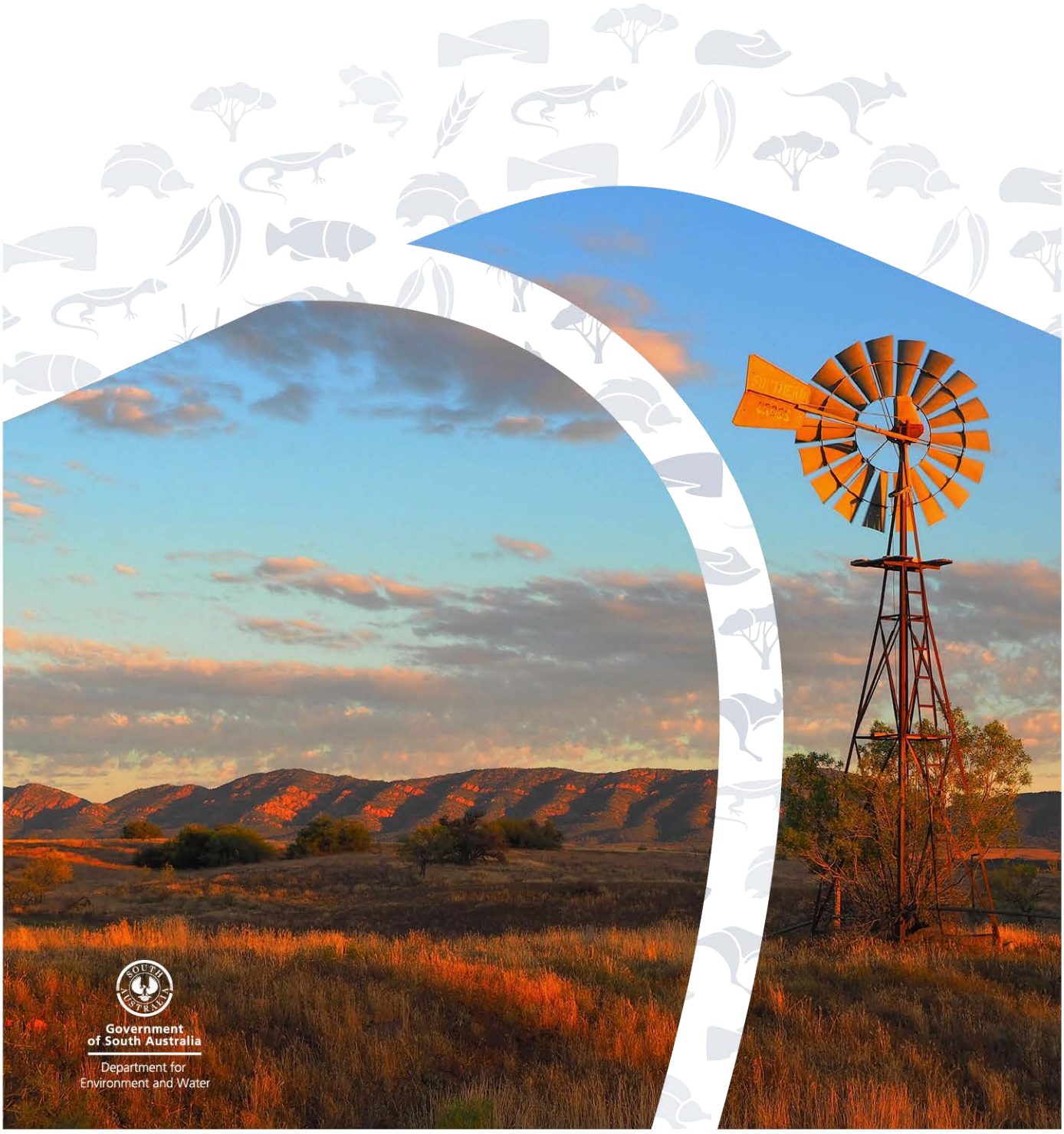
Northern Adelaide Plains PWA T1 aquifer

2017 Groundwater level and salinity status report



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2017 Status summary
Northern Adelaide Plains PWA
T1 aquifer

The T1 aquifer of the Northern Adelaide Plains (NAP) Prescribed Wells Area (PWA) 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, 100% of wells show rising groundwater pressure levels and 96% show 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	Smithfield Bureau of Meteorology (BoM) rainfall station 23025 was selected as a representative for the PWA
Annual total[1]	571 mm 134 mm (31%) greater than the five-year average of 437 mm 95 mm (20%) greater than the long-term average of 476 mm
Monthly summary	Well-above average rainfall recorded in July, September, December and January Well-below average rainfall recorded in March, May and June
Spatial distribution	Rainfall in 2016–17 was above average across the entire PWA

Water use

See Figure 3

Total allocated volume: 2016–17	6250 ML
Licensed groundwater extractions*	2262 ML[2] (36% of total allocation)
Extraction volume comparison	34% less than the previous year 30% 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 Figures 4 and 5

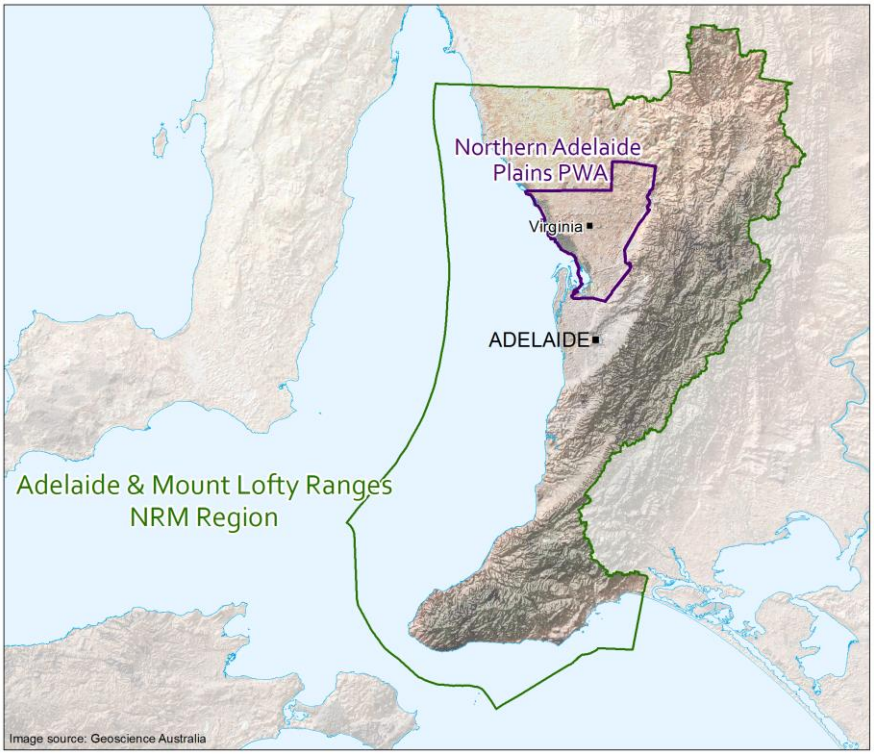
Five-year trend: 2013–17	All 19 wells (100%) show rising trends, at rates of 0.21–2.87 m/y (median of 0.79 m/y)
Potentiometric surfaces: March 2017	Near the coast in the south-western corner of the NAP PWA around the Dry Creek salt fields, pumping from the T1 aquifer for the industrial production of salt has formed a large and long-standing cone of depression that has been stable over the past 20 years. However, salt field operations ceased in 2015 and groundwater levels have subsequently recovered by 3-10 m

Groundwater salinity

See Figures 6 and 7

2017 salinity	589–2881 mg/L 40 out of 52 wells (77%) show salinities less than 1500 mg/L
Five-year trend: 2013–17	20 out of 23 wells (87%) are stable 2 wells (9%) show decreasing trends, at rates of 18 and 65 mg/L/y 1 well (4%) shows an increasing trend, at a rate of 123 mg/L/y

Regional setting



The NAP PWA is located immediately north of the Adelaide metropolitan area, in the Adelaide and Mount Lofty Ranges Natural Resource Management Region. It is prescribed under South Australia's *Natural Resources Management Act 2004,* and a water allocation plan (WAP) provides for the sustainable use of the groundwater resources.

Within the NAP PWA, the T1 and T2 aquifers are the shallowest Tertiary aquifers and these are the main source of groundwater, which is used mostly by the horticulture industry. The T1 aquifer and the deeper T2 aquifer are separated by the Munno Para Clay aquitard (i.e. confining layer).

The focus of this report is the T1 aquifer which, within the NAP PWA, consists of several stratigraphic units of varying lithology and thickness. In the reporting area, the T1 aquifer consists primarily of the Hallett Cove Sandstone, Dry Creek Sand and limestones of the upper Port Willunga Formation. The T1 aquifer is absent in the north-east portion of the PWA.

The main source of groundwater recharge to the T1 aquifer was 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 the 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.

Although there is no direct recharge from rainfall to the confined T1 aquifer, there may be an indirect correlation between groundwater pressure levels and rainfall, as periods of below-average rainfall will likely result in increased rates of groundwater extraction, which may lead to declines in groundwater pressure levels. Conversely, groundwater pressure levels may rise after periods of above-average rainfall due to reduced rates of groundwater extraction.

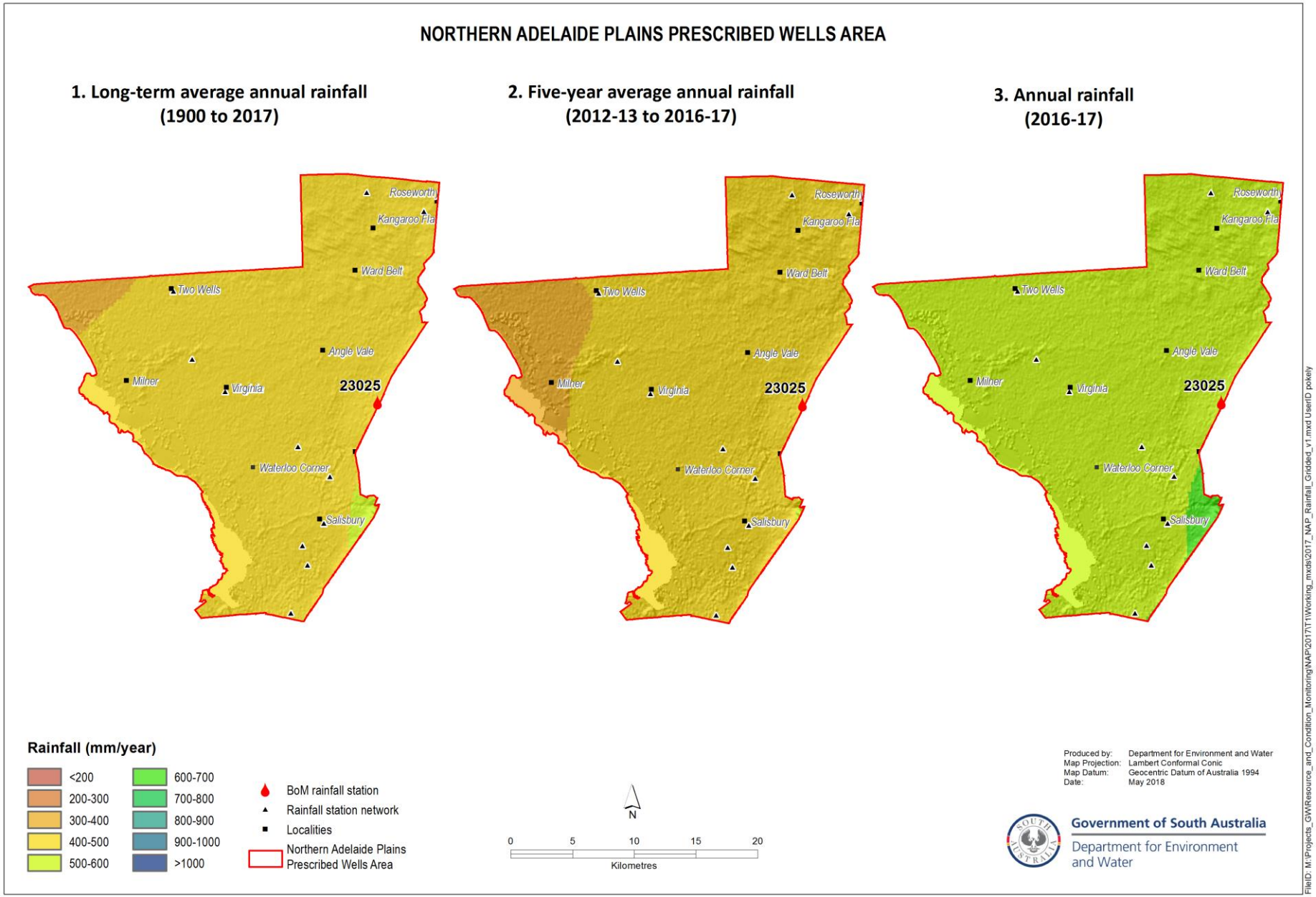


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall[3]

[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

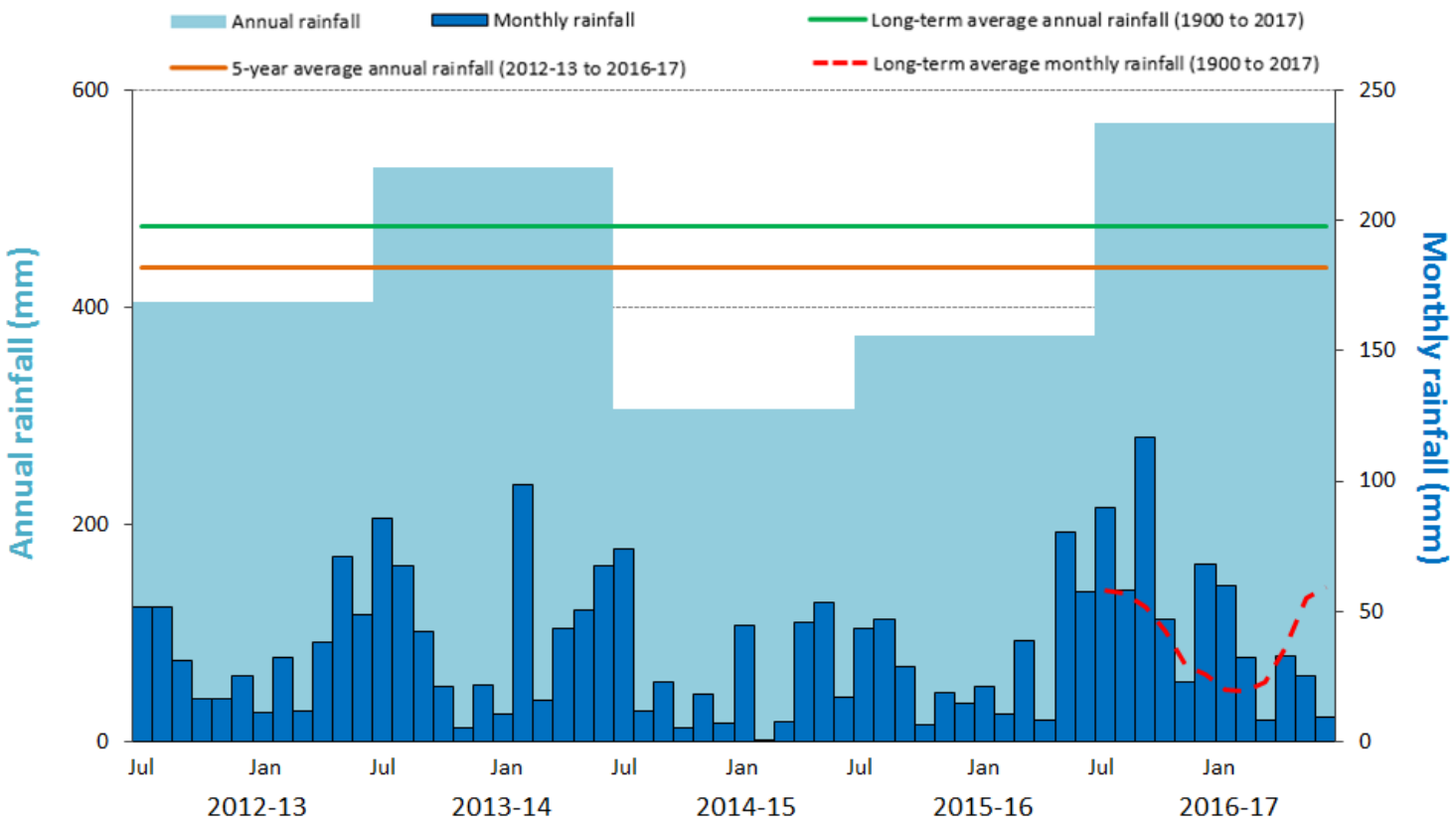


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Smithfield (BoM Station 23025)[4]

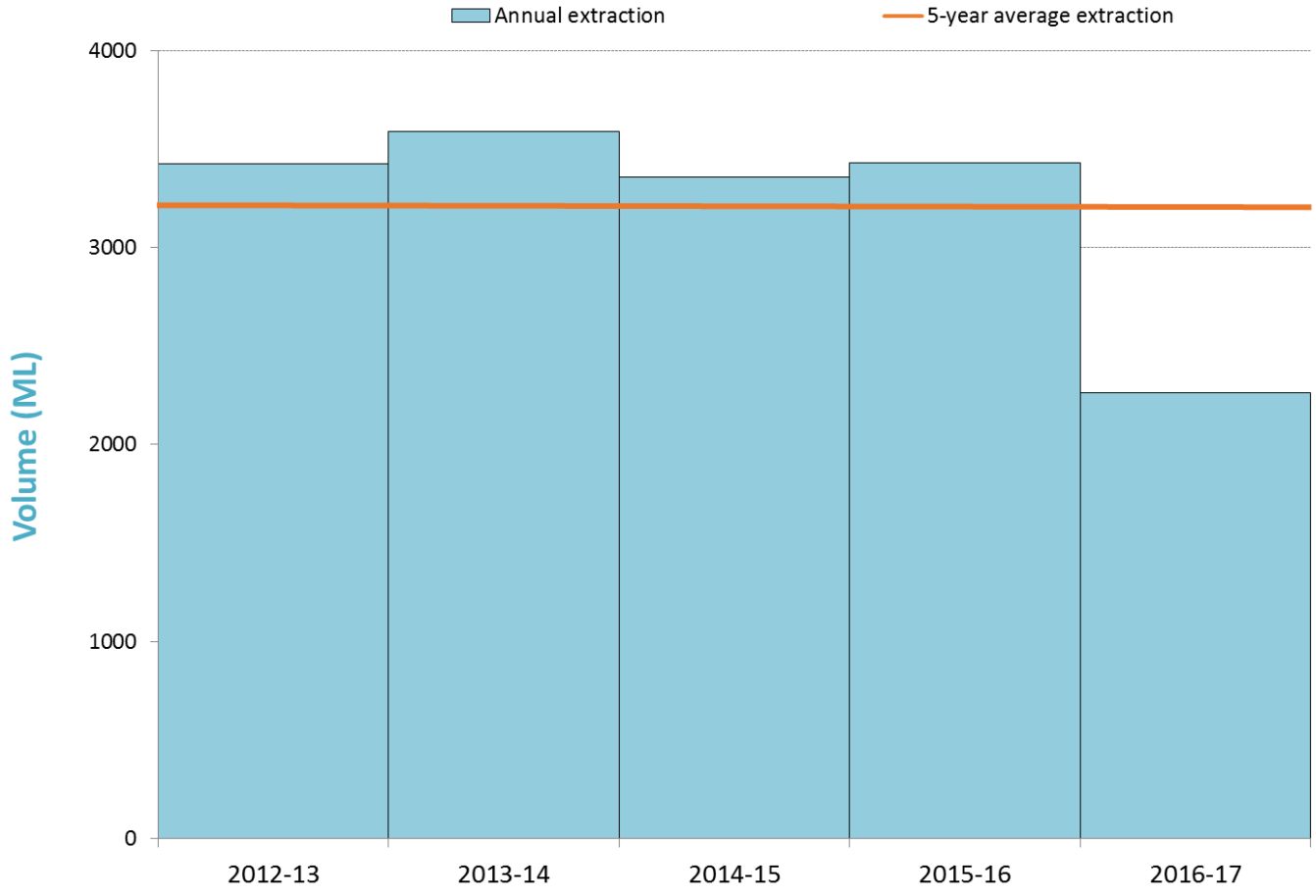


Figure 3. Licensed groundwater extraction volumes[5] for the past five water-use years

[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

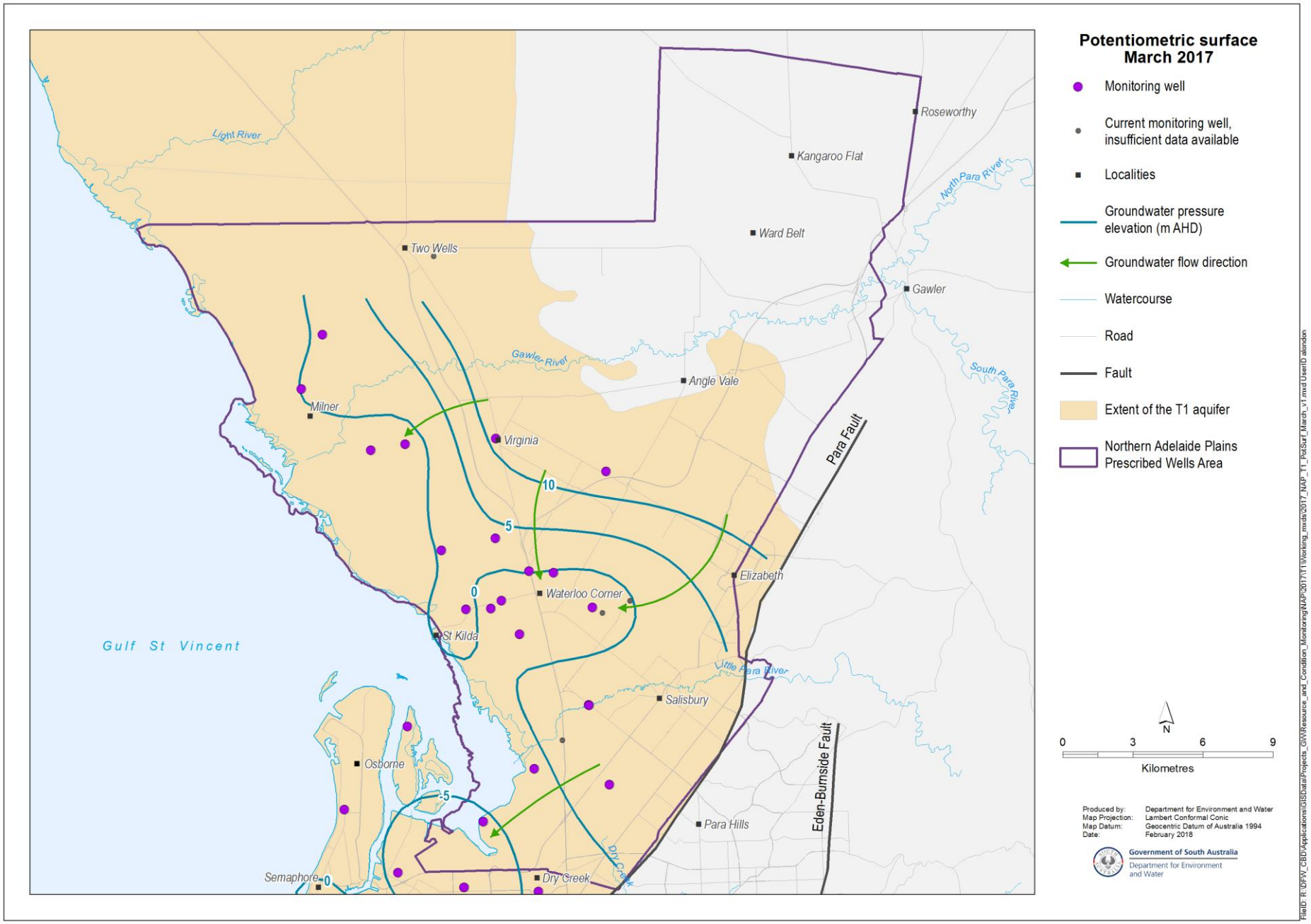


Figure 4. Potentiometric surface and direction of groundwater flow: T1 aquifer

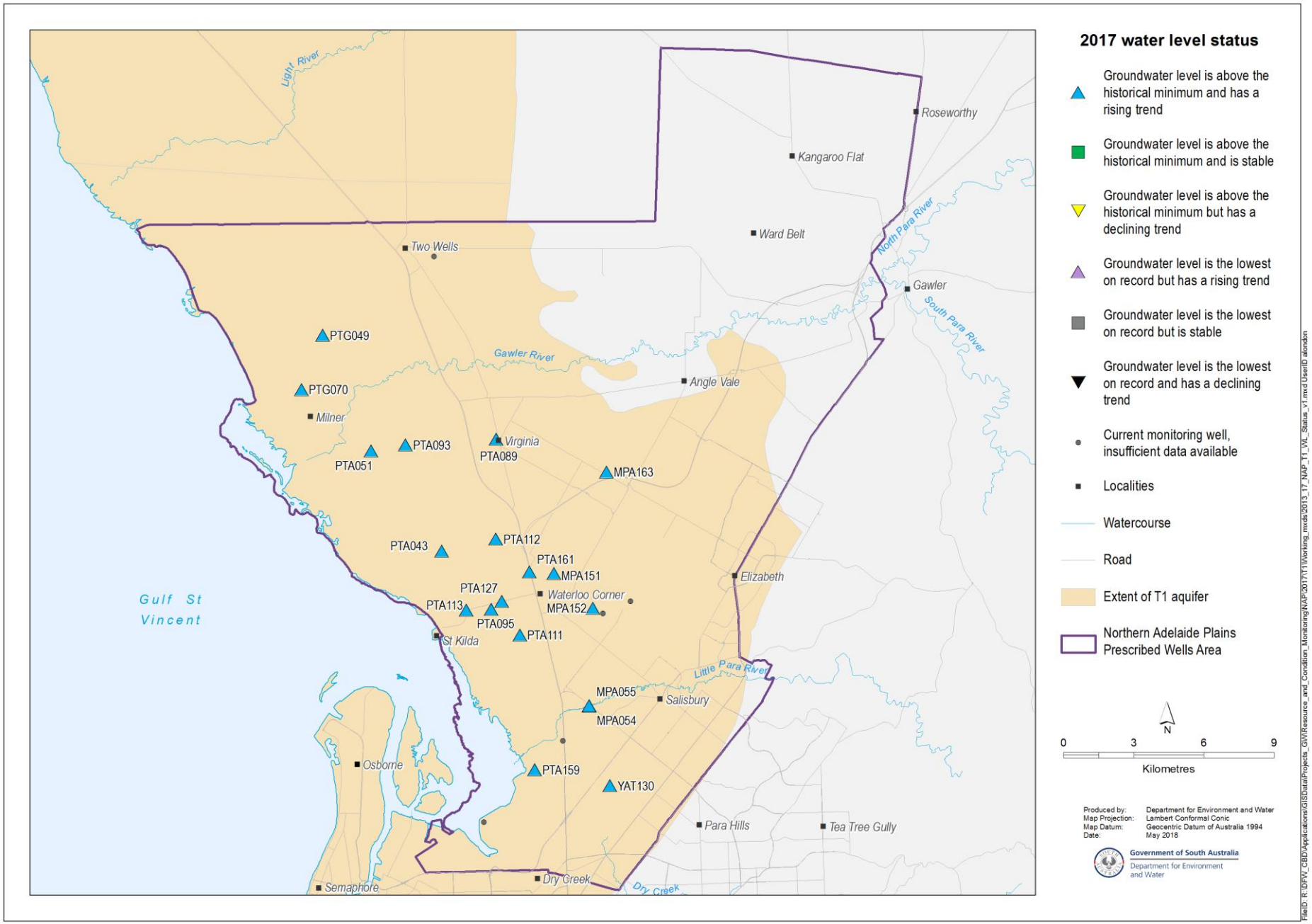


Figure 5. Five-year trends (2013–17) in groundwater levels: T1 aquifer

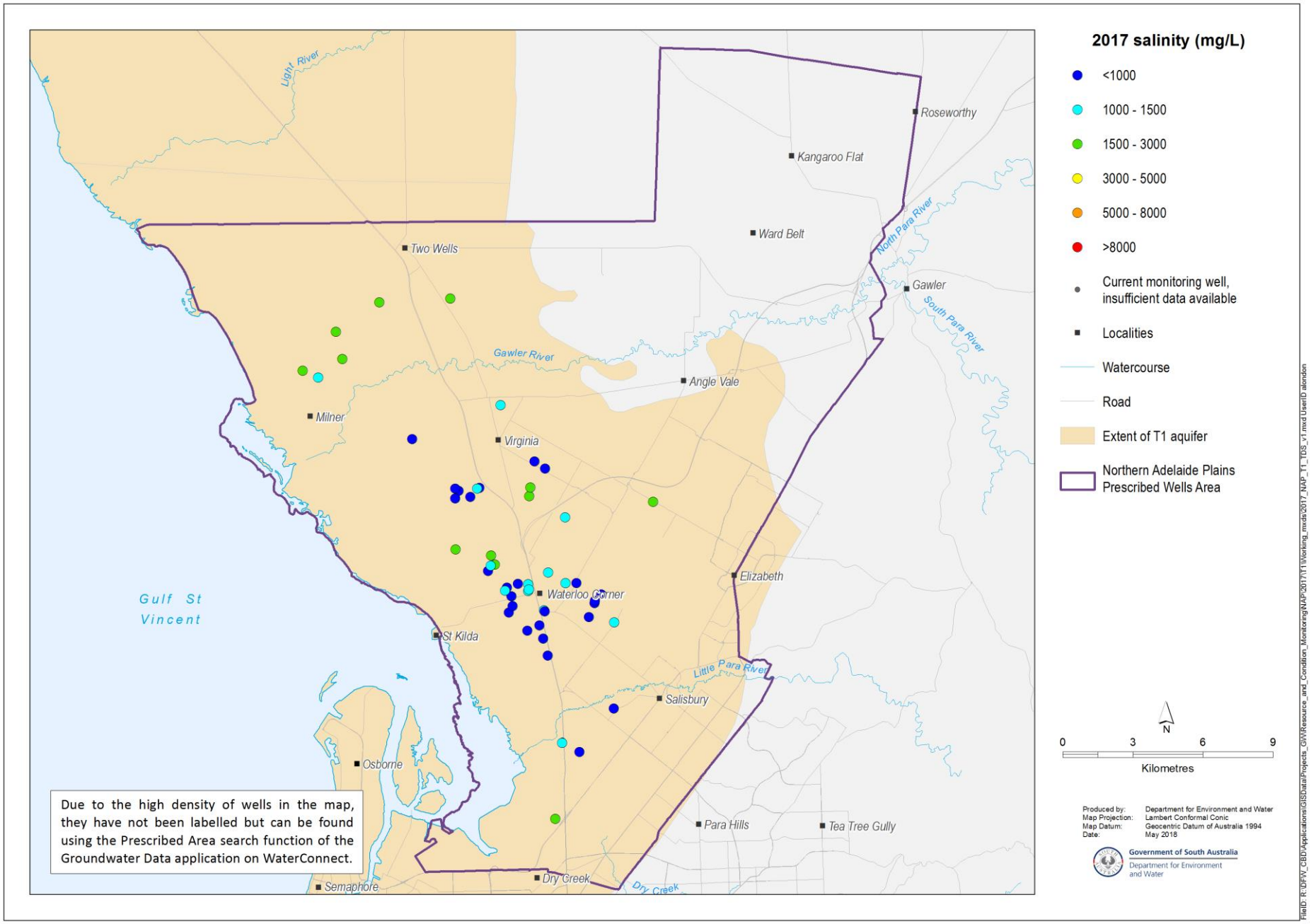


Figure 6. 2017 groundwater salinities: T1 aquifer

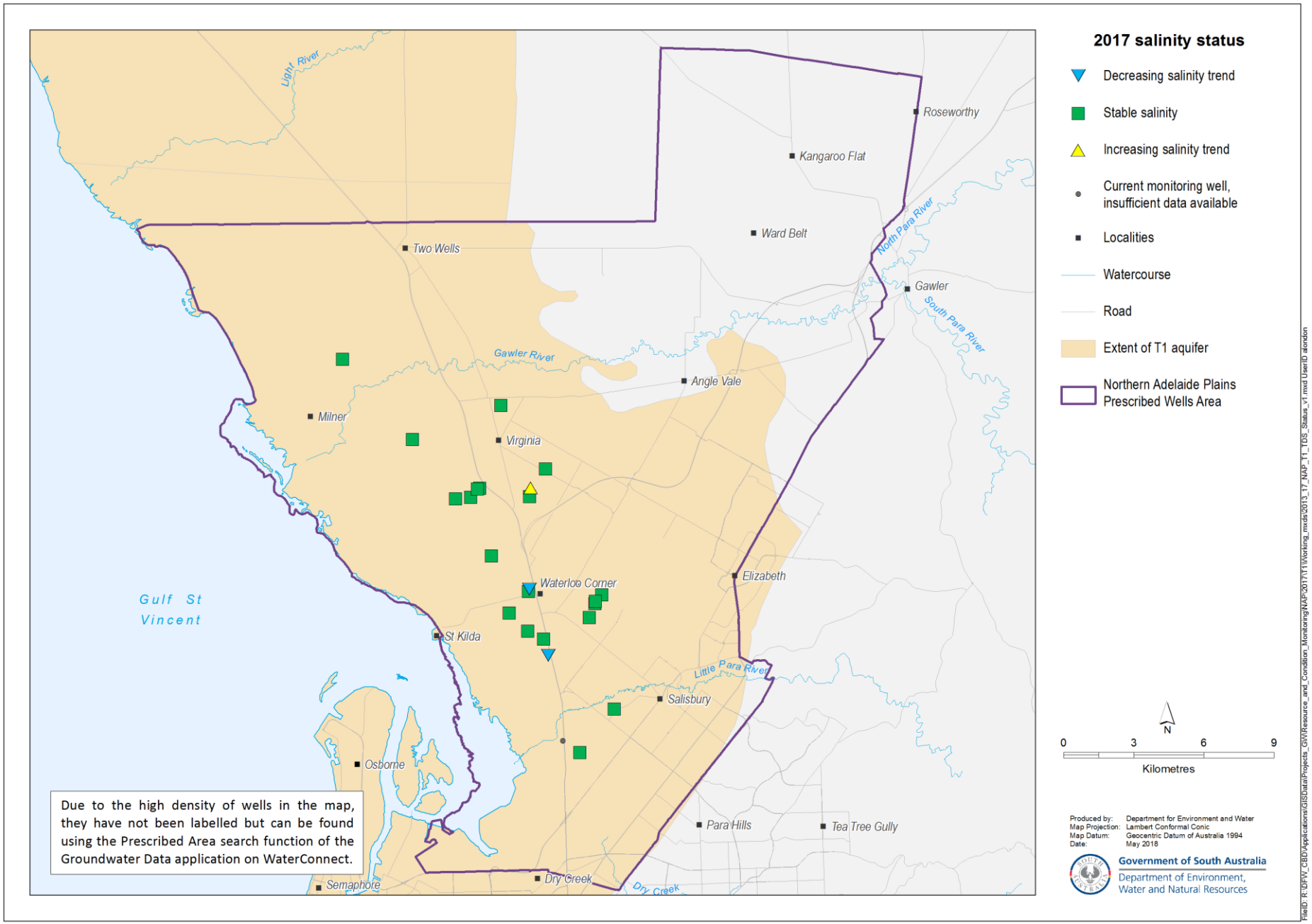


Figure 7. Five-year trends (2013–17) in groundwater salinities: T1 aquifer

More information

To determine the status of the T1 aquifer for 2017, the trends in groundwater pressure 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 G*roundwater 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 *Northern Adelaide Plains PWA groundwater level and salinity status report 2009–10*, 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 Northern Adelaide Plains PWA, please visit the *Groundwater Data* page under the Data Systems tab on WaterConnect.

For further details about the NAP PWA, please see *Adelaide Plains Water Allocation Plan* on the Natural Resources Adelaide and Mt 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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