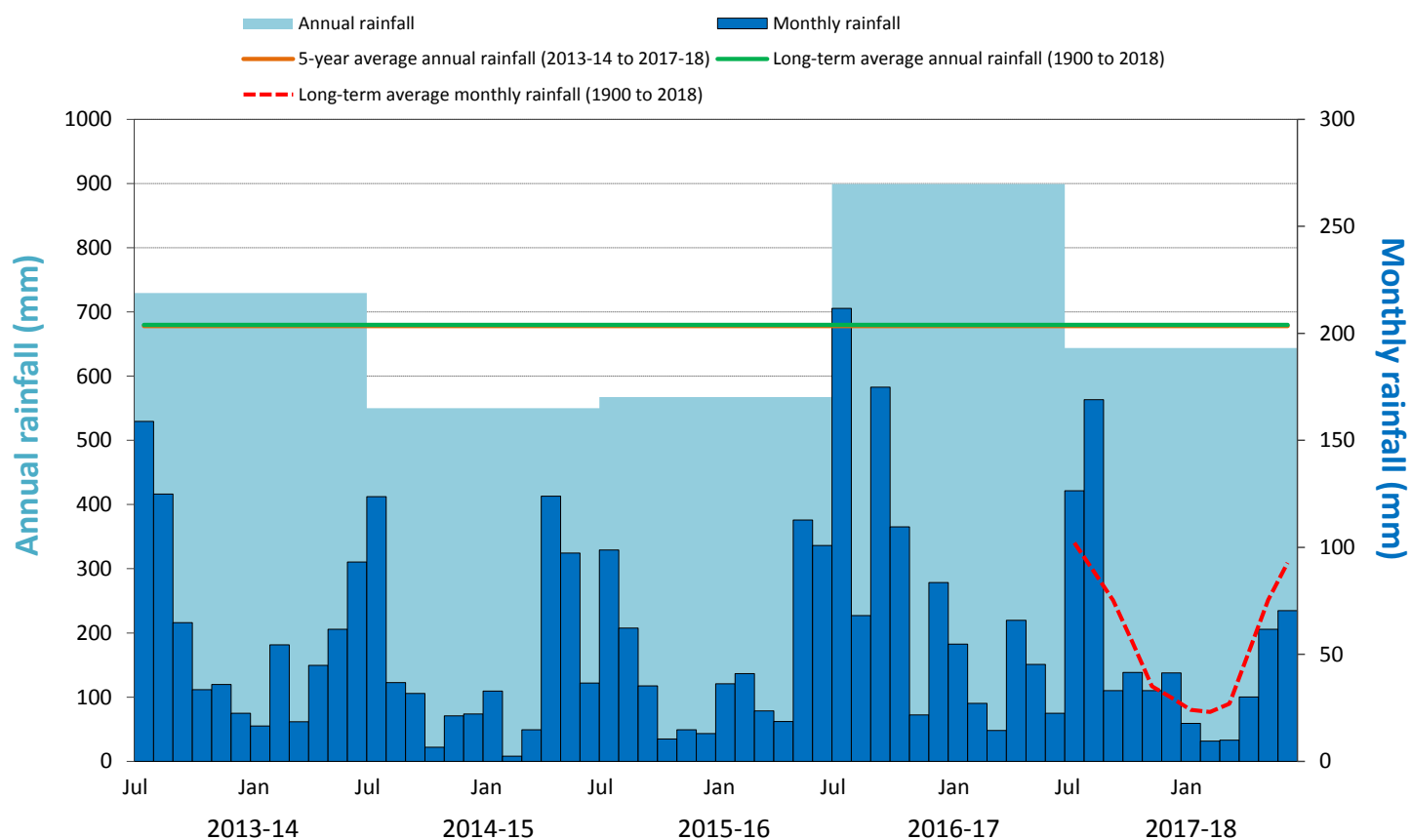
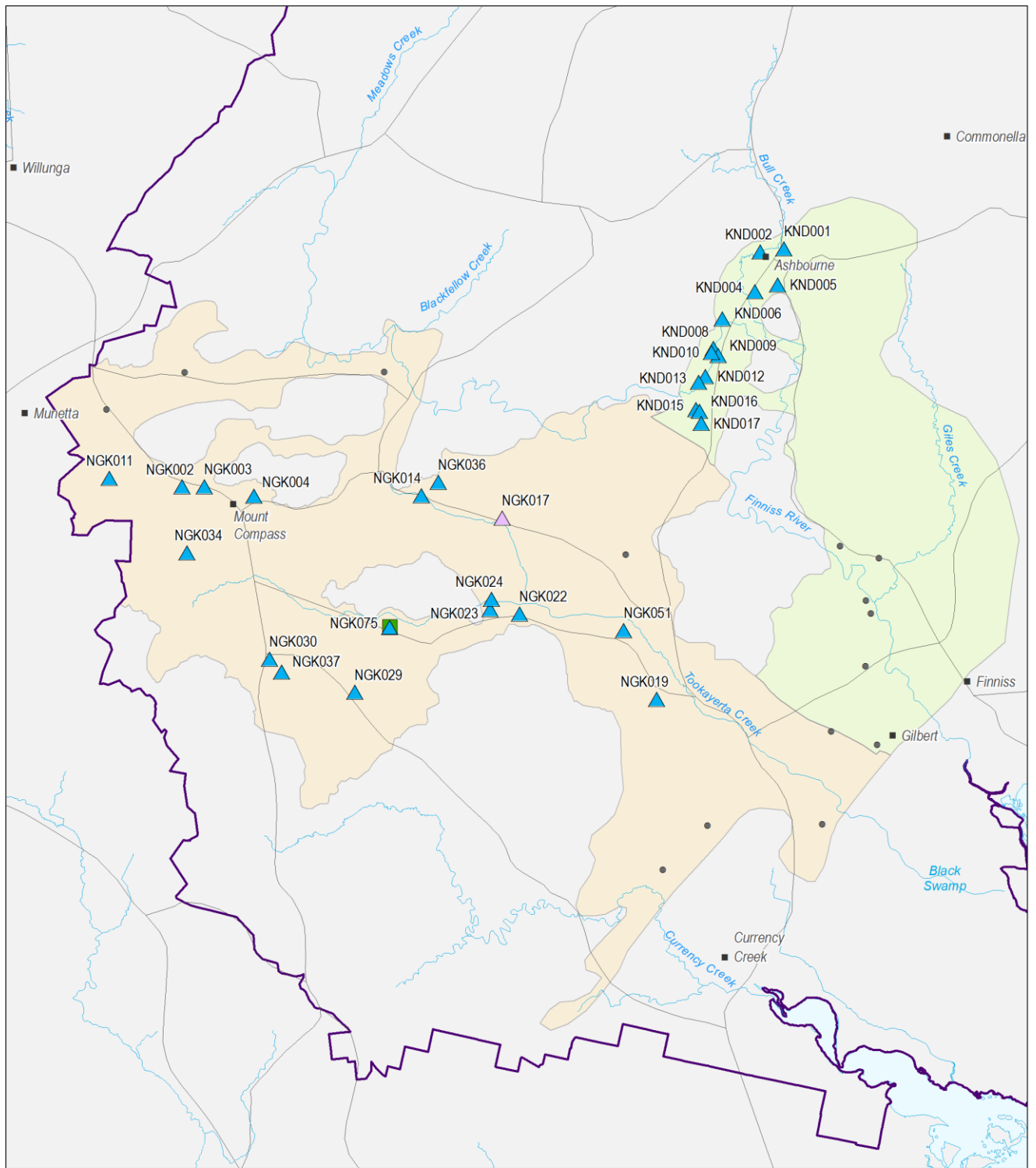


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Ashbourne (BoM Station 23701)⁷

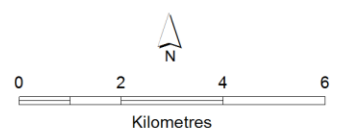
⁷ Data source: SILO Patched Point Dataset, available <https://legacy.longpaddock.qld.gov.au/silo/> – see [More information](#)



2018 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
- Locality
- Watercourse
- Road
- Tookayerta Permian Management Zone
- Finniss Permian 1 Management Zone
- Eastern Mount Lofty Ranges Prescribed Water Resources Area

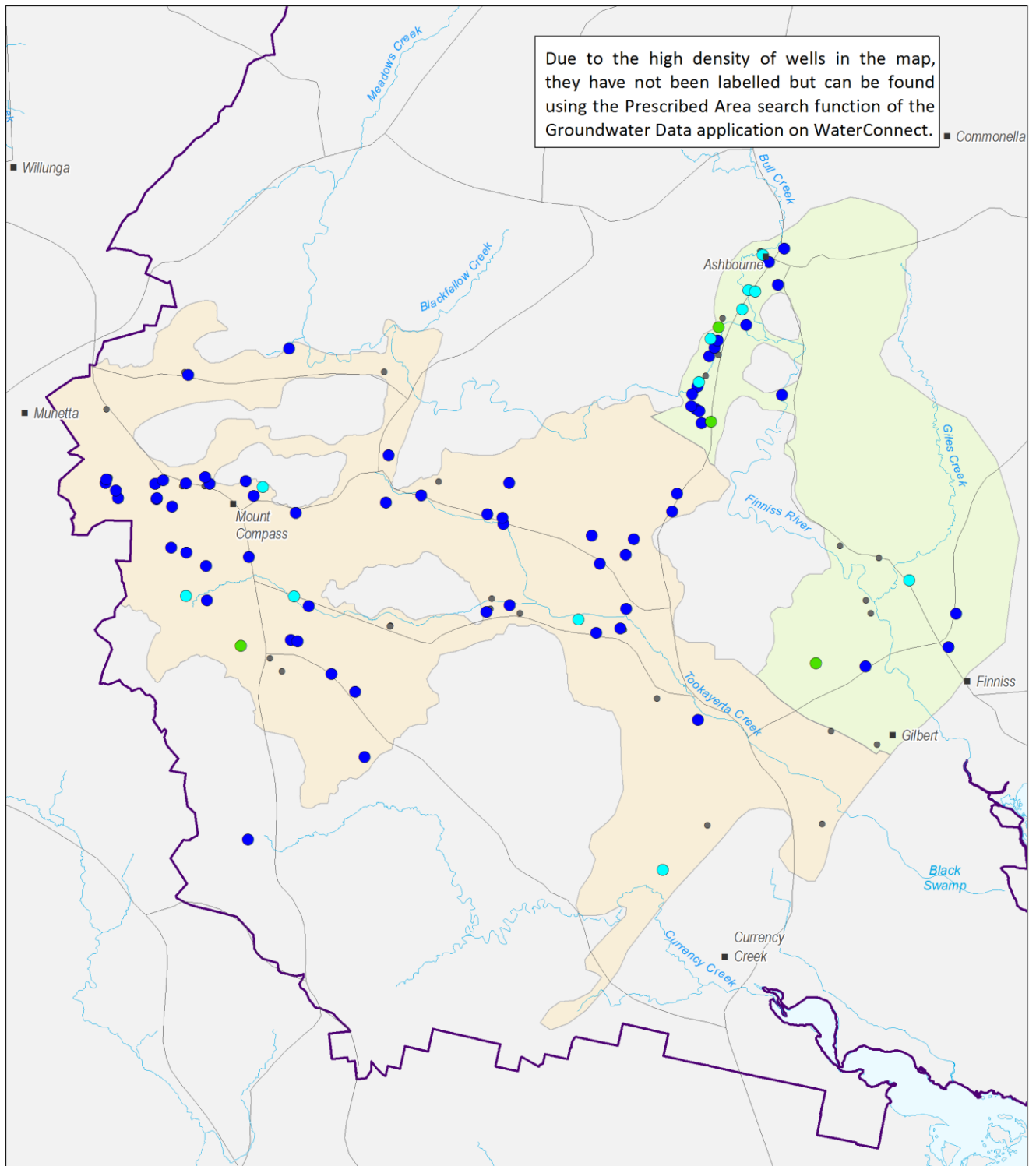


Produced by: Department for Environment and Water
 Map Projection: Lambert Conformal Conic
 Map Datum: Geocentric Datum of Australia 1994
 Date: April 2019



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

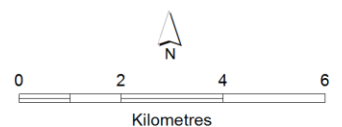


2018 salinity (mg/L)

- < 1000
- 1000 - 1500
- 1500 - 3000
- 3000 - 5000
- 5000 - 8000
- > 8000

● Current monitoring well,
insufficient data available

- Locality
- Watercourse
- Road
- Tookayerta Permian Management Zone
- Finnis Permian 1 Management Zone
- Eastern Mount Lofty Ranges Prescribed Water Resources Area



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Date: March 2019



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Figure 4. 2018 groundwater salinities: Permian sand aquifer

More information

To determine the status of the Permian sand aquifer in the Tookayerta Permian and Finnis Permian 1 Management Zones 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 [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 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 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; 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 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 <https://legacy.longpaddock.qld.gov.au/silo/>.

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

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