Marne Saunders Prescribed Water Resources Area Murray Group Limestone aquifer

2018 Groundwater level and salinity status report

Government of South Australia
Department for Environment and Water

2018 Status summary
Marne Saunders PWRA
Murray Group Limestone aquifer

Murray Group Limestone aquifer

The Murray Group Limestone (MGL) aquifer of the Marne Saunders Prescribed Water Resources Area (PWRA) 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, 57% of wells show declining groundwater levels.

The status is based on five-year trends. To view the *Marne Saunders 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 Marne Saunders 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	The Kongolia Bureau of Meteorology (BoM) rainfall station, number 24513, is located in the eastern part of the Murray Group PWRA.
Annual total[1]	220 mm 78 mm (26%) less than the five-year average of 298 mm 72 mm (25%) less than the long-term (1900-2018) average of 292 mm

Groundwater extraction

See Figure 3

Total allocated volume[1,2]	2088 ML
Licensed groundwater extractions[1,3]	1240 ML
Extraction volume comparison	19% greater than the previous year 5% greater than the five-year average

[1] For the water-use year 1 July 2017 to 30 June 2018
[2] Allocated volume does not include rollover, carry over or recharge allocations
[3] Total licensed 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: 2014–18	8 out of 14 wells (57%) show declining trends, at rates of 0.02-1.01 m/y (median of 0.09 m/y); 1 of these wells shows its lowest level on record 1 well (7%) is stable 5 wells (36%) show rising trends, at rates of 0.02–0.26 m/y (median of 0.08 m/y)

Groundwater salinity

See Figures 5 and 6

2018 salinity	1322–4124 mg/L (29 wells; median of 1832 mg/L)
Five-year trend: 2014–18	2 out of 14 wells (14%) show decreasing trends, at rates of 35 and 70 mg/L/y 8 wells (57%) show stable salinities 4 wells (29%) show increasing trends, at rates of 26–51 mg/L/y (median of 36 mg/L/y)
Citizen science	Since 2014, irrigators in the Marne Saunders PWRA have submitted groundwater samples that DEW have tested for salinity concentration. Data that have been validated are augmenting the existing DEW monitoring network.[4]

Groundwater resource condition limits

See Figures 4, 5 and 6

Definition	The water allocation plan for the Marne Saunders PWRA has identified resource condition limits based on groundwater level and salinity thresholds—these are designed to give early warning of adverse trends that may impact users of the resource.
Management zone	Unconfined Zone 1
Water level triggers definition	Decline below the minimum groundwater level experienced between 1998 and 2002, in any of the monitoring wells.
Water level triggers in 2017–18	5 out of 6 wells show declines below the trigger level, therefore the resource condition limit is exceeded.
Salinity triggers definition	Long-term salinity increase
Salinity triggers in 2017–18	No long-term salinity increase observed in the 4 available monitoring wells, therefore the resource condition limit is not exceeded.

[4] The salinity data collected from irrigation wells can be viewed at Groundwater Data or via WaterConnect

Regional setting

The Marne Saunders PWRA is located within the South Australian Murray-Darling Basin Natural Resources Management Region and lies on the eastern side of the Mount Lofty Ranges, approximately 60 km north-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 Marne Saunders PWRA consists of two tributary catchments of the River Murray and can be divided into two distinct groundwater regions: the 'hills zone' to the west and the 'plains zone' in the east. The plains zone is underlain by unconsolidated sediments of the Murray Basin consisting of limestone, sand and clay layers up to 80 m thick. These sediments, which overlie basement rocks that are exposed in the hills zone, comprise four units: Quaternary sediments; the MGL; the Ettrick Formation; and the Renmark Group. In general, the MGL is overlain by Quaternary sediments and underlain by the Ettrick Formation and the Renmark Group.

The MGL aquifer is highly fossiliferous and sandy with solution cavities, and as it constitutes the main aquifer in the plains zone, it is the focus of this report. Adjacent to the hills zone in the west, the MGL aquifer is confined by the Quaternary-aged Pooraka Formation, but it becomes unconfined where the Pooraka Formation pinches out to the east of Cambrai. Recharge to the MGL aquifer is via lateral throughflow from the adjacent basement rocks in the hills zone, and during periods of flood, vertical recharge occurs from streamflow in those locations where the aquifer is unconfined.

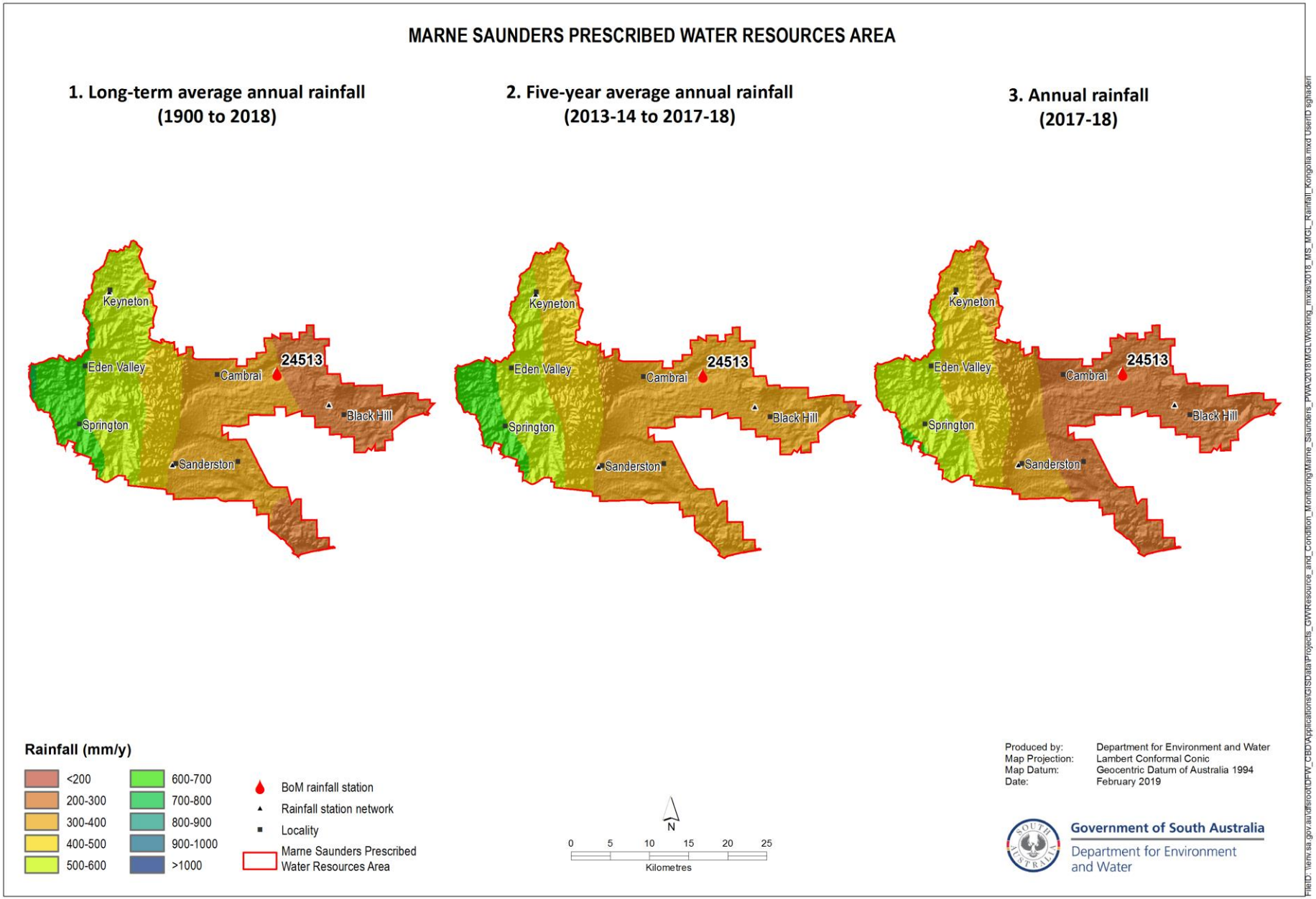

Figure 1. Spatial distribution of (1) long-term and (2) five-year average annual rainfall, and (3) annual rainfall[5]

[5] Data sources: SILO interpolated point and gridded datasets available at https://legacy.longpaddock.qld.gov.au/silo/ – see More information

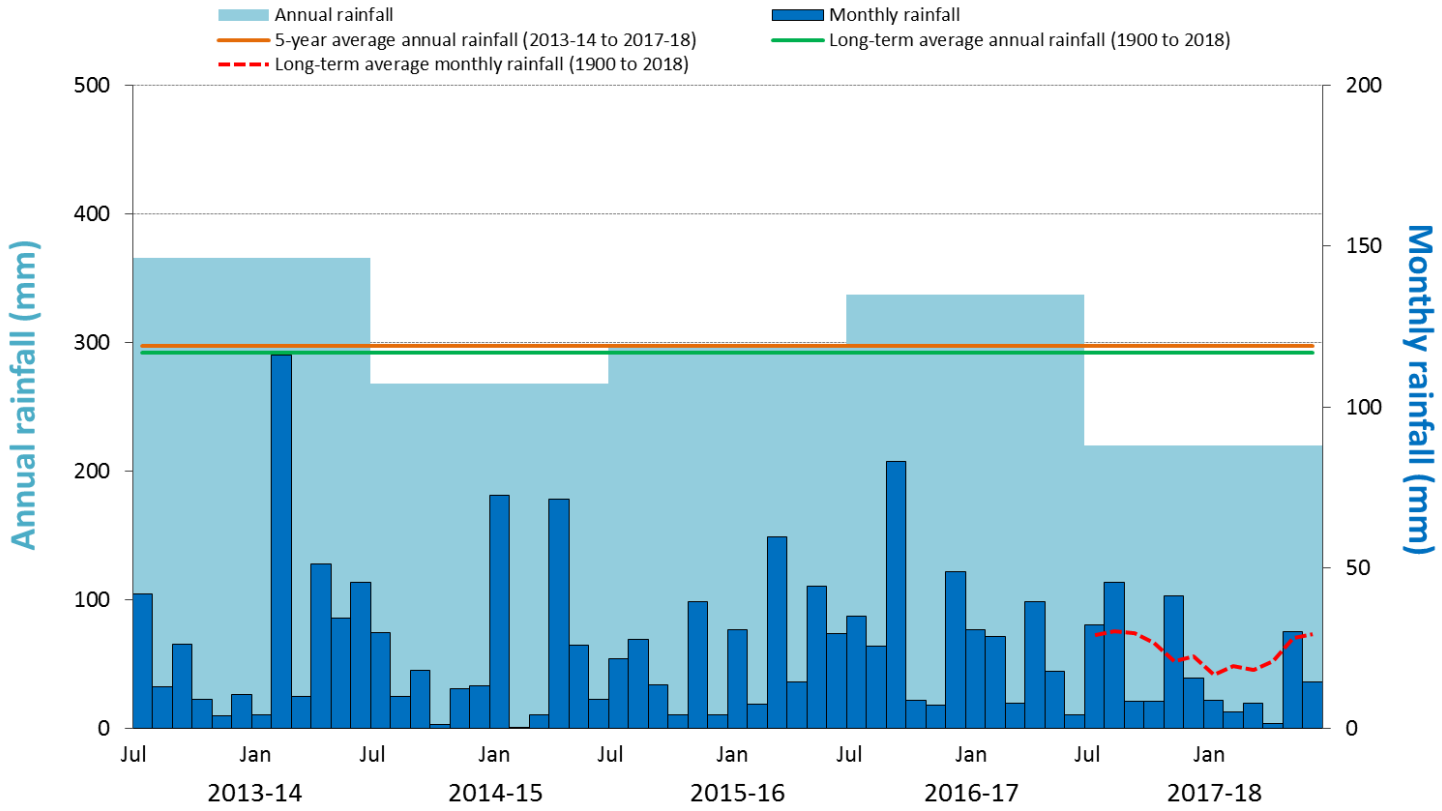

Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Kongolia (BoM Station 24513)[6]

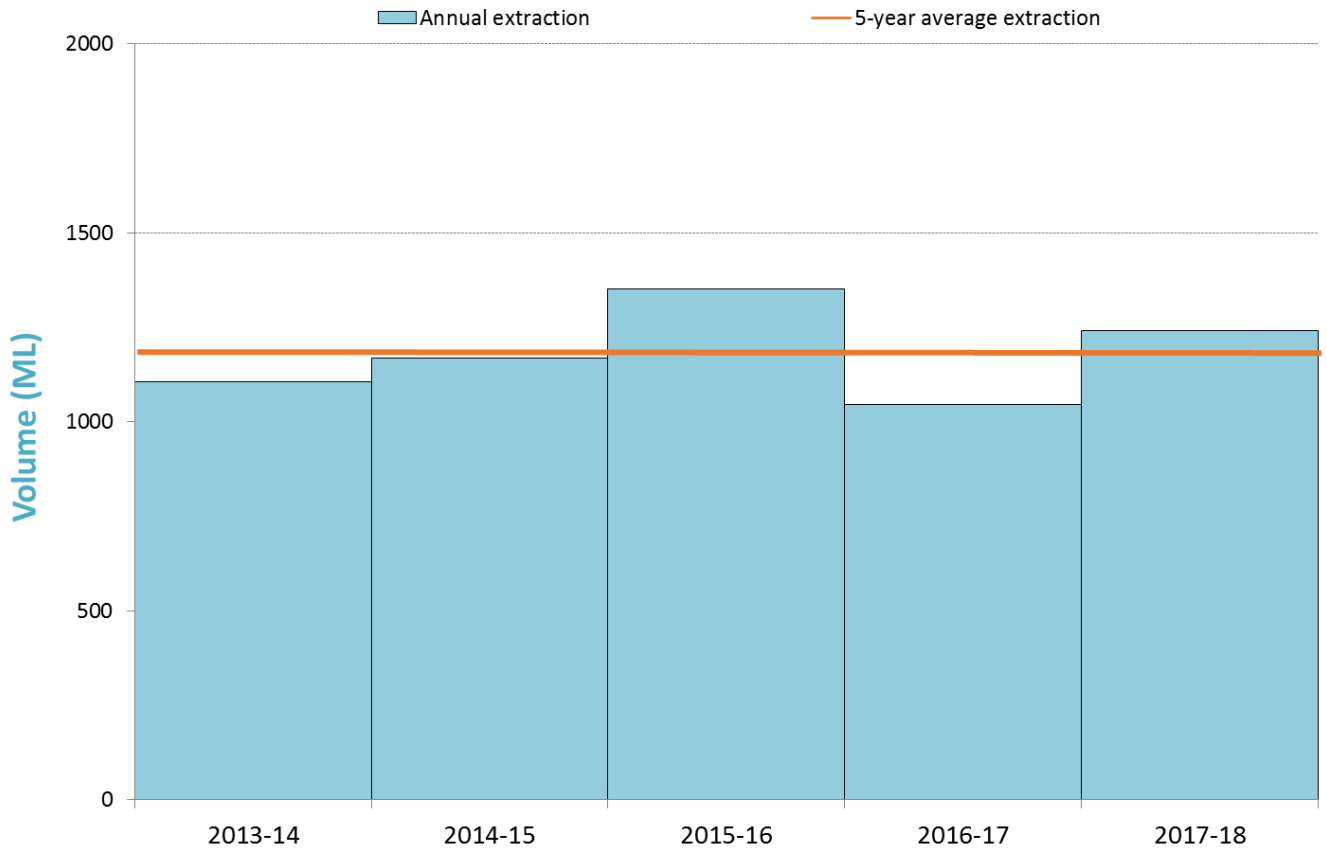

Figure 3. Licensed groundwater extraction volumes[7] for the past five water-use years

[6] Data source: SILO Patched Point Dataset, available https://legacy.longpaddock.qld.gov.au/silo/ – see More information
[7] Total licensed extractions are subject to change as extraction data have not yet been verified in full – see More information

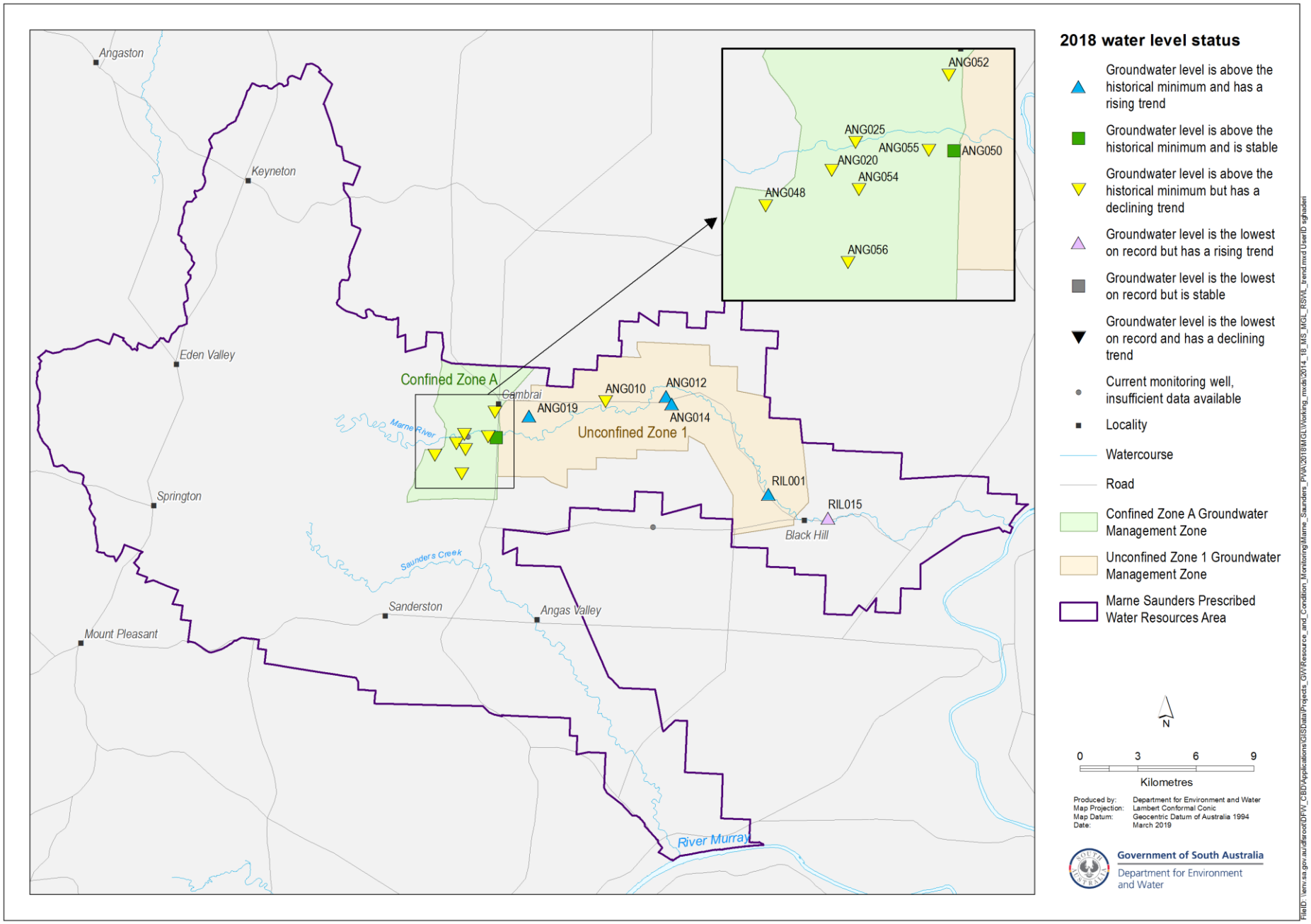

Figure 4. Five-year trends (2014–18) in groundwater levels: Murray Group Limestone aquifer

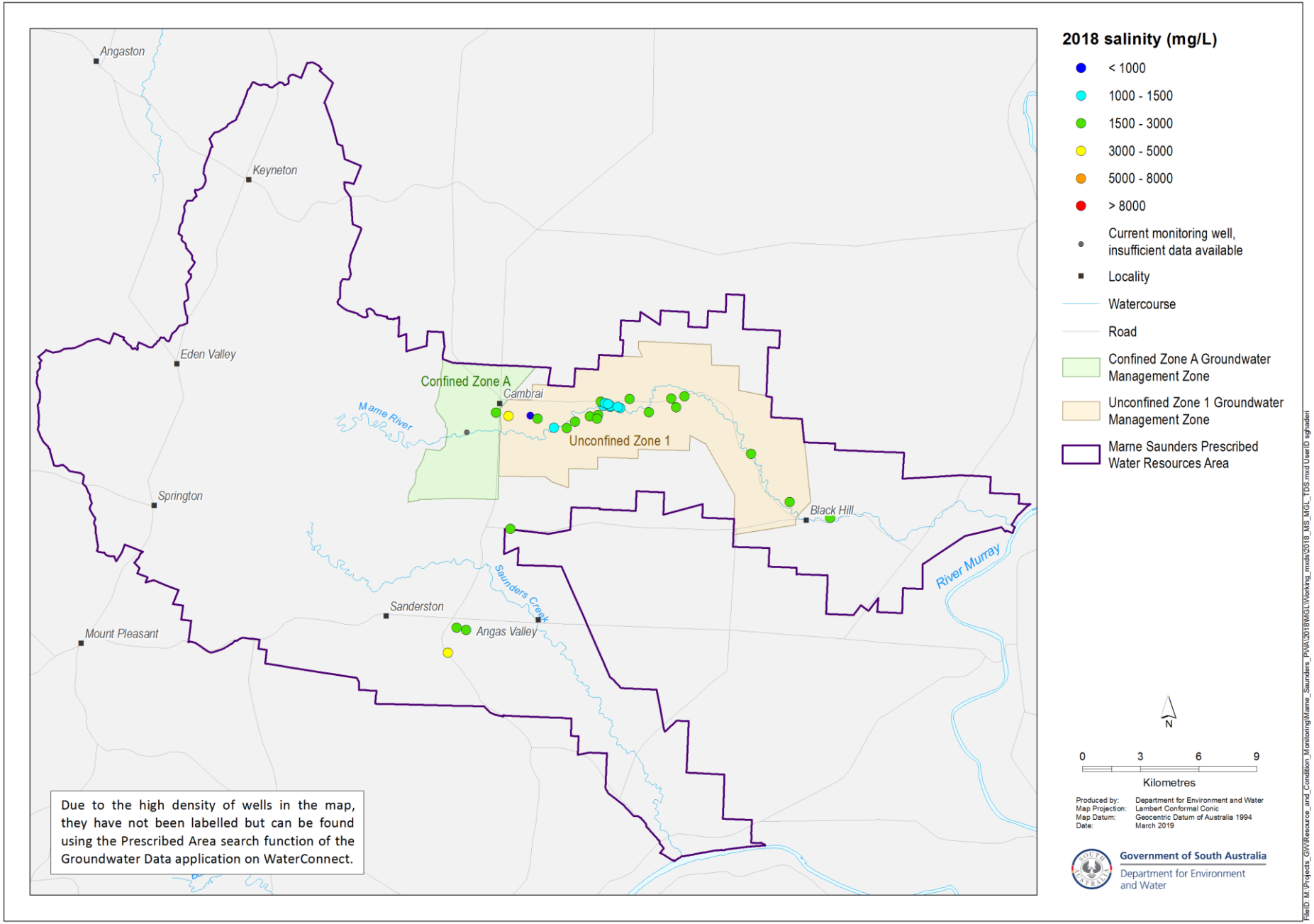

Figure 5. 2018 groundwater salinities: Murray Group Limestone aquifer

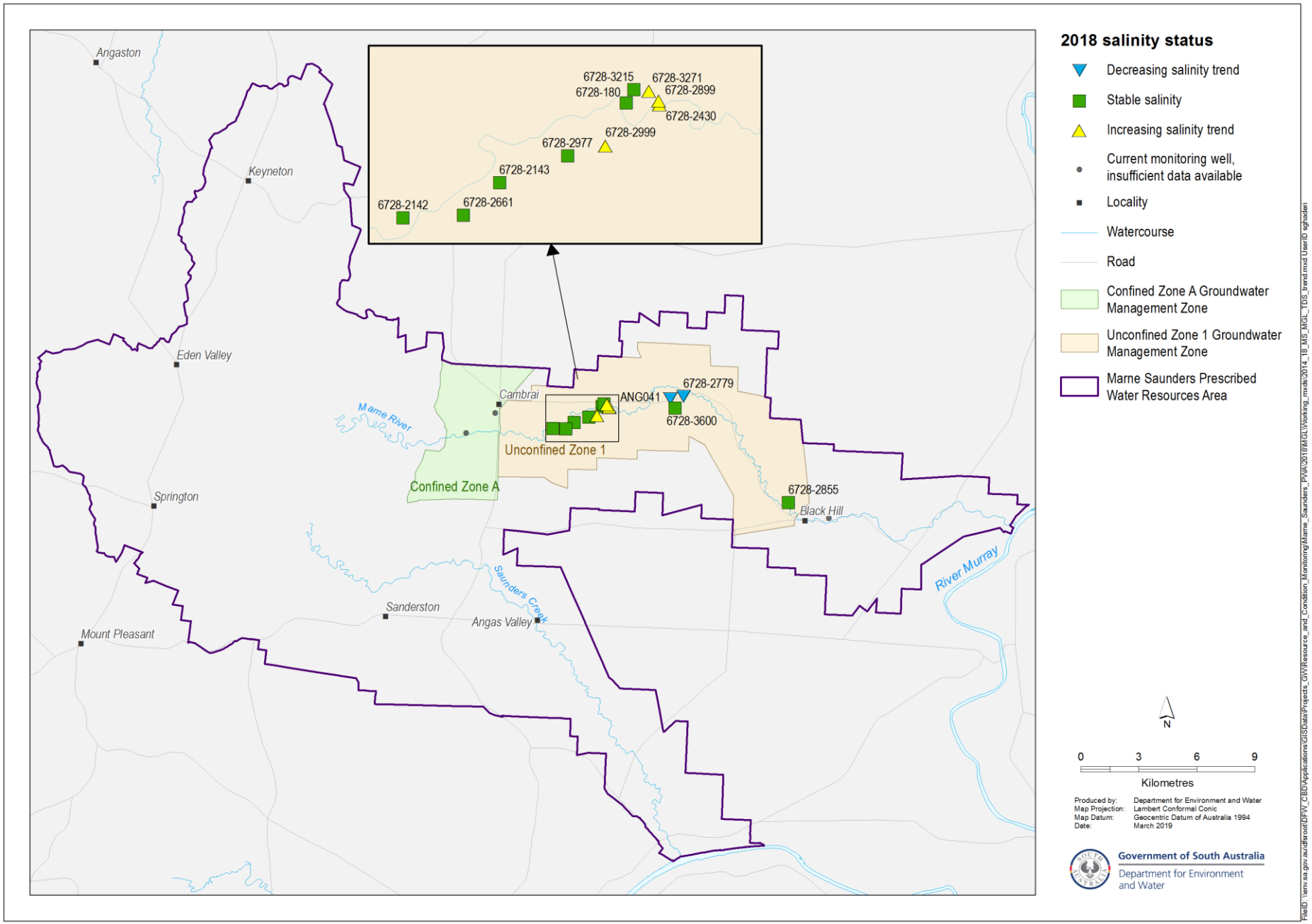

Figure 6. Five-year trends (2014–18) in groundwater salinities: Murray Group Limestone aquifer

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 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 *Well 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.

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 *Marne Saunders 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 Marne Saunders PWRA, please visit the *Groundwater Data* page under the *Data Systems* tab on WaterConnect.

For further information about the Marne Saunders PWRA, please see the *Water Allocation Plan for the Marne Saunders Prescribed Water Resources Area* on the Natural Resources SA 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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