

Kangaroo Flat region of the Northern Adelaide Plains PWA T2 aquifer

2017 Groundwater level and salinity status report



Government
of South Australia

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Environment and Water

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2017 Status summary

Northern Adelaide Plains PWA

T2 aquifer of the Kangaroo Flat Region



The T2 aquifer of the Kangaroo Flat region of the Northern Adelaide Plains Prescribed Wells Area (PWA) has been assigned an **orange** status for 2017 because moderate adverse trends have been observed over the past five years.

The status is based on five-year trends: over the period 2013–17, 50% of wells show declining groundwater pressure levels and 67% of wells show increasing salinities.

Despite above-average rainfall and a large reduction in extraction, declining pressure levels and increasing salinities have been observed.

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	Gawler Bureau of Meteorology (BoM) rainfall station 23078, located immediately east of the Kangaroo Flat region
Annual total ¹	510 mm 75 mm (17%) greater than the five-year average of 435 mm 65 mm (15%) greater than the long-term average of 445 mm
Monthly summary	Well-above average rainfall recorded in September, December and January Well-below average rainfall recorded in November, March, May and June
Spatial distribution	Rainfall in 2016–17 was above average across the entire PWRA

Water use

See Figure 3

Total allocated volume: 2016–17	1500 ML
Licensed groundwater extractions*	434 ML ² (29% of total allocation)
Extraction volume comparison	65% less than the previous year 57% 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 extractions are subject to change as extraction data have not yet been verified in full – see [More information](#)

Groundwater pressure level

See Figure 4

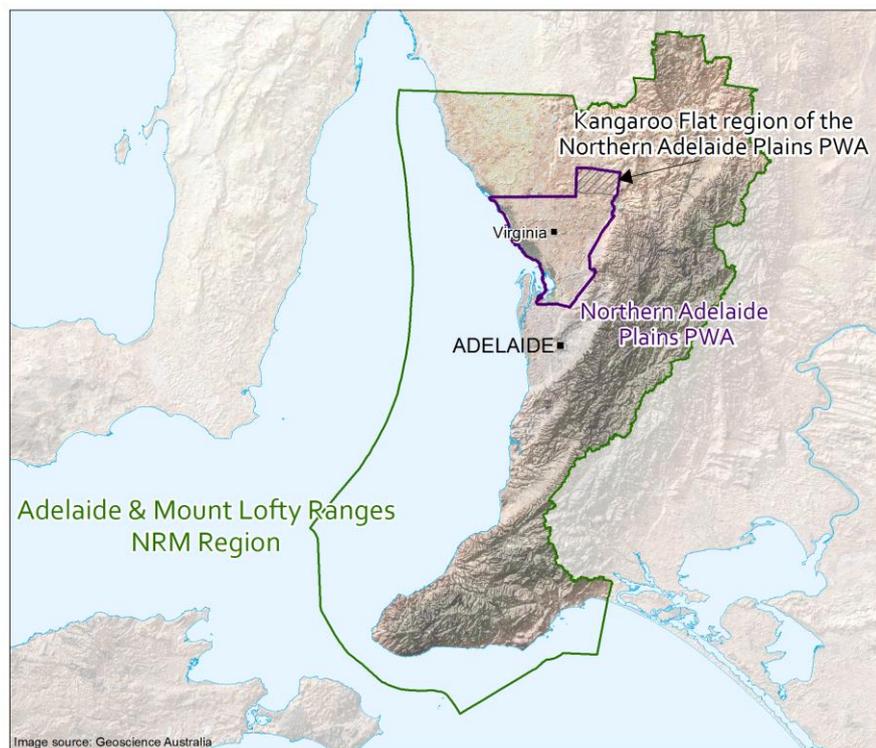
Five-year trend: 2013–17	2 out of 4 wells (50%) show rising pressure levels of 0.28 and 0.46 m/y 2 wells (50%) show declining pressure levels of 0.06 and 0.42 m/y
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Groundwater salinity

See Figures 5 and 6

2017 salinity	928–4448 mg/L 4 out of 9 wells (44%) show salinities less than 1500 mg/L, which is the salinity threshold for most crop types
Five-year trend: 2013–17	2 out of 3 wells (67%) show increasing trends, at rates of 81 and 36 mg/L/y The remaining well is stable

Regional setting



The Kangaroo Flat region is located in the north-east area of the Northern Adelaide Plains PWA, within the Adelaide and Mount Lofty Ranges Natural Resource Management Region. It encompasses an area of around 80 km². Groundwater use in the Kangaroo Flat region was restricted in 2000 and the area was prescribed in 2004 — as an addition to the Northern Adelaide Plains PWA — under South Australia's *Natural Resources Management Act 2004*. The current water allocation plan (WAP) is being amended to provide for the sustainable management of the water resources.

In 2013, an assessment of the capacity of the groundwater resource in the Kangaroo Flat region was undertaken to estimate sustainable extraction volumes for future licensed groundwater allocations. Consequently, the status of the Kangaroo Flat region's groundwater resources is reported here, independently of the *Northern Adelaide Plains PWA T2 aquifer 2017 Groundwater level and salinity status report*.

The Kangaroo Flat region contains Quaternary and Tertiary sediments that extend to a depth of around 100 m below ground surface. These sediments can be broadly divided into four regional hydrogeological units: the Hindmarsh Clay aquitard, the Carisbrooke Sand (Q4) aquifer, a semi-confining layer consisting of weathered Quaternary and Tertiary sediments, and the confined T2 aquifer. The T2 aquifer comprises limestones and sands of the lower Port Willunga Formation, and is directly overlain by the Q4 aquifer and the Hindmarsh Clay aquitard. In the Kangaroo Flat region, groundwater is extracted only from the T2 aquifer, which is the focus of this report.

Groundwater recharge to the T2 aquifer was previously thought to occur by lateral inflow from the adjacent fractured rock aquifers of the Mount Lofty Ranges, which are located along the eastern boundary of the PWA. However, recent research suggests that primarily recharge to the aquifer occurs from infiltration of surface water from streams that flow onto the plains from the ranges. Outflows from the groundwater system occur through extraction from irrigation and domestic wells, and discharge to Gulf St Vincent.

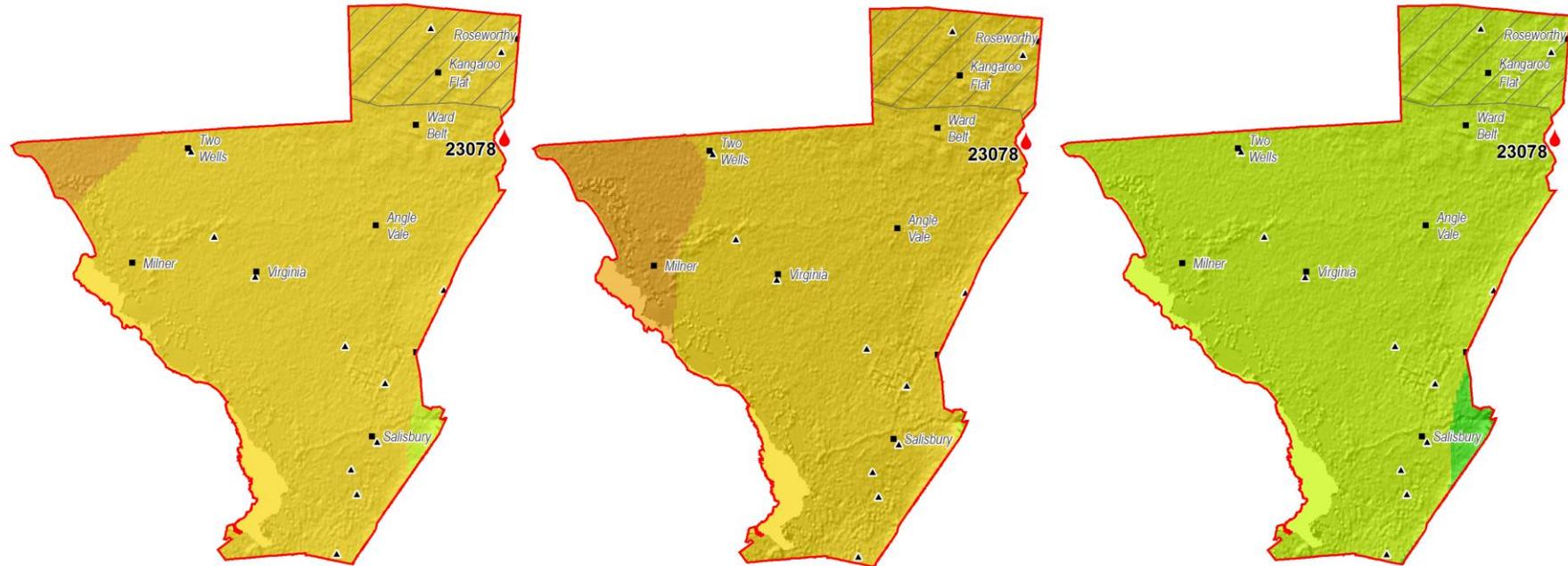
A localised cone of depression in the T2 aquifer, centred in the south-western corner of the region, has been observed since 2011 on a seasonal basis as the result of the intensive spring/early-summer extraction regime.

NORTHERN ADELAIDE PLAINS PRESCRIBED WELLS AREA

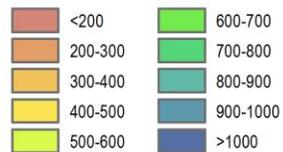
**1. Long-term average annual rainfall
(1900 to 2017)**

**2. Five-year average annual rainfall
(2012-13 to 2016-17)**

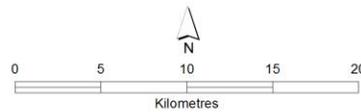
**3. Annual rainfall
(2016-17)**



Rainfall (mm/year)



- BoM rainfall station
- ▲ Rainfall station network
- Localities
- Kangaroo Flat region
- Northern Adelaide Plains Prescribed Wells Area



Produced by: Department for Environment and Water
 Map Projection: Lambert Conformal Conic
 Map Datum: Geocentric Datum of Australia 1994
 Date: May 2018



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Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall³

³ 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](#)

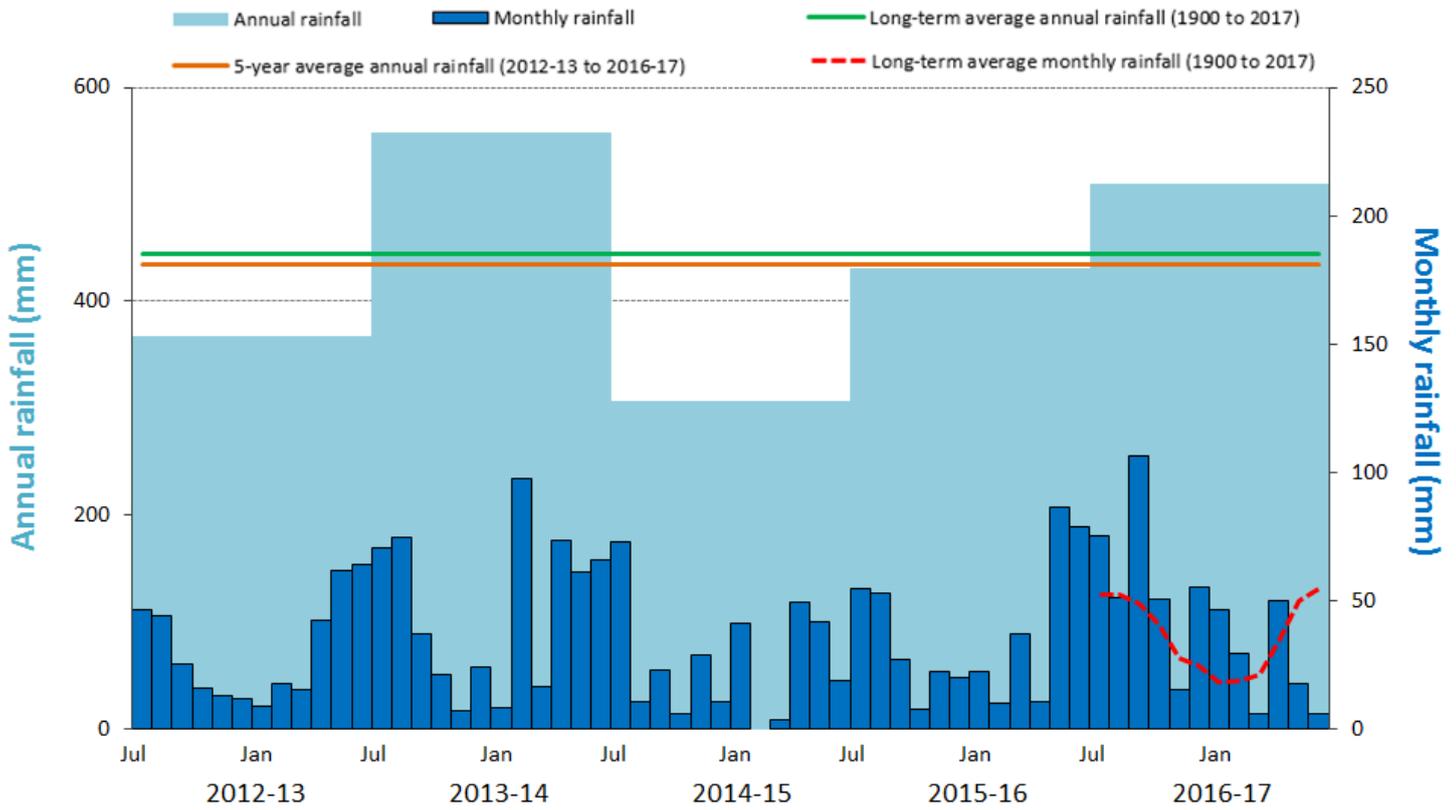


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Gawler (BoM Station 23078)⁴

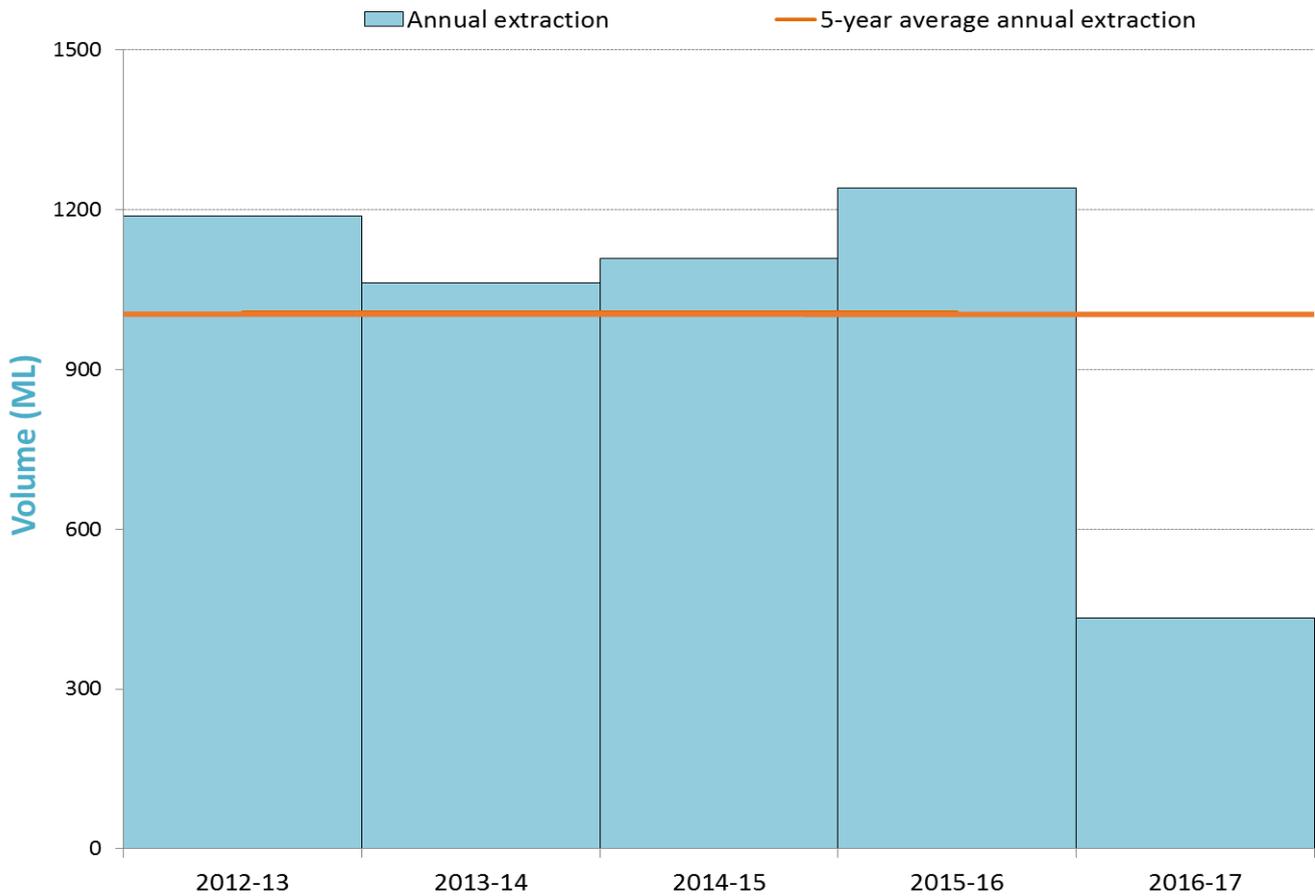


Figure 3. Licensed groundwater extraction volumes⁵ for the past five water-use years

⁴ Data source: SILO Patched Point Dataset, available <https://silo.longpaddock.qld.gov.au/> – see [More information](#)

⁵ Total licensed extractions are subject to change as extraction data have not yet been verified in full – see [More information](#)

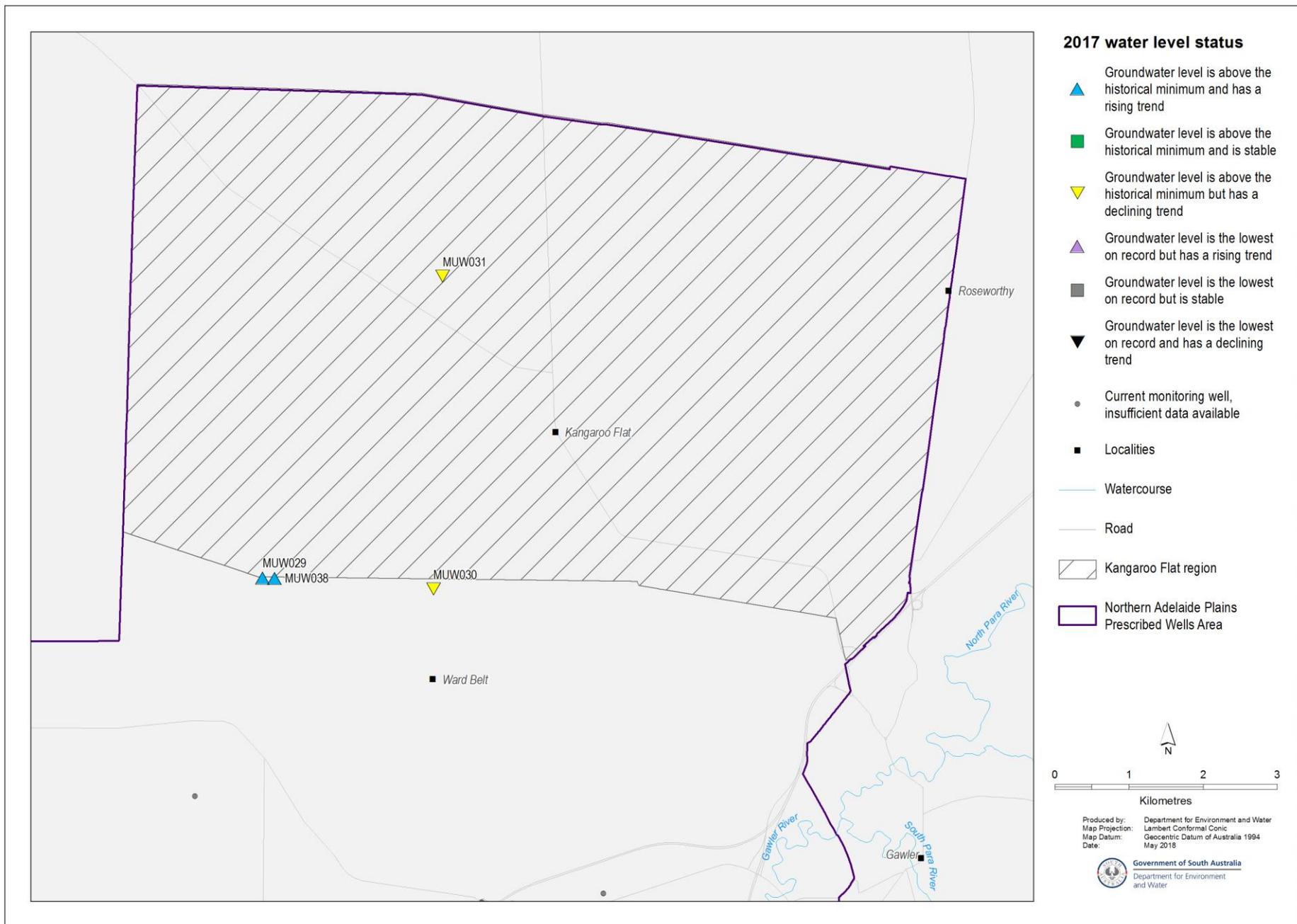


Figure 4. Five-year trends (2013–17) in groundwater pressure levels: T2 aquifer

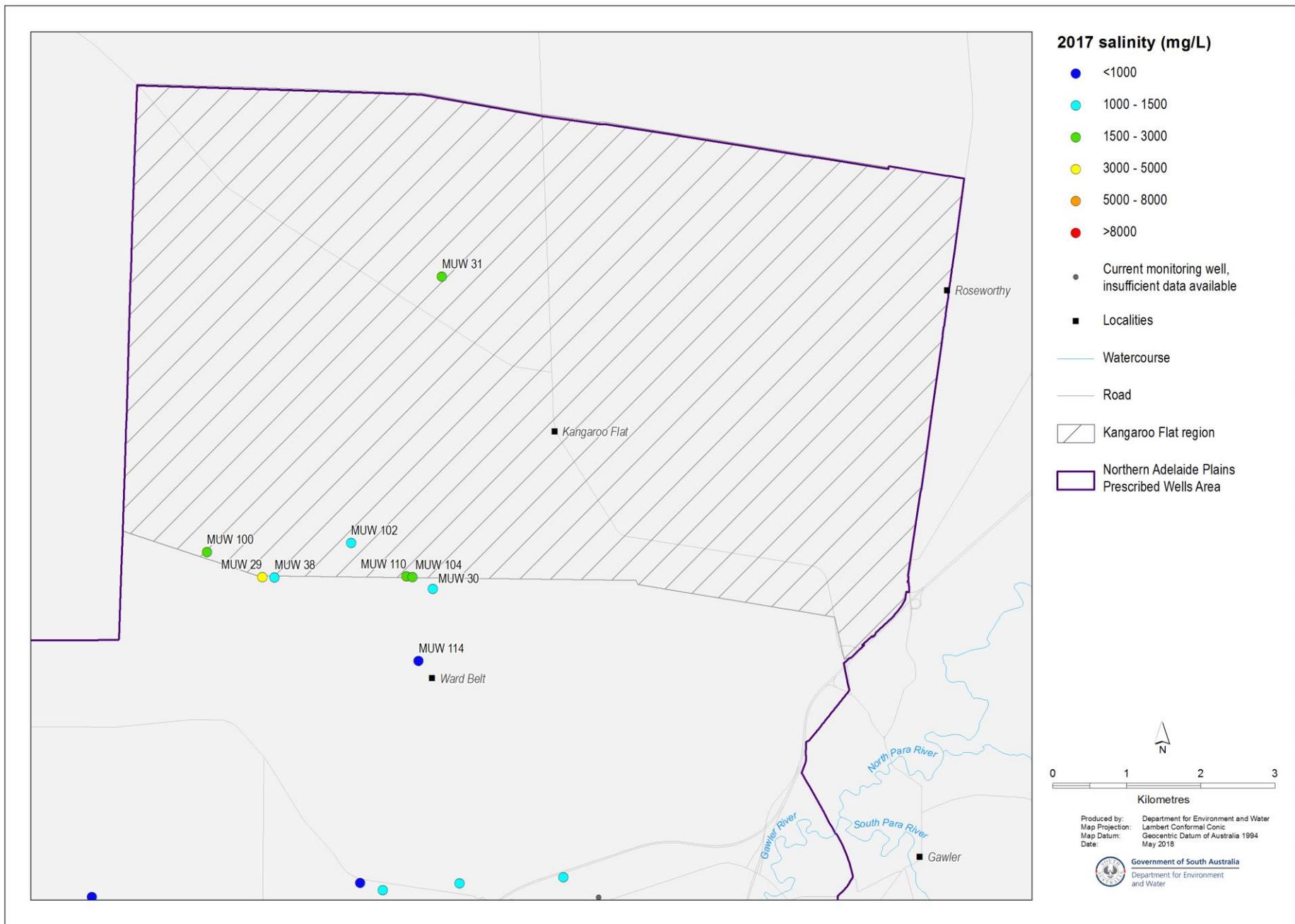


Figure 5. 2017 groundwater salinities: T2 aquifer

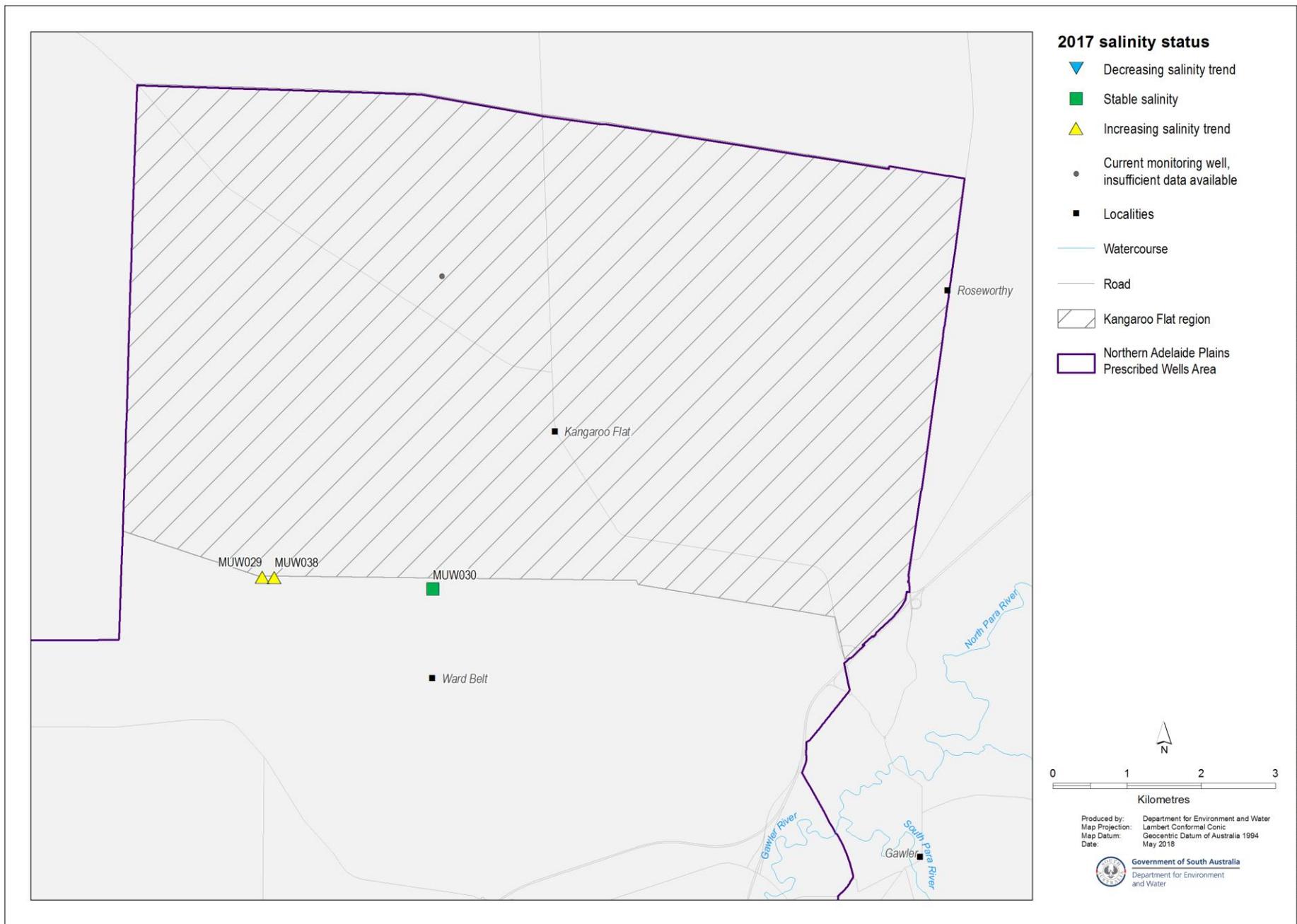


Figure 6. Five-year trends (2013–17) in groundwater salinities: T2 aquifer

More information

To determine the status of the T2 aquifer in the Kangaroo Flat region 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 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 *Kangaroo Flat region of the Northern Adelaide Plains PWA 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 Barossa PWRA, please visit the *Groundwater Data* page under the Data Systems tab on [WaterConnect](#).

For further details about the Northern Adelaide Plains PWA, please see the *Water Allocation Plan for the Northern Adelaide Plains Prescribed Wells Area* on the Natural Resources Adelaide and Mount Lofty Ranges [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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