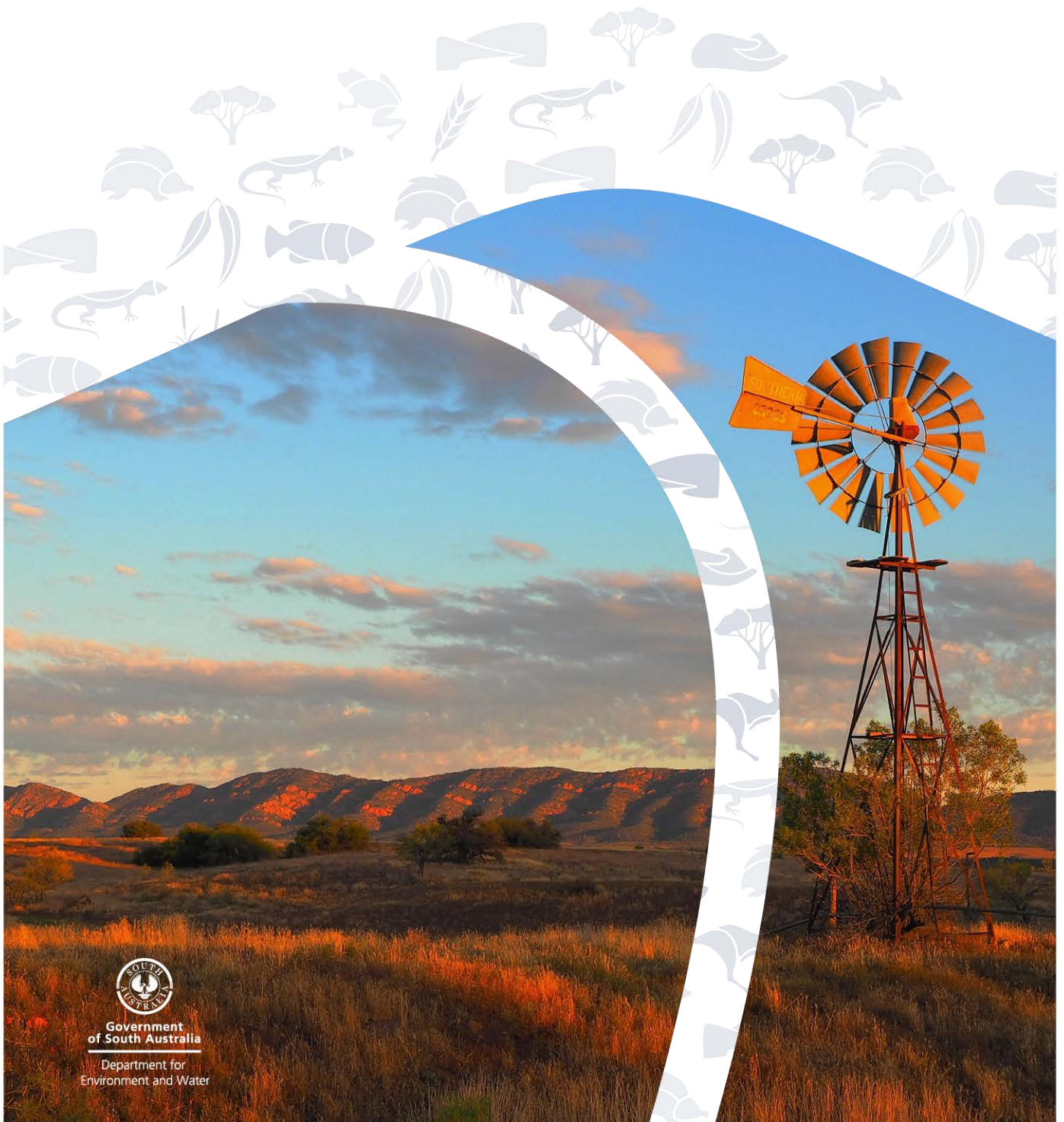


Marne Saunders PWRA Murray Group Limestone aquifer

2017 Groundwater level and salinity status report



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of South Australia

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2017 Status summary

Marne Saunders PWRA

Murray Group Limestone aquifer



The Murray Group Limestone aquifer (MGL) of the Marne Saunders Prescribed Water Resources Area (PWRA) has been assigned a **green** status for 2017 because positive trends have been observed over the past five years.

The status is based on five-year trends: over the period 2013–17, all wells show rising or stable groundwater levels and 63% show a decreasing or stable salinities.

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 | Kongolia Bureau of Meteorology (BoM) rainfall station 24513, located in the eastern part of the PWRA |
| Annual total ¹ | 324 mm 30 mm (10%) greater than the five-year average of 294 mm 28 mm (9%) greater than the long-term average of 296 mm |
| Monthly summary | Well-above average rainfall recorded in September, December, January and February Well-below average rainfall recorded in October, November, March and June |
| Spatial distribution | Rainfall in 2016–17 was slightly above average across the entire PWRA |

Water use

See Figure 3

| | |
|-----------------------------------|--|
| Total allocated volume: 2016–17 | 1982 ML ² |
| Licensed groundwater extractions* | 1046 ML ² (53% of total allocation) |
| Extraction volume comparison | 23% less than the previous year 13% less than the five-year average |

*Stock and domestic use is not included in licensed extractions

¹ For the water-use year 1 July 2016 to 30 June 2017

² 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 15 wells (93%) show rising trends, at rates of 0.02–0.78 m/y (median of 0.28 m/y) 1 well (7%) is stable |
|--------------------------|--|

Groundwater salinity

See Figures 5 and 6

| | |
|--------------------------|---|
| 2017 salinity | 1088–4169 mg/L 11 out of 45 wells (24%) show salinities less than 1500 mg/L, which is the salinity threshold for most crop types |
| Five-year trend: 2013–17 | 3 out of 16 wells (19%) show decreasing trends, at rates of 44–115 mg/L/y 7 wells (44%) show stable salinities 6 wells (37%) show increasing trends, at rates of 37–66 mg/L/y (median of 43 mg/L/y) |
| Citizen science | Since 2014, irrigators in the Marne Saunders PWRA have submitted salinity samples and once validated, these will augment the existing DEW monitoring network ³ |

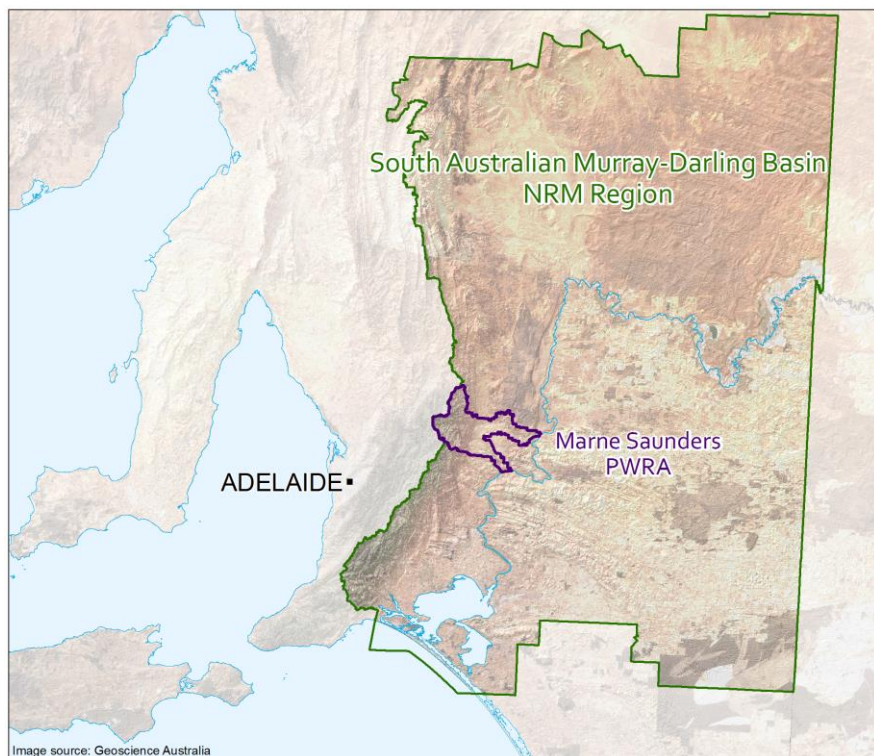
Groundwater condition limits

See Figures 4, 5 and 6

| | |
|---------------------------------|--|
| Definition | The water allocation plan (WAP) for the Marne Saunders PWRA has identified resource condition limits based on water level and salinity thresholds – these are designed to give early warning of adverse trends that may impact users of the resource |
| Management zone | Confined Zone A |
| Water level triggers definition | Sustained flattening of the pressure gradient between pumping seasons or reversal of the pressure gradient |
| Water level triggers in 2016–17 | Data not available |
| Salinity triggers definition | Increase greater than 2%/y averaged over five years, in more than 50% of monitoring wells |
| Salinity triggers in 2016–17 | Triggers have not been reached or exceeded |
| Management zone | Unconfined Zone 1 |
| Water level triggers definition | Decline below the minimum water level experienced between 1998–2002, in any of the monitoring wells |
| Water level triggers in 2016–17 | 2 out of 5 wells show declines below the trigger level, therefore the resource condition limit is exceeded |
| Salinity triggers definition | Long-term salinity increase |
| Salinity triggers in 2016–17 | A median increase of 3% shown in 4 available wells, therefore the resource condition is not exceeded |

³ The salinity data collected from irrigation wells can be viewed at [WaterConnect](#)

Regional setting



The Marne Saunders PWRA is located on the eastern side of the Mount Lofty Ranges, approximately 60 km north-east of Adelaide in the South Australian Murray-Darling Basin Natural Resources Management Region. 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*. A WAP provides for sustainable management of the water resources.

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 Murray Group Limestone; 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.

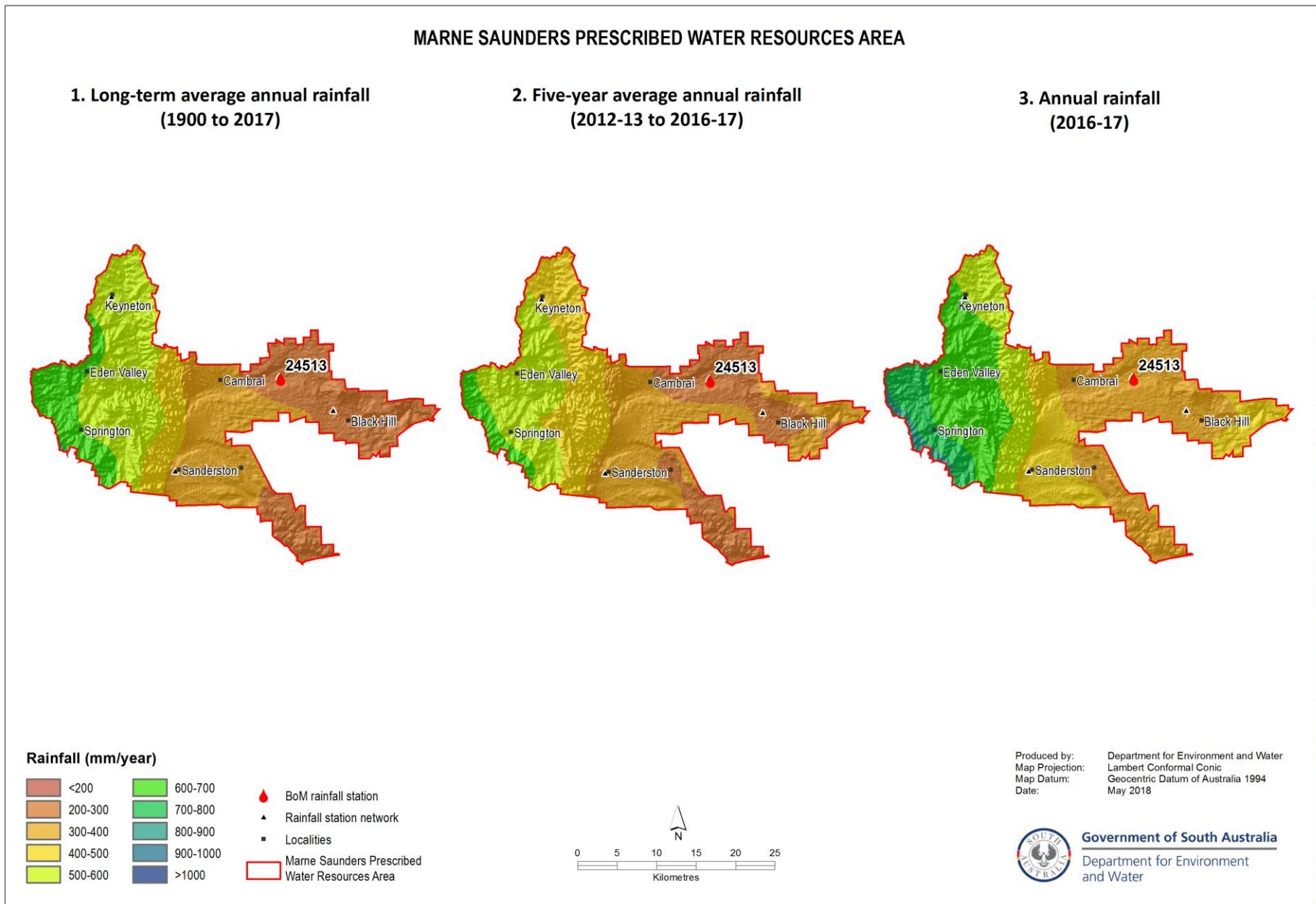


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall⁴

⁴ Data sources: SILO Patched Point Dataset <https://silo.longpaddock.qld.gov.au/> and BoM Australian Water Availability Project (<http://www.bom.gov.au/jsp/awap/>) – see [More information](#)

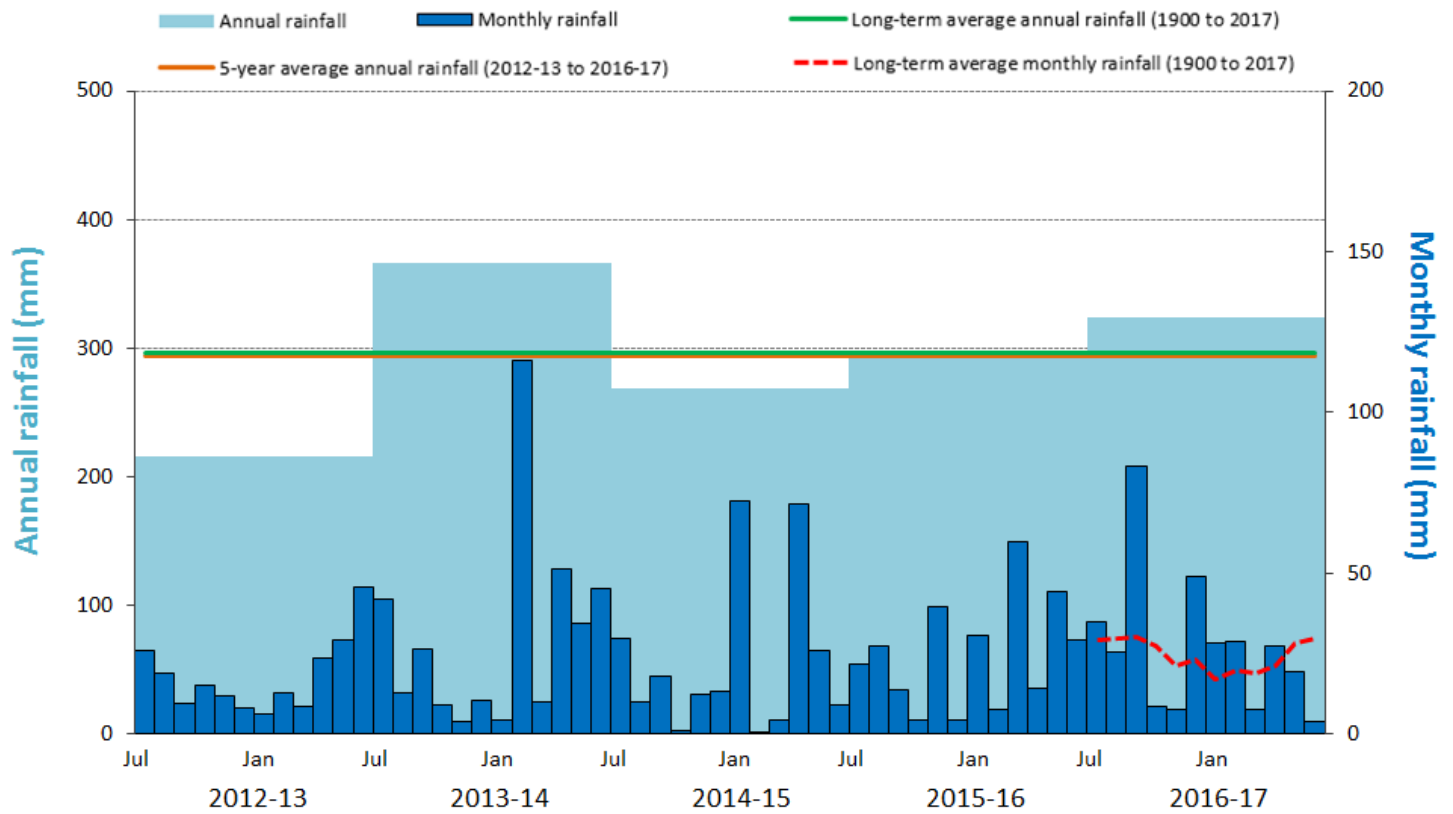


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Kongolia (BoM Station 24513)⁵

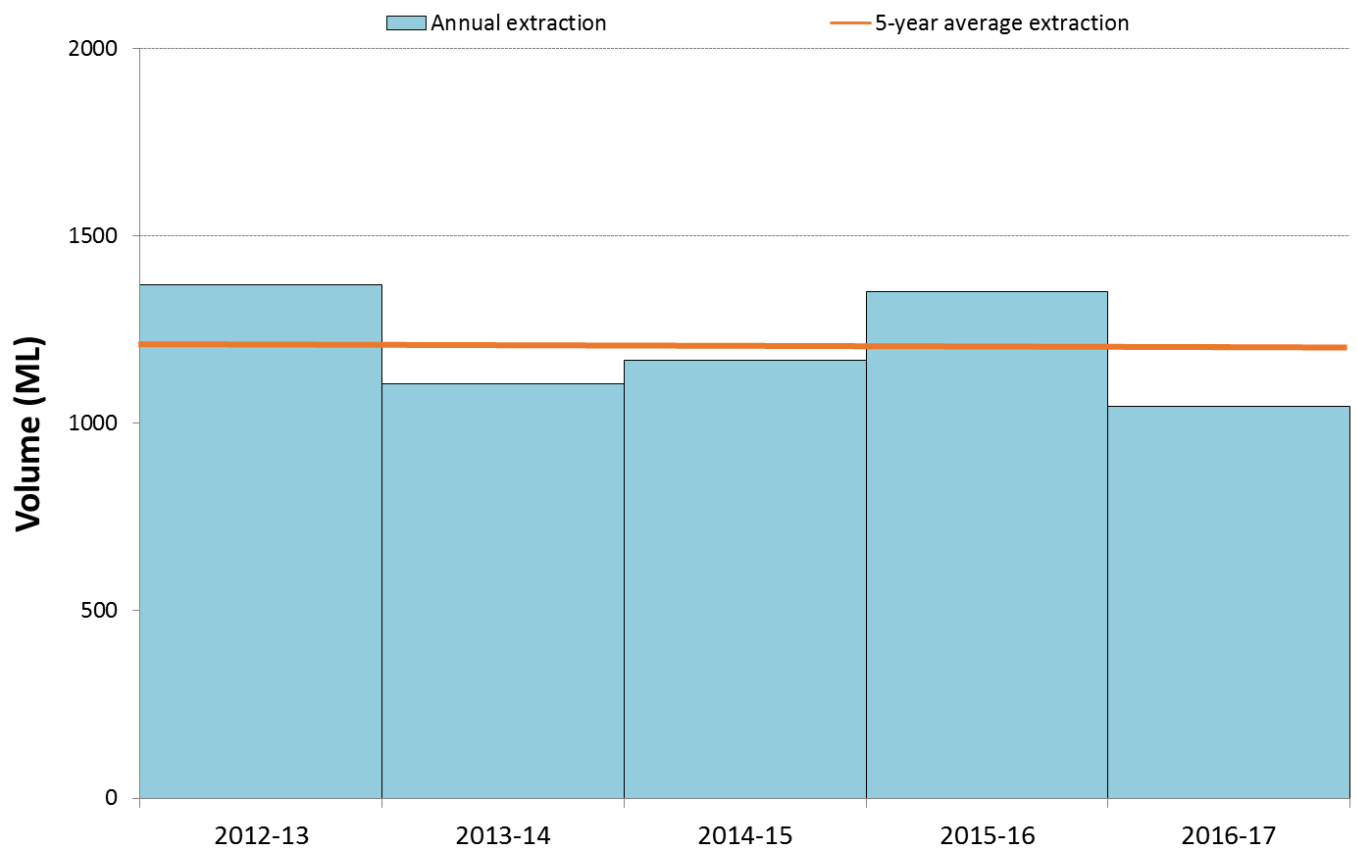


Figure 3. Licensed groundwater extraction volumes⁶ for the past five water-use years

⁵ Data source: SILO Patched Point Dataset, available <https://silo.longpaddock.qld.gov.au/> – see [More information](#)

⁶ Total licensed extractions are subject to change as extraction data have not yet been verified in full – see [More information](#)

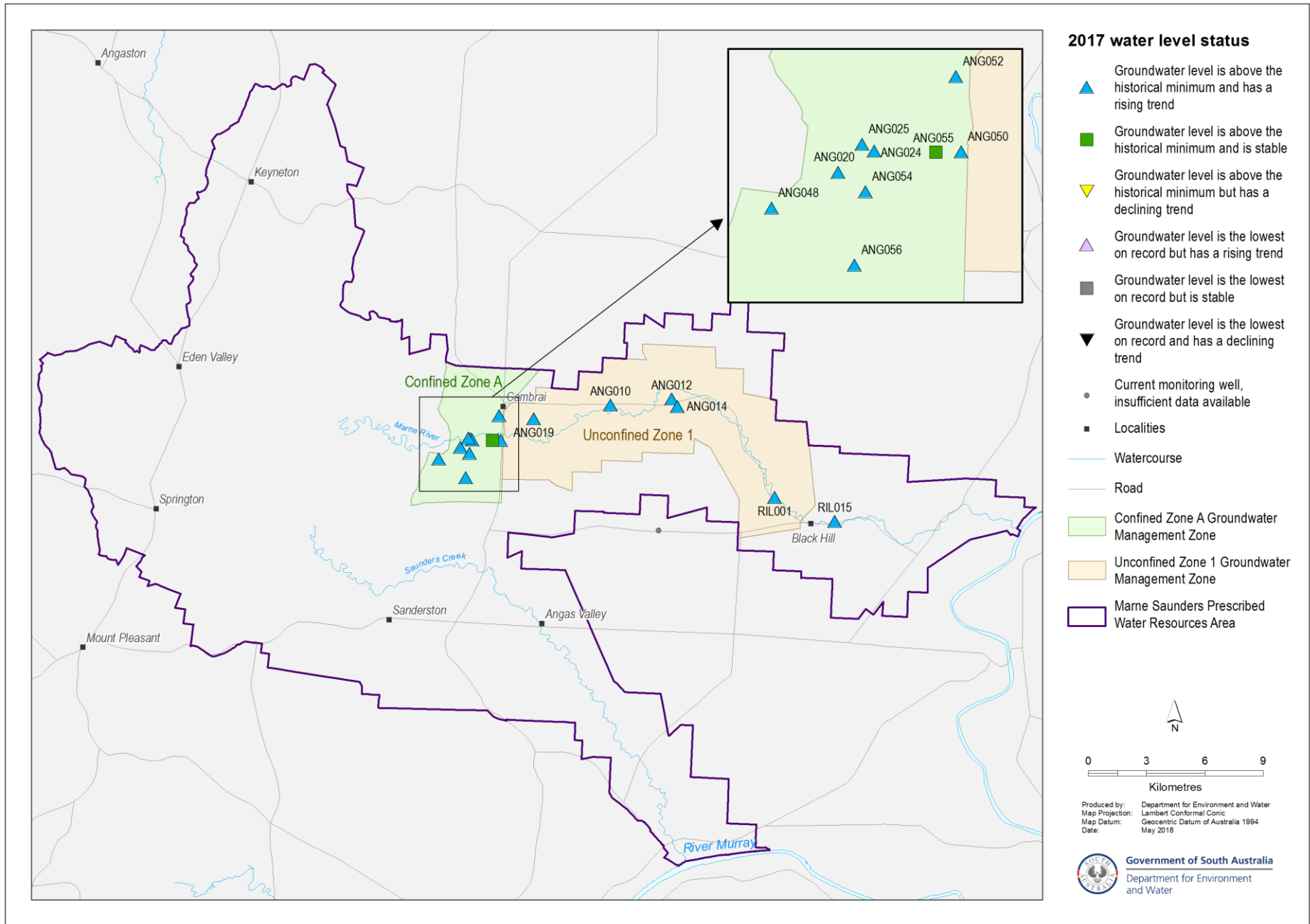


Figure 4. Five-year trends (2013–17) in groundwater pressure levels: Murray Group Limestone aquifer

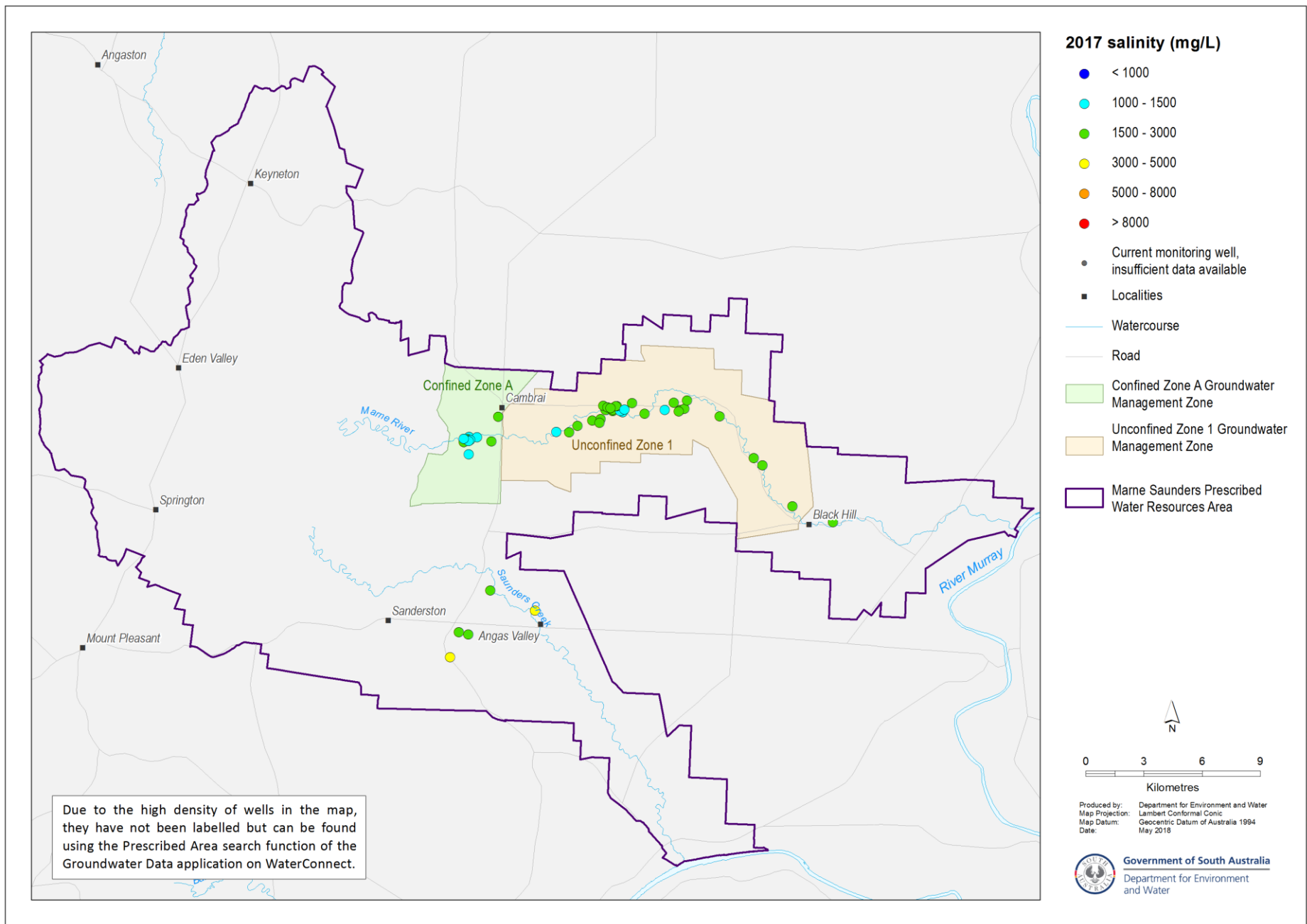


Figure 5. 2017 groundwater salinities: Murray Group Limestone aquifer

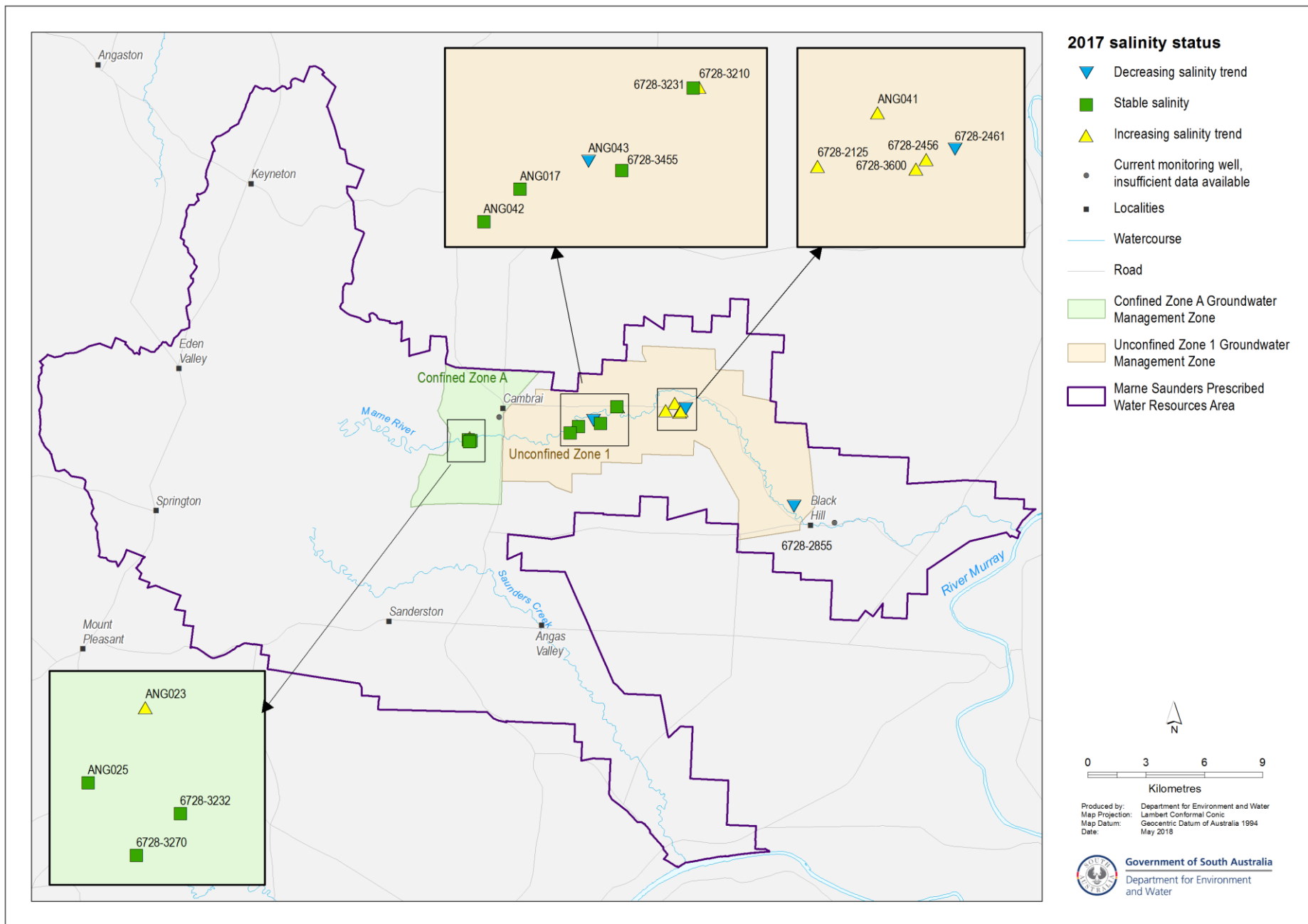


Figure 6. Five-year trends (2013–17) in groundwater salinities: Murray Group Limestone aquifer

More information

To determine the status of the MGL 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 [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, and to review the full historical record of the monitoring wells, 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 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 <https://silo.longpaddock.qld.gov.au/>. Rainfall maps have been compiled using daily gridded data produced by the BoM Australian Water Availability Project (www.bom.gov.au/jsp/awap/).

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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