Northern Adelaide Plains Prescribed Wells Area T1 aquifer

2018 Groundwater level and salinity status report

Government of South Australia
Department for Environment and Water

2018 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 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 groundwater levels and 88% show stable salinities.

The status is based on five-year trends. To view the *Northern Adelaide Plains PWA groundwater level and salinity status report 2009–10*, 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 Northern Adelaide Plains PWA, 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	Smithfield Bureau of Meteorology (BoM) rainfall station, number 23025, is located in the east of the NAP PWA.
Annual total[1]	413 mm 26 mm (6%) less than the five-year average of 439 mm 62 mm (13%) less than the long-term (1900–2018) average of 475 mm

Groundwater extraction

See Figure 3

Allocated volume[1,2]	27 251 ML (for all aquifers of the NAP PWA)
Licensed groundwater extractions[1,3]	2508 ML (T1 aquifer)
Extraction volume comparison[4]	11% greater than the previous year 17% less 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 extraction data have not yet been verified in full – see More information
[4] Extraction volumes for T1 aquifer only

Groundwater level

See Figures 4 and 5

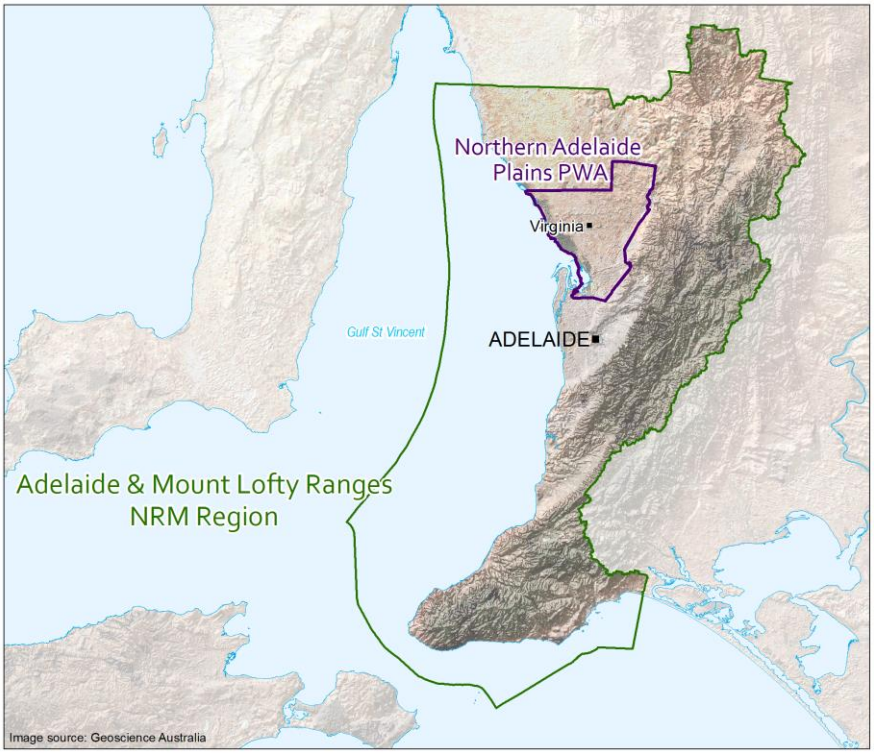
Five-year trend: 2014–18	All 20 wells (100%) show rising trends, at rates of 0.14–3.33 m/y (median of 0.66 m/y)
Potentiometric surface: March 2018	Near the coast in the south-western corner of the NAP PWA around the Dry Creek salt fields, pumping from the T1 aquifer for the industrial production of salt formed a large and long-standing cone of depression that was stable for 20 years. However, salt field operations ceased in 2015 and groundwater levels in the area have subsequently recovered by 3–10 m.

Groundwater salinity

See Figures 6 and 7

2018 salinity	438–2756 mg/L (69 wells; median of 760 mg/L)
Five-year trend: 2014–18	14 out of 16 wells (88%) are stable 2 wells (12%) show increasing trends, at rates of 42 and 79 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 Resources Management Region. The groundwater resources are prescribed under South Australia's *Natural Resources Management Act 2004,* and a water allocation plan provides for their sustainable use.

Within the NAP PWA, the T1 and T2 aquifers are the shallowest Tertiary aquifers and 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 consists of several stratigraphic units of varying lithology and thickness within the NAP PWA. 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 two main sources of groundwater recharge to the T1 aquifer are thought to be lateral inflow from the adjacent fractured rock aquifers of the Mount Lofty Ranges and the infiltration of surface water from streams that flow onto the plains from the ranges. Outflows from the groundwater system occur through groundwater extraction and discharge to Gulf St Vincent.

Although there is no direct recharge from incident rainfall to the confined T1 aquifer, there may be an indirect correlation between groundwater 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 levels and increases in salinities. Conversely, above-average rainfall may result in increased recharge and decreases in extraction, which can cause groundwater levels to rise and salinities to stabilise or decrease.

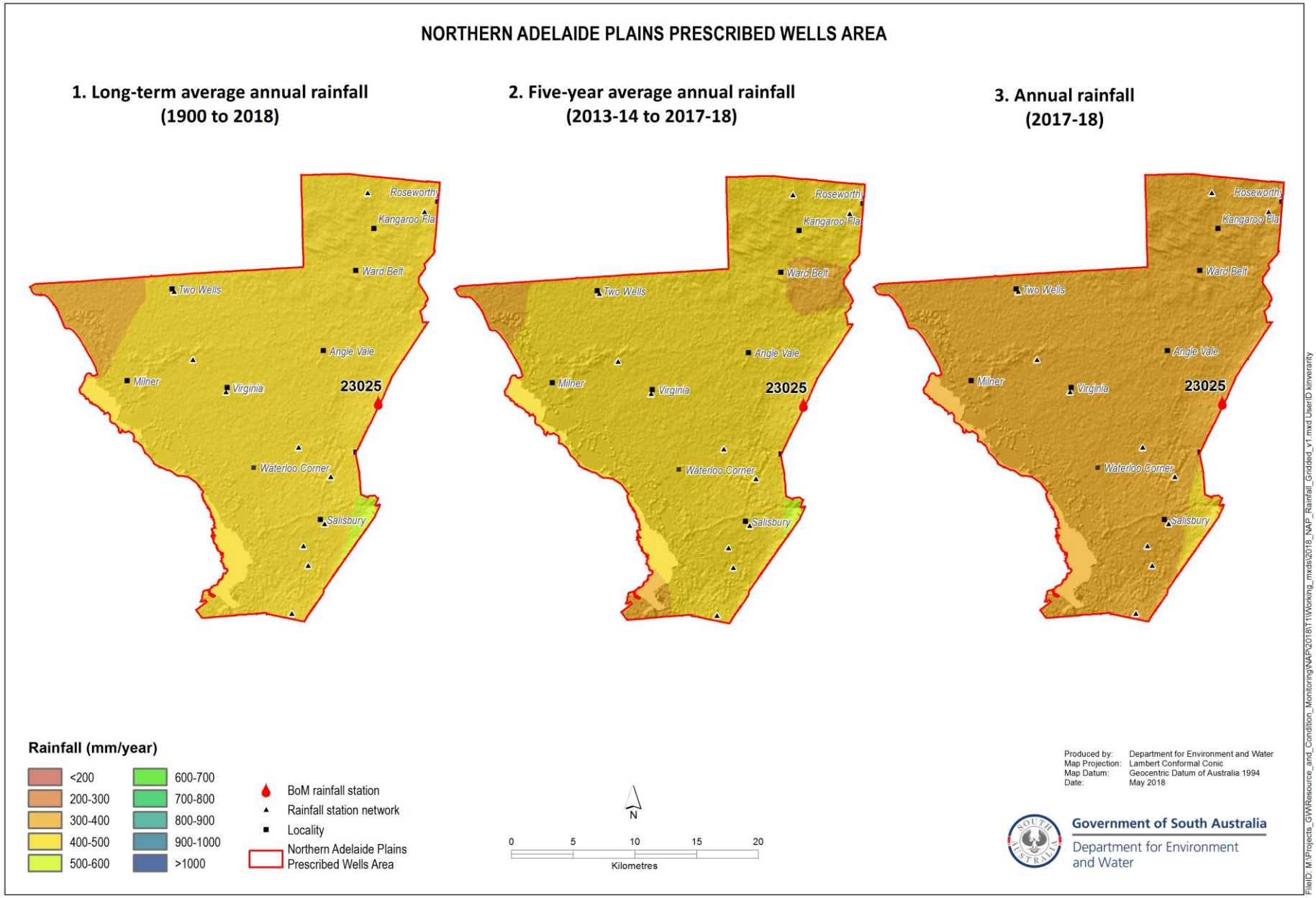


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall[5]

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

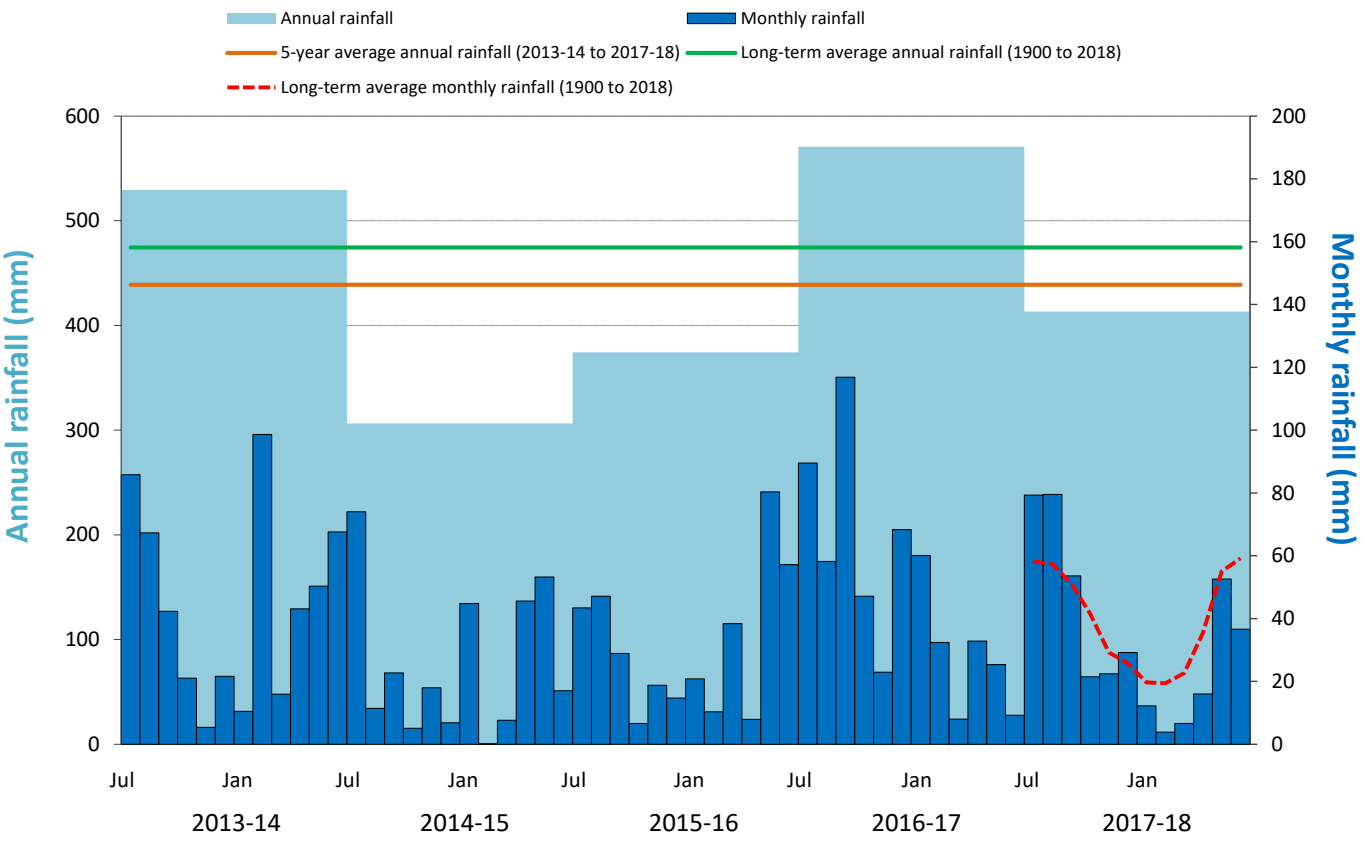


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Smithfield (BoM Station 23025)[6]

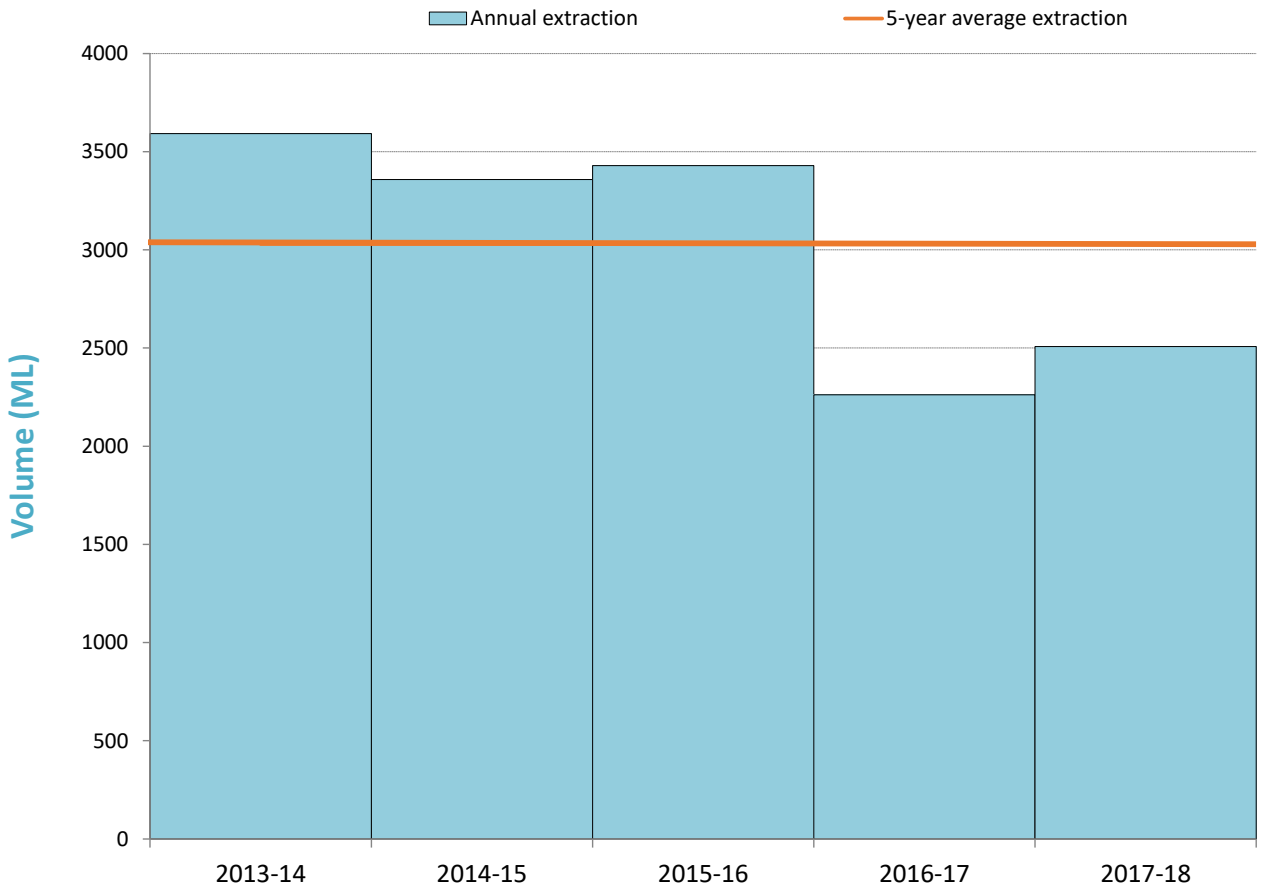


Figure 3. Licensed groundwater extraction volumes[7] for the past five water-use years

[6] Data source: SILO Patched Point Dataset, available at 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

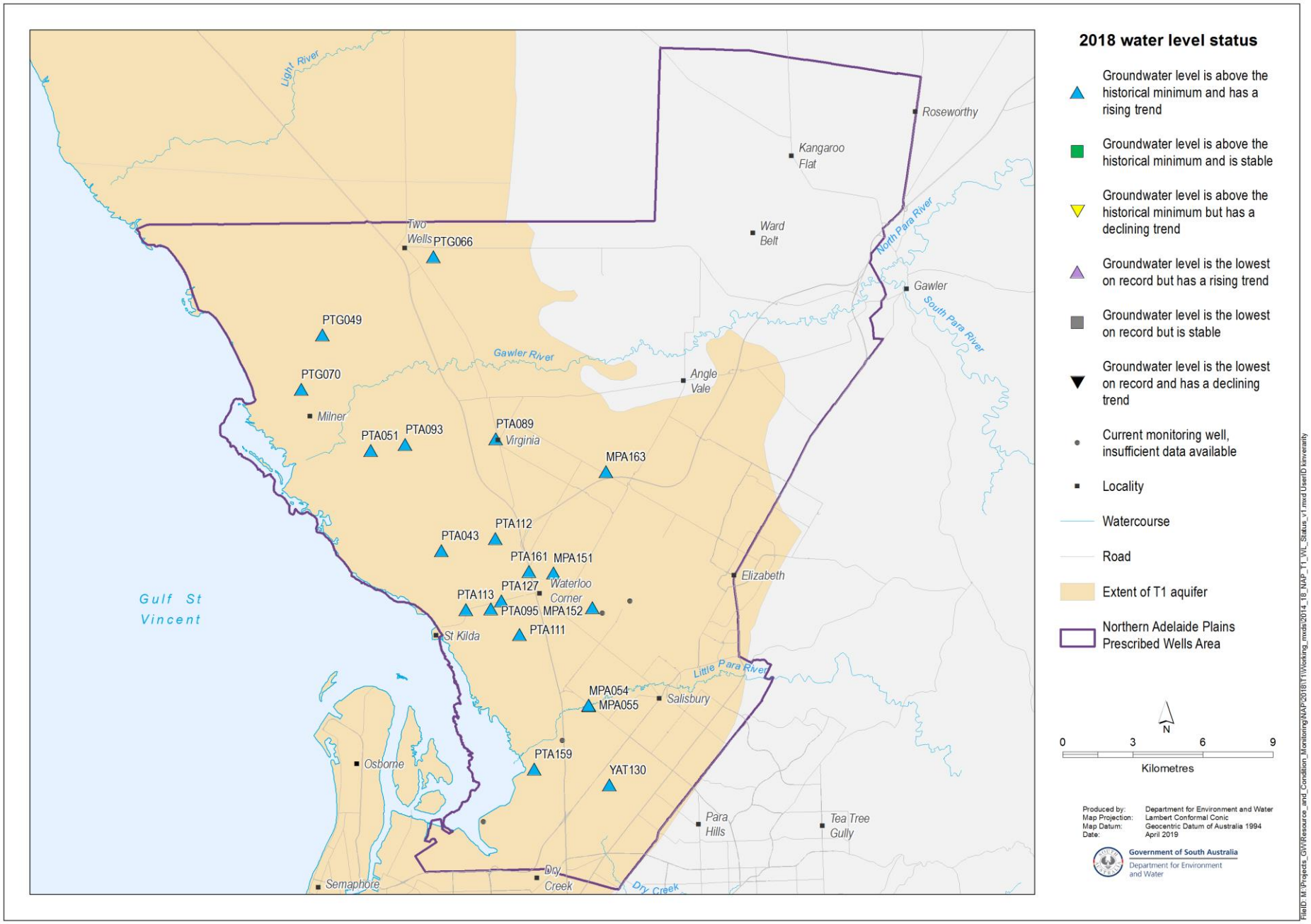


Figure 4. Five-year trends (2014–18) in groundwater levels: T1 aquifer

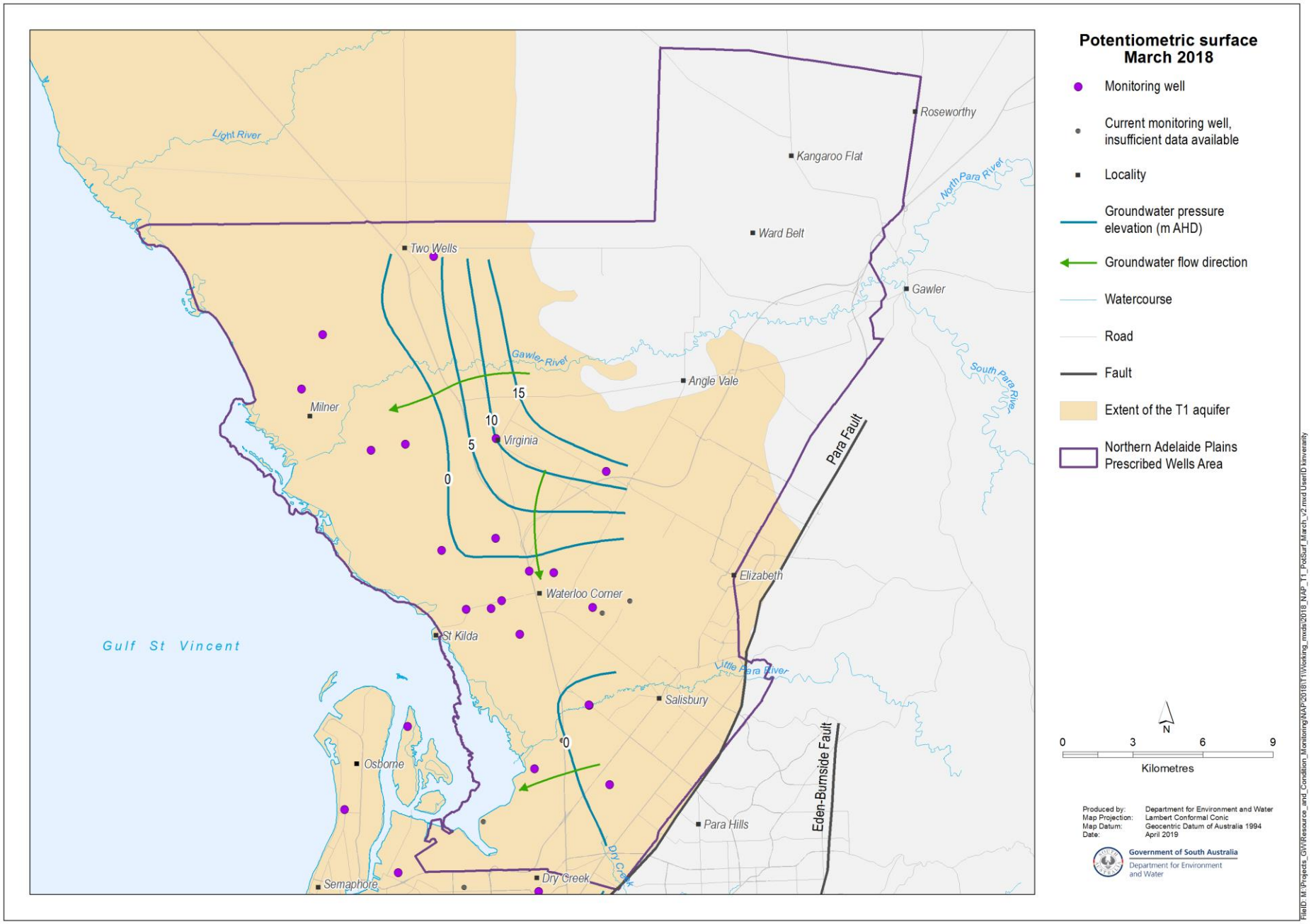


Figure 5. Potentiometric surface and direction of groundwater flow: T1 aquifer, March 2018

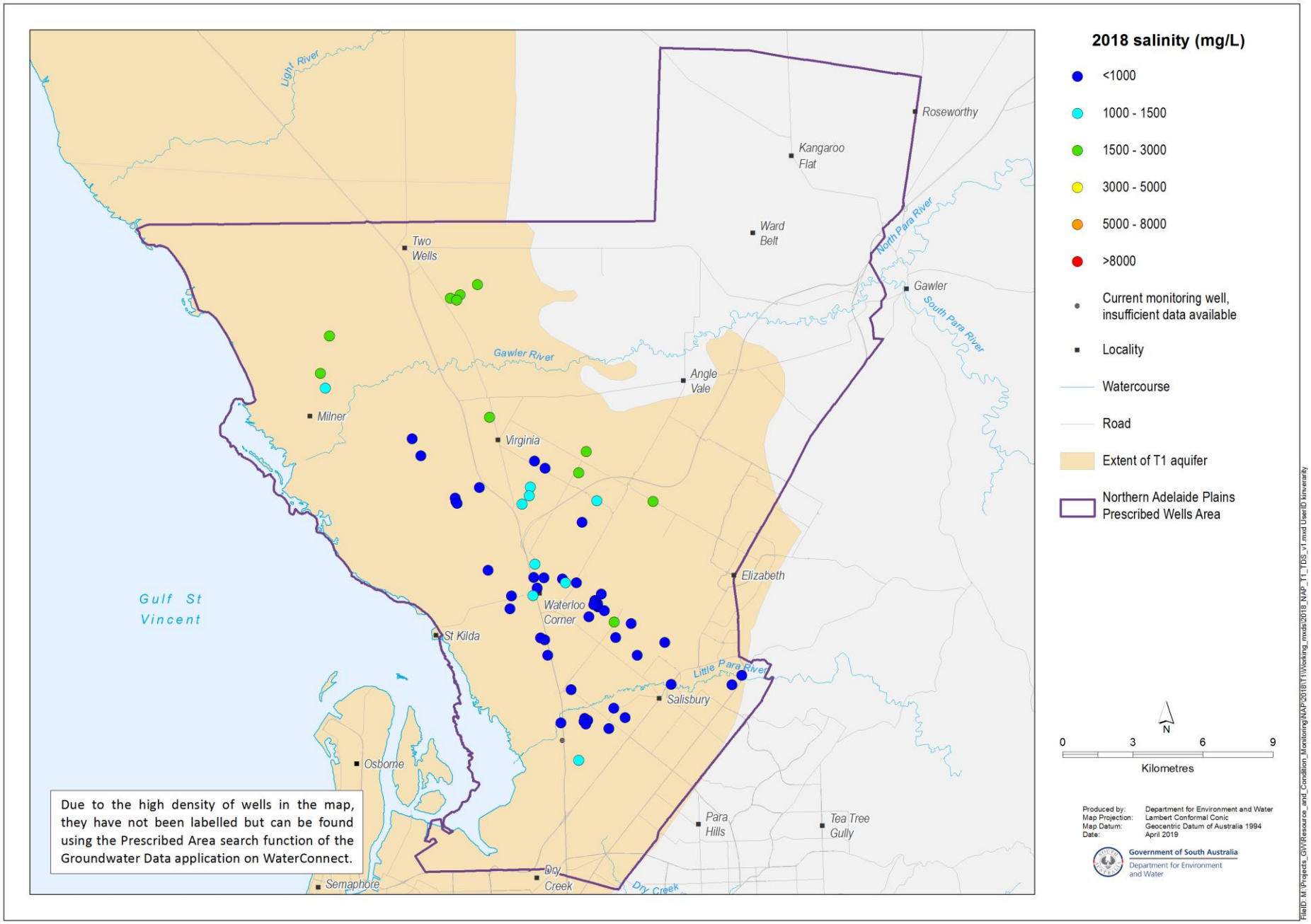


Figure 6. 2018 groundwater salinities: T1 aquifer

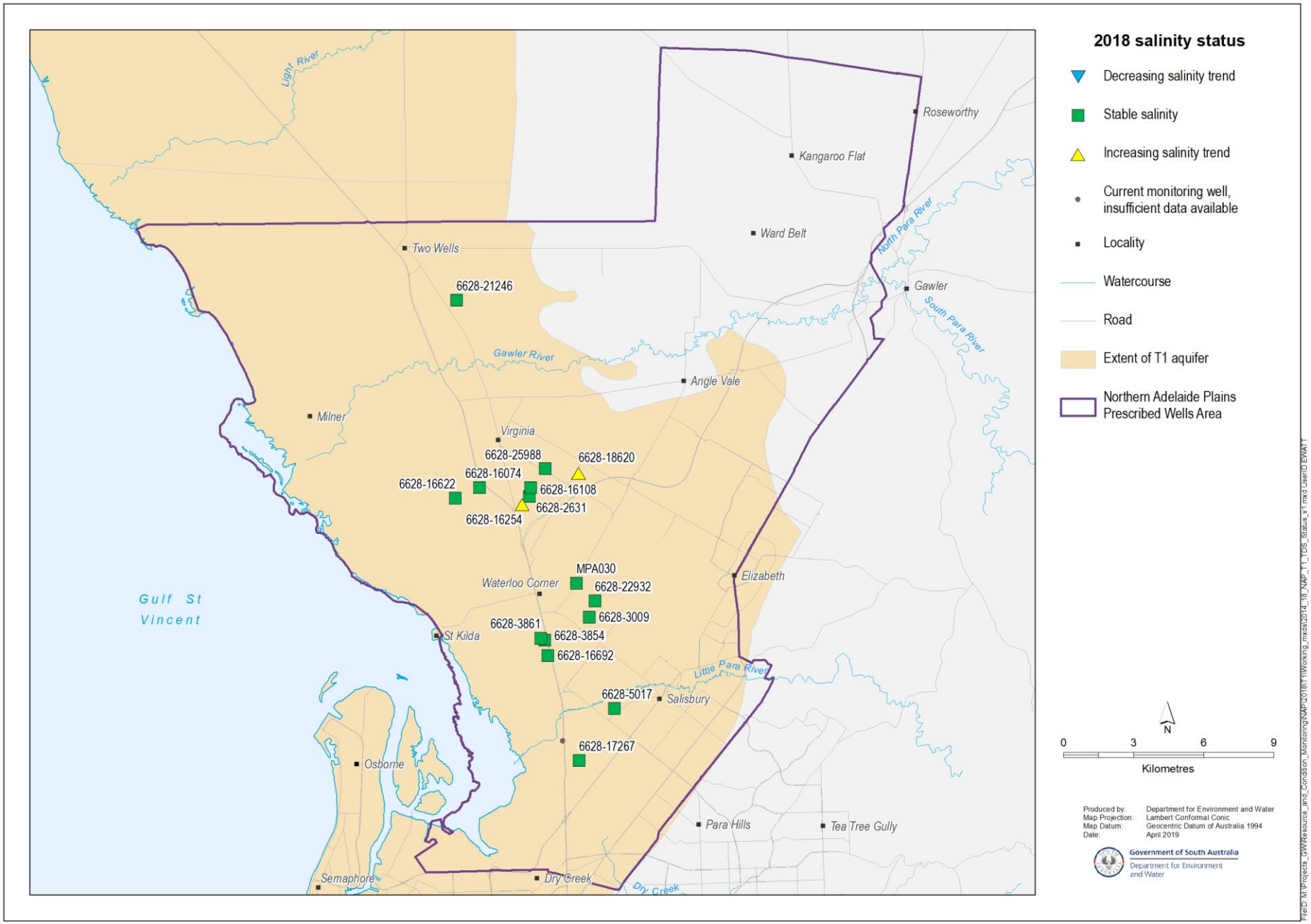


Figure 7. Five-year trends (2014–18) in groundwater salinities: T1 aquifer

More information

To determine the status of the T1 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 *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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Head Office
81-95 Waymouth St
ADELAIDE SA 5000

Telephone +61 (8) 8463 6946
Facsimile +61 (8) 8463 6999

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