Tatiara PWA
Unconfined aquifer

2017 Groundwater level and salinity status report

Government of South Australia
Department for Environment and Water

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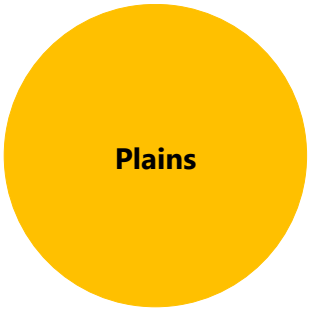
2017 Status summary
Tatiara PWA
Unconfined aquifer

Due to the vast area, different land uses and geomorphology of the Tatiara Prescribed Wells Area (PWA), the unconfined aquifer has been divided into two resource groups (Figure 4), with a status assigned to each group.

The *highlands* of the Tatiara 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, 68% of wells show stable or rising groundwater levels and 100% of wells show stable salinities.



The *plains* in the Tatiara PWA have 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, 94% of wells show declining groundwater levels.

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	Keith Bureau of Meteorology (BoM) rainfall station 25507, located in the west of the Tatiara PWA
Annual total[1]	591 mm 183 mm (45%) greater than the five-year average of 408 mm 129 mm (28%) greater than the long-term average of 462 mm
Monthly summary	Well-above average rainfall recorded in July, September, October, December, January and April Well-below average rainfall recorded in March and June
Spatial distribution	Rainfall in 2016–17 was well above average across the entire PWA

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

Water use

See Figure 3

Total allocated volume: 2016–17	138 885 ML
Licensed groundwater extractions*	72 719 ML[2] (52% of total allocation)
Extraction volume comparison	24% less than the previous year 13% less than the five-year average

*Stock and domestic use is not included in licensed extractions

Groundwater level

See Figure 4

Five-year trend: 2013–17	
Highlands (Shaugh, Cannawaigara, Zone 8A-Senior and Tatiara management areas)	1 out of 28 wells (4%) shows a rising trend, at a rate of 0.06 m/y 18 wells (64%) are stable; one of these wells shows its lowest level on record 9 wells (32%) show declining trends, at rates of 0.02–0.09 m/y (median of 0.03 m/y); four of these wells show their lowest level on record
Plains (North Pendleton, Stirling, Willalooka and Wirrega management areas)	1 out of 51 wells (2%) shows a rising trend, at a rate of 0.15 m/y 2 wells (4%) are stable 48 wells (94%) show declining trends, at rates of 0.03–0.20 m/y (median of 0.09 m/y); twelve of these wells show their lowest level on record

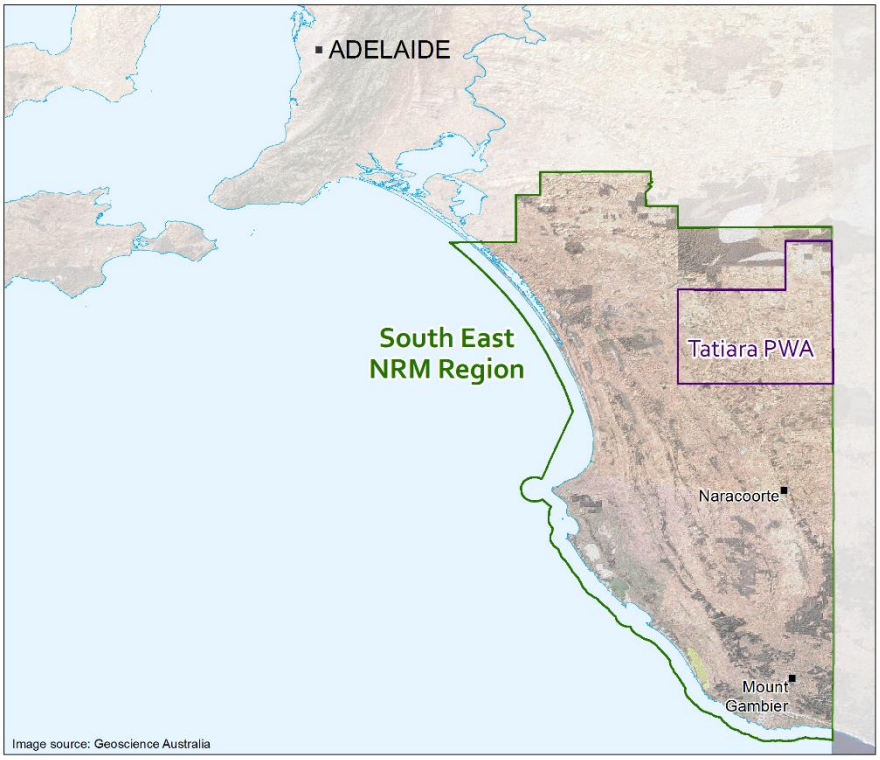
Groundwater salinity

See Figures 5 and 6

2017 salinity	349–8730 mg/L 21 out of 69 wells (30%) show salinities less than 1500 mg/L, which is the salinity threshold for the irrigation of most crop types
Five-year trend: 2013–17	
Highlands (Shaugh, Cannawaigara, Zone 8A-Senior and Tatiara management areas)	All 9 wells (100%) are stable
Plains (North Pendleton, Stirling, Willalooka and Wirrega management areas)	2 out of 35 wells (6%) show decreasing trends, at rates of 166 and 238 mg/L/y 29 wells (83%) are stable 4 wells (11%) show increasing trends, at rates of 24–182 mg/L/y (median of 96 mg/L/y)

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

Regional setting



The Tatiara PWA is located in the South East Natural Resources Management Region, approximately 200 km south-east of Adelaide. It is a regional-scale resource for which groundwater is prescribed under South Australia's *Natural Resources Management Act 2004*. A water allocation plan (WAP) provides for the sustainable management of the groundwater resources.

The Tatiara PWA is underlain by sediments of the Murray Basin and can be divided topographically into two discrete landforms, each with different hydrogeological characteristics: highlands located to the east and low-lying plains to the west (Fig. 4). Both landforms are underlain by two groundwater systems – an unconfined aquifer comprising various Quaternary and Tertiary limestones, sands and sandstones, and an underlying confined Tertiary sand aquifer.

The Quaternary-aged Padthaway, Coomandook and Bridgewater Formations form the unconfined aquifer on the plains. In the highlands, the Tertiary-aged Murray Group Limestone forms the unconfined aquifer. The main sources of recharge to the unconfined aquifer are: direct infiltration of local rainfall; groundwater flow from east to west; and point-source recharge to sinkholes (otherwise known as runaway holes).

Trends in groundwater levels and salinities in the Tatiara PWA are primarily climate driven: below-average rainfall results in a reduction in recharge to the aquifers. Below-average summer rainfall can also result in increased irrigation extraction, and these two elements may cause groundwater levels to decline and salinities to increase. Conversely, increased rainfall may result in increased recharge, decreased irrigation extraction and a rise in groundwater levels, which may cause salinities to stabilise or decrease.

Groundwater levels and salinities have also been affected by the clearance of native vegetation and subsequent land-use change and recycling of irrigation drainage water. The response of groundwater levels of the unconfined aquifer to rainfall varies between the plains and highlands primarily due to the depth to the watertable and lithology of the sediments (i.e. clay content). Groundwater levels are more responsive to rainfall on the low-lying plains where the watertable is shallow. In the ranges, where the watertable is greater than 10 m below ground surface, the watertable shows a delayed response with a lag time that is dependent on the depth to the watertable, land use and the permeability of the sediments.

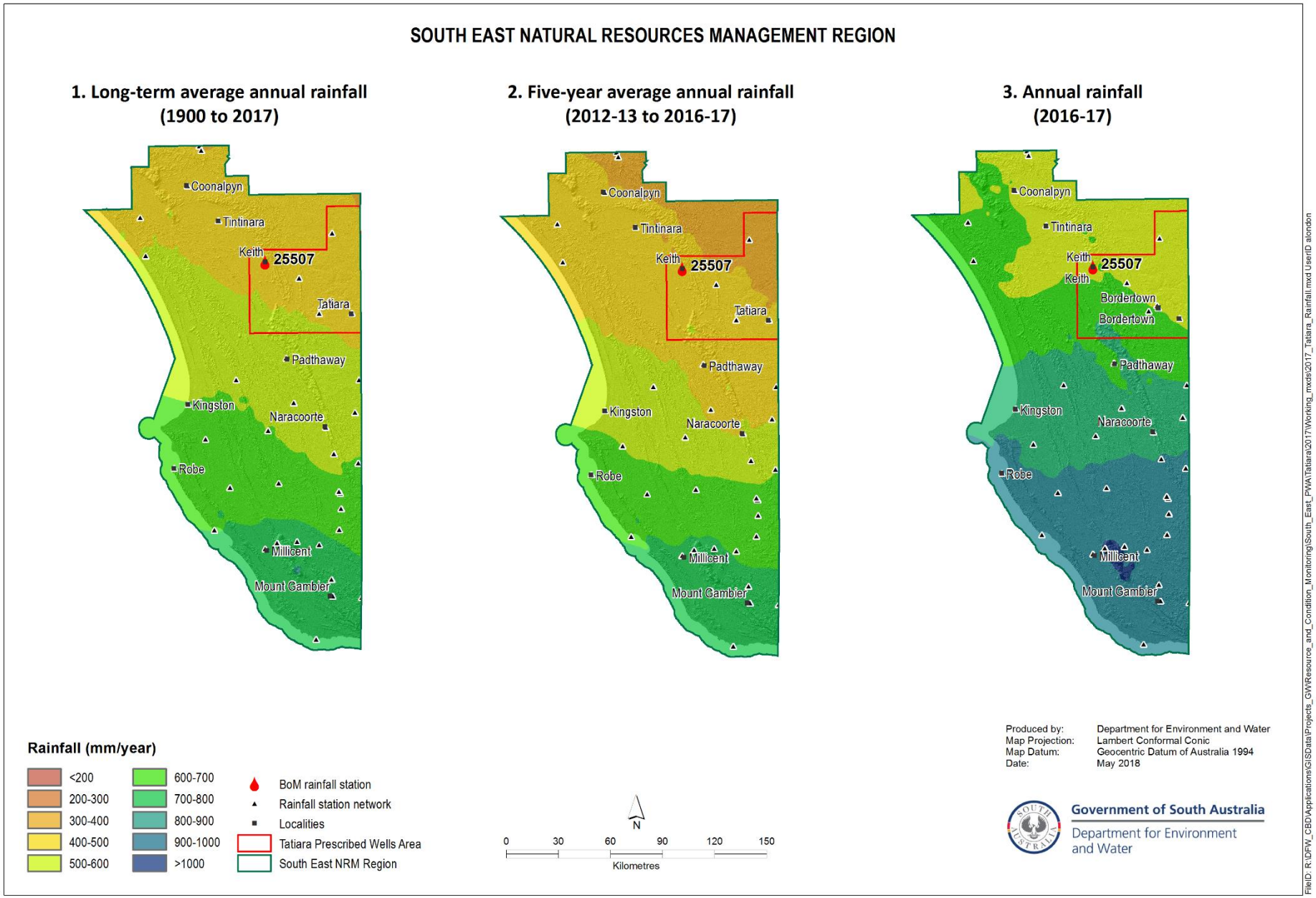


Figure 1. Spatial distribution of (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall[3]

[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

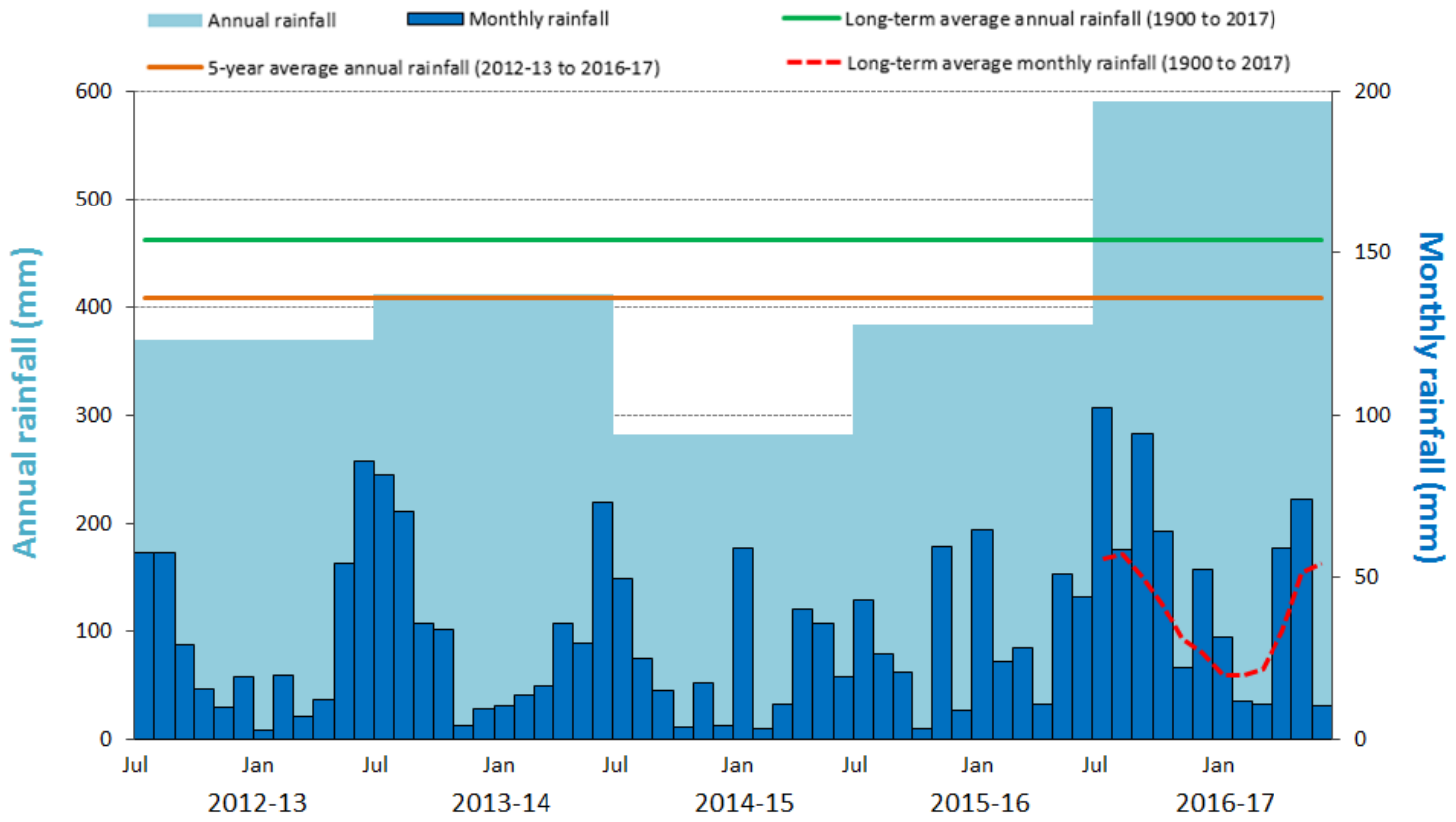


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Keith (BoM Station 25507)[4]

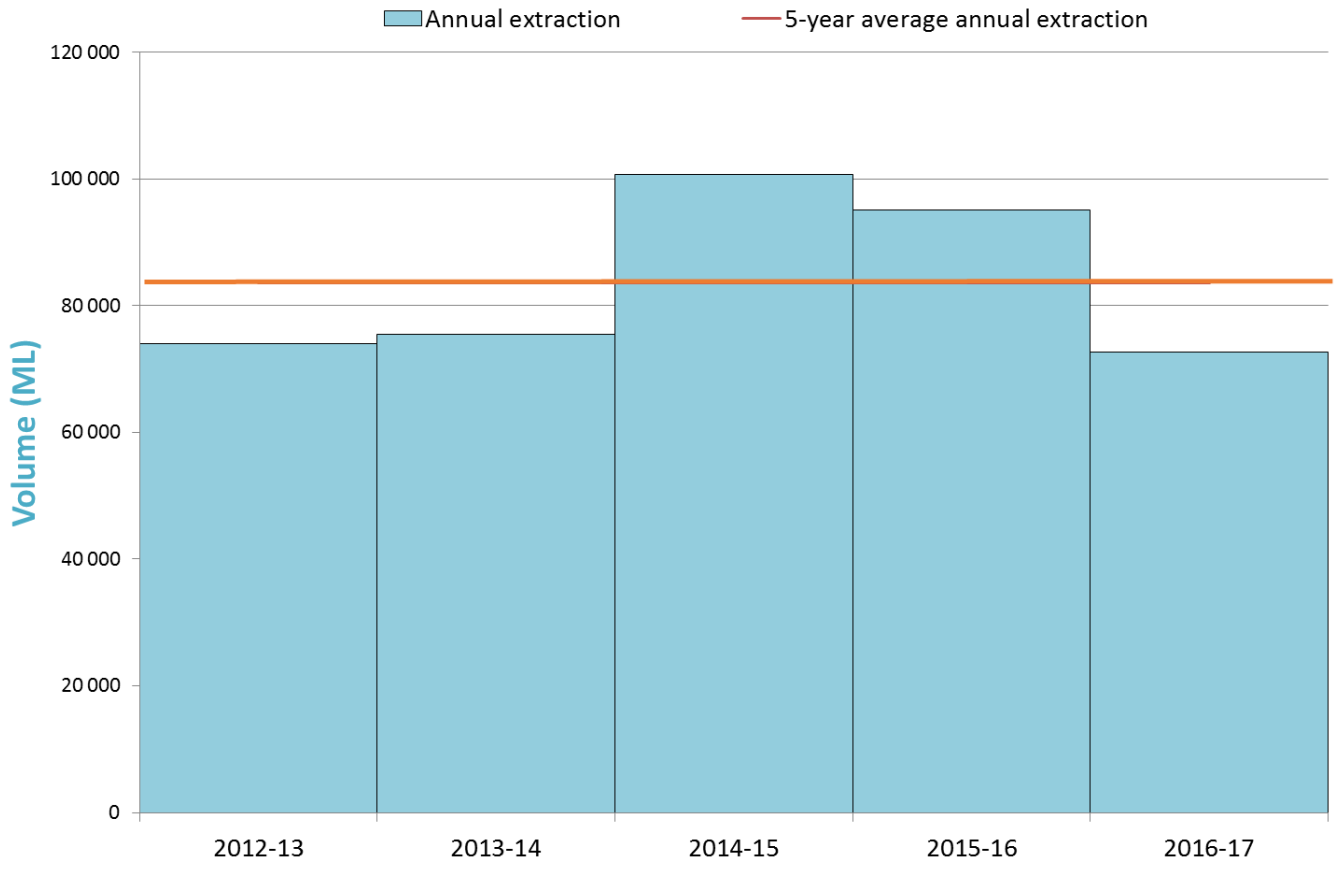


Figure 3. Licensed groundwater extraction volumes[5] for the past five water-use years

[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

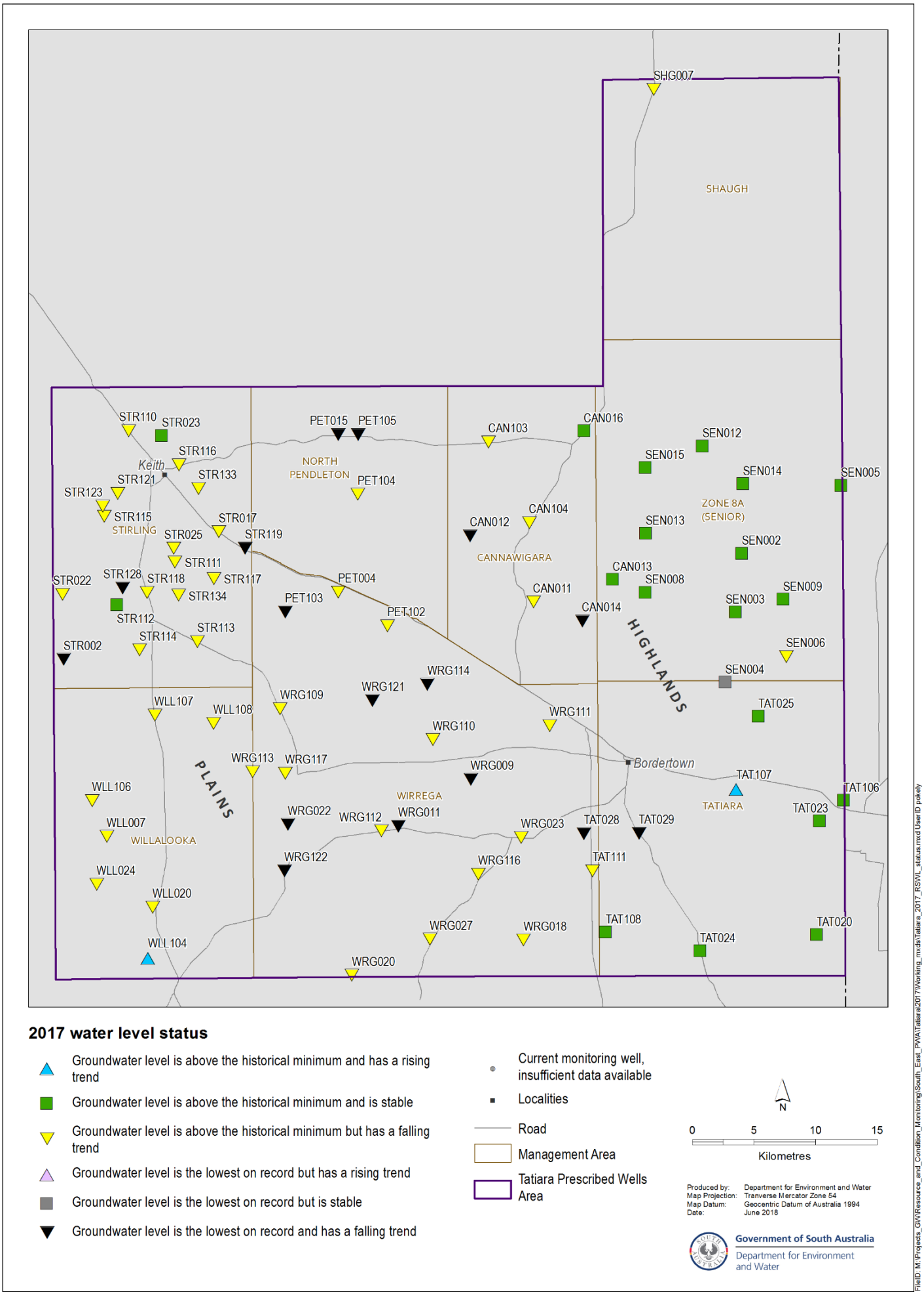


Figure 4. Five-year trends (2013–17) in groundwater levels: unconfined aquifer

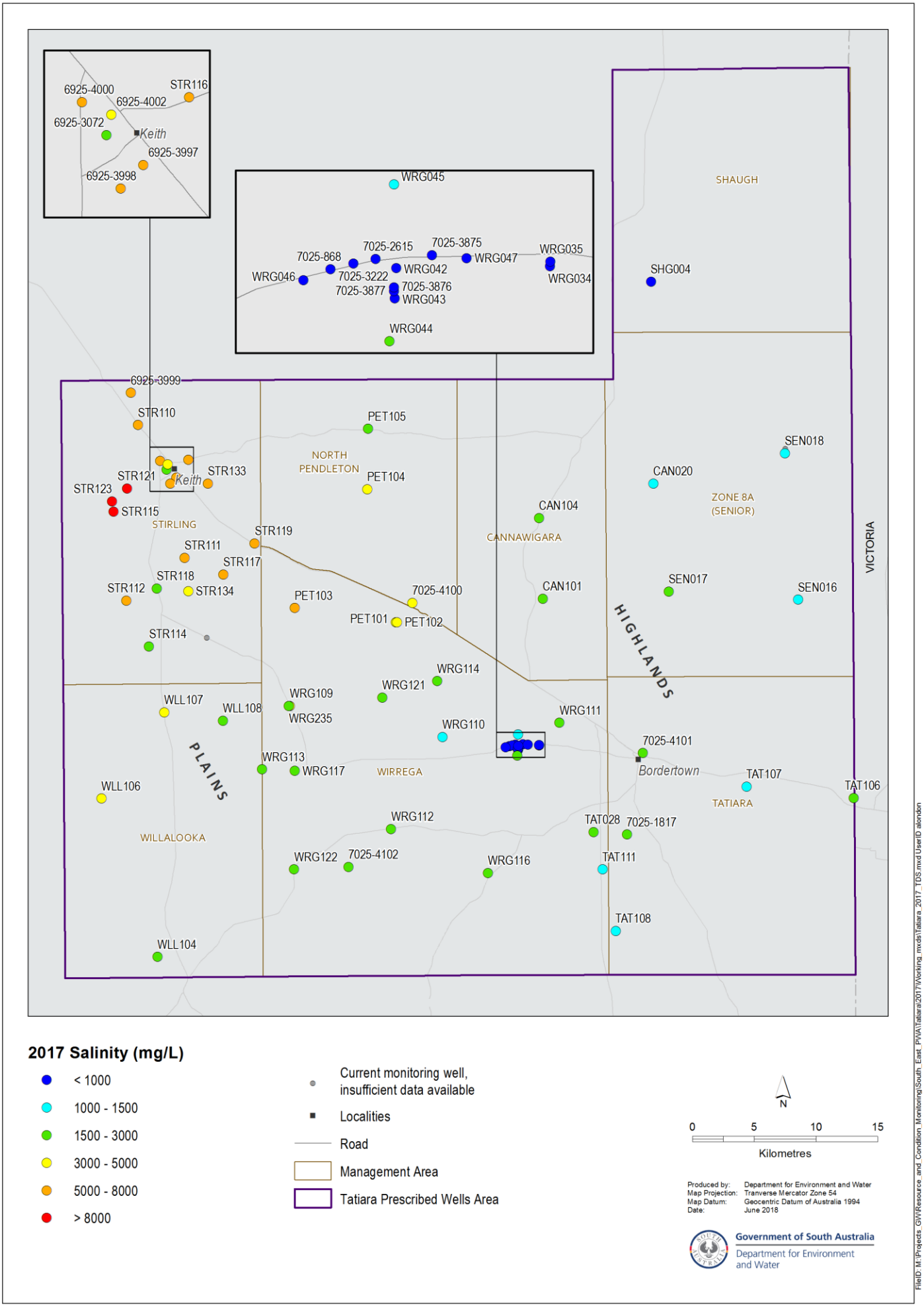


Figure 5. 2017 groundwater salinities: unconfined aquifer

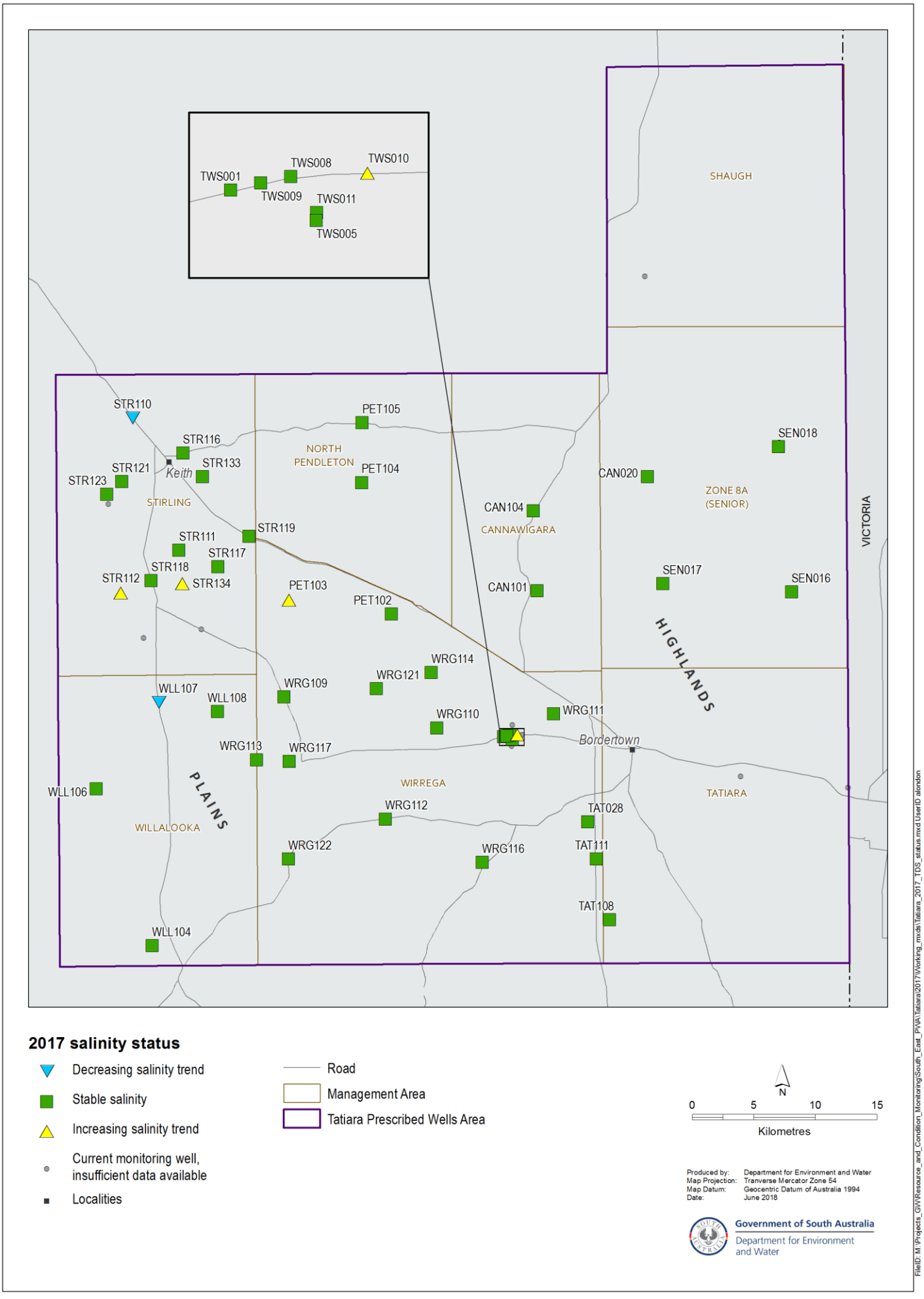


Figure 6. Five-year trends (2013–17) in groundwater salinities: unconfined aquifer

More information

To determine the status of the unconfined aquifer of the Tatiara PWA 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 and unique code, 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 April 2018 and may be subject to change, as some extraction volumes may be in the process of verification.

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/).

The status of the confined groundwater resource is published in a separate report *Prescribed Wells Areas of the South East confined aquifer 2017 Groundwater level and salinity status report*. Please visit the Water Resource Assessments page on WaterConnect to view this report.

To view the Tatiara 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 Tatiara PWA, please visit the *Groundwater Data* page under the Data Systems tab on WaterConnect. To view all past published *Groundwater level and salinity status reports,* please visit the Water Resource Assessments page on WaterConnect.

For further details on the Tatiara PWA, please see the *Tatiara Water Allocation Plan* available on the Natural Resources South East 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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