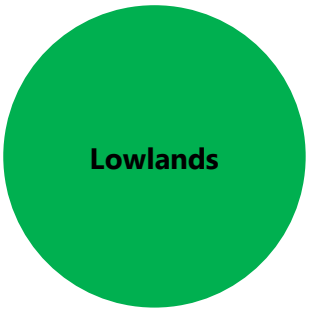
Lower Limestone Coast Prescribed Wells Area Unconfined aquifer

2018 Groundwater level and salinity status report

Government of South Australia
Department for Environment and Water

2018 Status summary
Lower Limestone Coast PWA
Unconfined aquifer

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



The *lowlands* (coastal plain, interdunal flats and Donovans Management Area) 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, 93% of wells show rising or stable groundwater levels and 86% show decreasing or stable salinities.

The *highlands* 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, 56% of wells show rising or stable groundwater levels and 100% of wells show decreasing or stable salinities.

The status is based on five-year trends. To view the *Lower Limestone Coast PWA groundwater level and salinity status report 2011*, 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 Lower Limestone Coast 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	Mount Gambier Aero Bureau of Meteorology (BoM) rainfall station, number 26021, is located approximately 8 km north of Mount Gambier in the southern part of the Lower Limestone Coast PWA.
Annual total[1]	793 mm 28 mm (4%) greater than the five-year average of 765 mm 71 mm (10%) greater than the long-term (1900–2018) average of 722 mm

[1] For the water-use year 1 July 2017 to 30 June 2018

Groundwater extraction

See Figure 3

Total allocated volume[2,3]	665 374 ML
Licensed groundwater extraction[2,4]	192 607 ML
Extraction volume comparison	22% greater than the previous year 7% less than the five-year average

Groundwater level

See Figure 4

Five-year trend: 2014–18	
Lowlands	375 out of 478 wells (78%) show rising trends, at rates of 0.02–0.73 m/y (median of 0.13 m/y) 71 wells (15%) are stable; 1 of these wells shows its lowest level on record 32 wells (7%) show declining trends, at rates of 0.02–0.76 m/y (median of 0.05 m/y); 8 of these wells show their lowest level on record
Highlands	19 out of 43 wells (44%) show rising trends, at rates of 0.02–0.23 m/y (median of 0.11 m/y) 5 wells (12%) are stable 19 wells (44%) show declining trends, at rates of 0.01–0.02 m/y (median of 0.01 m/y); 6 of these wells show their lowest level on record

Groundwater salinity

See Figures 5 and 6

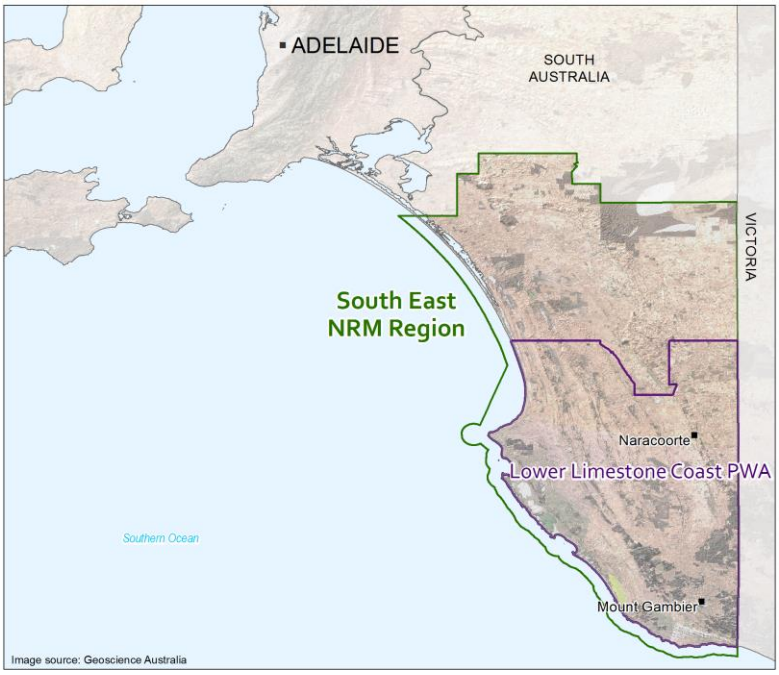
2018 salinity	193–10 542 mg/L (199 wells; median of 819 mg/L) Two sea water intrusion monitoring wells (CAR061 & CAR081) located near the coast in the Donovans Management Area show salinities of around 33 000 mg/L and 14 000 mg/L; salinities have been stable over the past five years. Inland monitoring wells in this area typically show salinity of less than 1000 mg/L.
Five-year trend: 2014–18	
Lowlands	23 out of 146 wells (16%) show decreasing trends, at rates of 15–322 mg/L/y (median of 45 mg/L/y) 102 wells (70%) are stable 21 wells (14%) show increasing trends, at rates of 14–220 mg/L/y (median of 32 mg/L/y)
Highlands	2 out of 25 wells (8%) show decreasing trends, at rates of 8 and 18 mg/L/y 23 wells (92%) are stable

[2] For the water-use year 1 July 2017 to 30 June 2018.

[3] The total allocated volume can vary year to year due to the amount of carry over allocation.

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

Regional setting



The Lower Limestone Coast PWA is located in the South East Natural Resources Management Region, the northern boundary being approximately 300 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* anda water allocation plan provides for their sustainable management.

The Lower Limestone Coast PWA is underlain predominantly by Tertiary sediments of the Gambier Basin, with a continuous transition to similar sediments of the Murray Basin in the northern portion of the PWA. The PWA is characterised by two discrete landforms (Fig. 4): (1) a low-lying coastal plain and also the northern and central parts of the PWA that are characterised by north-west trending remnants of old coastal dunes separated by inter-dunal flats (herein referred to as the lowlands, which comprises the coastal plain, inter-dunal flats and Donovans Management Area), and (2) an area towards the east and north-east that gently rises to 70 m above sea level (herein referred to as the highlands).

The Quaternary-aged Padthaway, Coomandook and Bridgewater Formations form the unconfined aquifer in the northern and central parts of the PWA. In the south of the PWA, the Tertiary-aged Gambier Limestone forms the unconfined aquifer. Beneath the highlands, the unconfined aquifer is contained within the Murray Group Limestone (also of Tertiary age), which is in the Murray Basin and is equivalent to the Gambier Limestone of the Gambier Basin. The main source of recharge to the unconfined aquifer is the direct infiltration of local rainfall. Groundwater flows from the topographic high of the Dundas Plateau, located in western Victoria (not shown), to the PWA in a radial direction, westward and southward towards the coast.

Trends in groundwater levels and salinities in the Lower Limestone Coast 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 increasing irrigation extractions, and both these elements can cause the groundwater levels to decline and may cause salinities to increase. Conversely, increased rainfall can result in increased recharge and decreased irrigation extraction, which may cause groundwater levels to rise and salinities to stabilise or decrease.

Groundwater levels and salinity have also been affected by the clearance of native vegetation (and subsequent land-use change) and the recycling of irrigation drainage water. The response of groundwater levels of the unconfined aquifer to rainfall varies between the coastal plain and highlands primarily due to the depth to the watertable. Groundwater levels are more responsive to rainfall on the low-lying coastal plain where the watertable is shallow. In the highlands, 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.

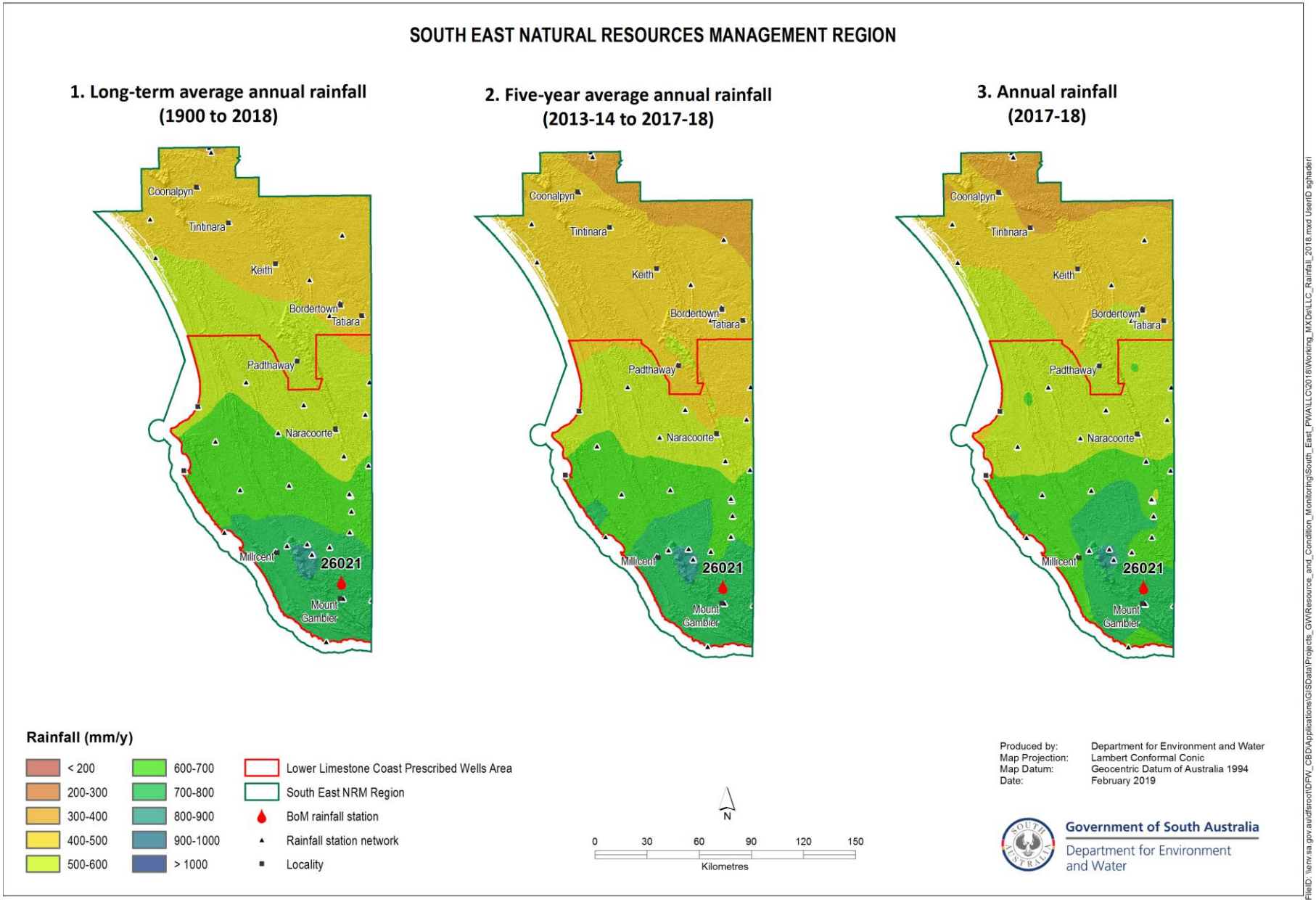


Figure 1. Spatial distribution of (1) long-term and (2) five-year average annual rainfall, and (3) annual rainfall[5]

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

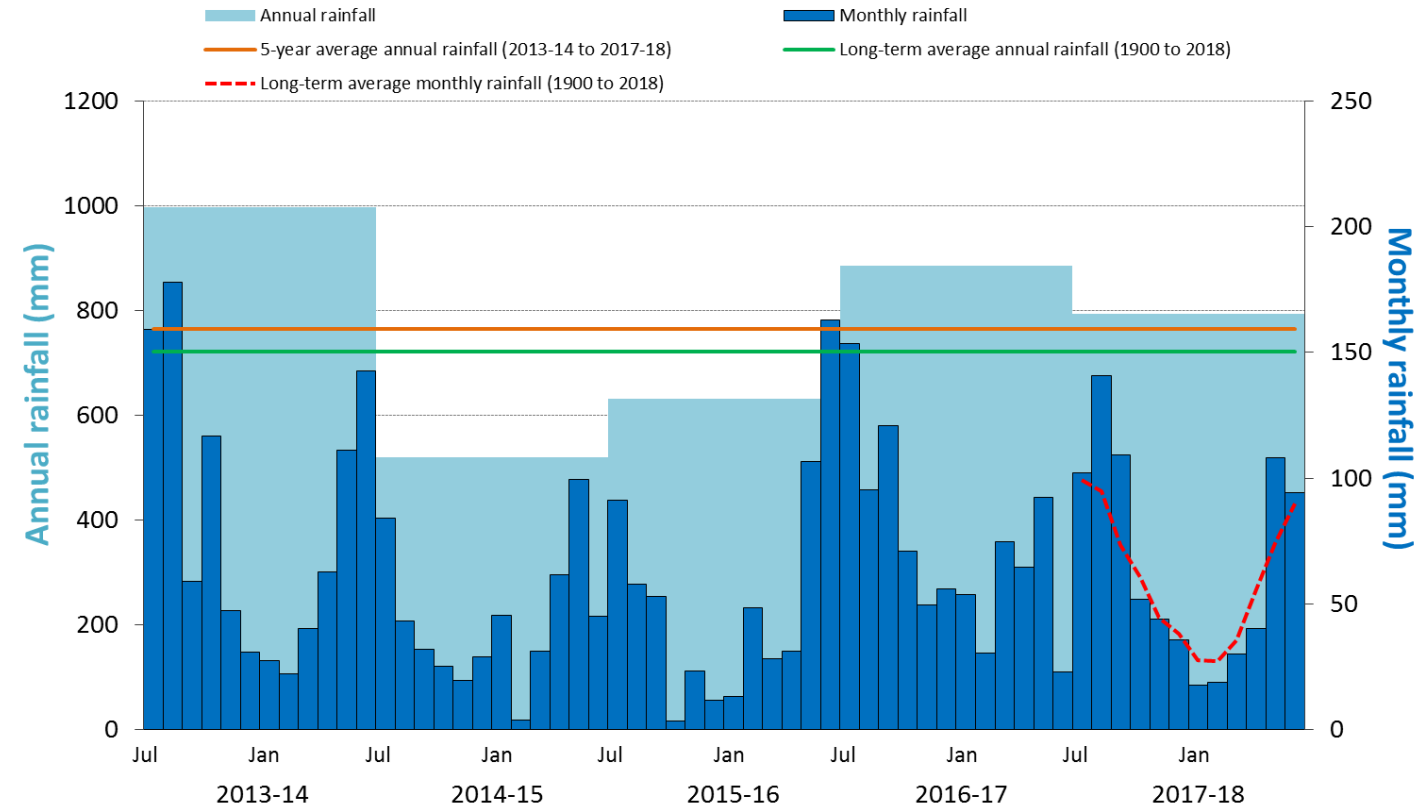


Figure 2. Annual and monthly rainfall for the past five water-use years recorded at Mount Gambier (BoM Station 26021)[6]

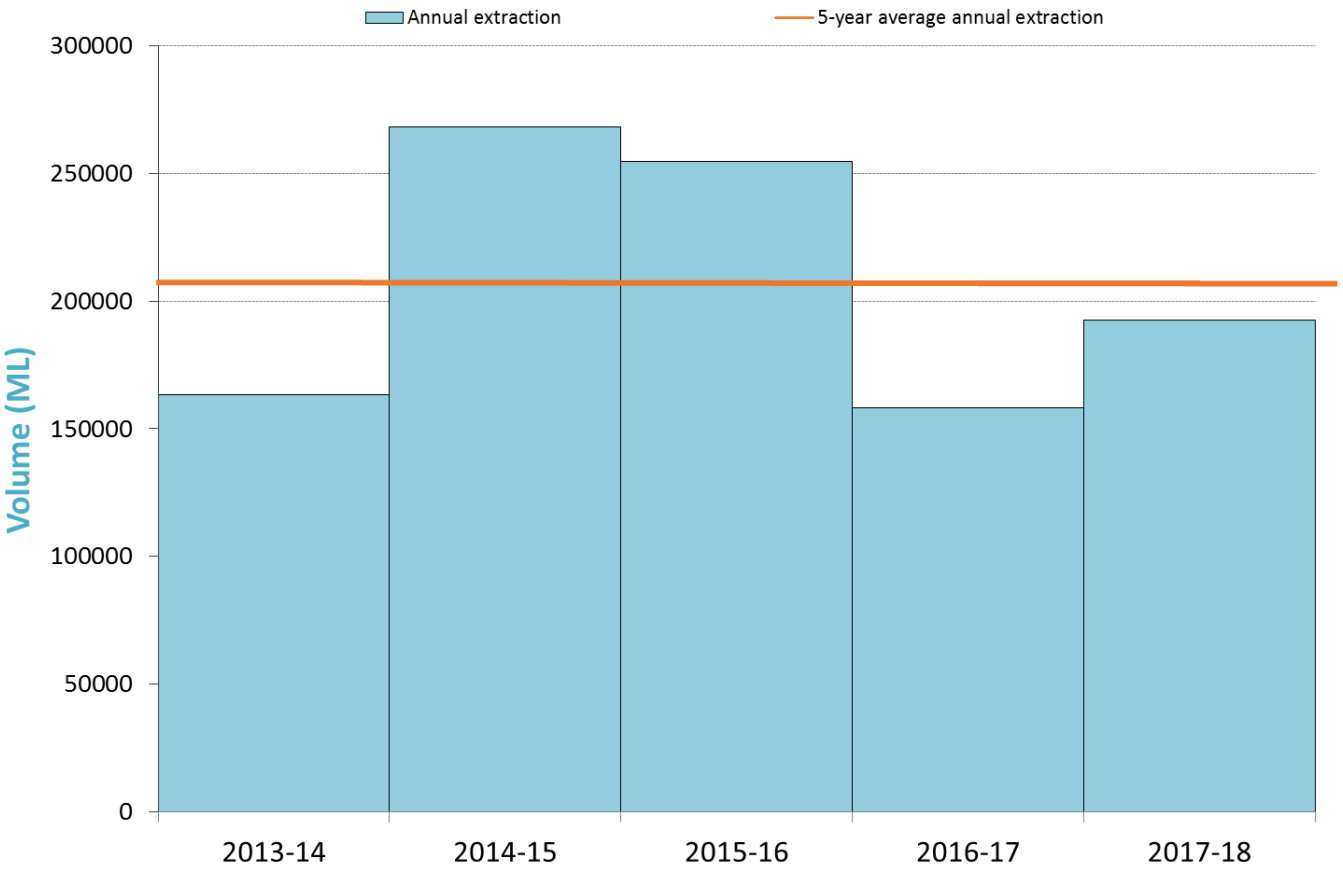


Figure 3. Licensed groundwater extraction volumes[7] for the past five water-use years

[6] Data source: SILO Patched Point Dataset, available https://silo.longpaddock.qld.gov.au/ – see More information.

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

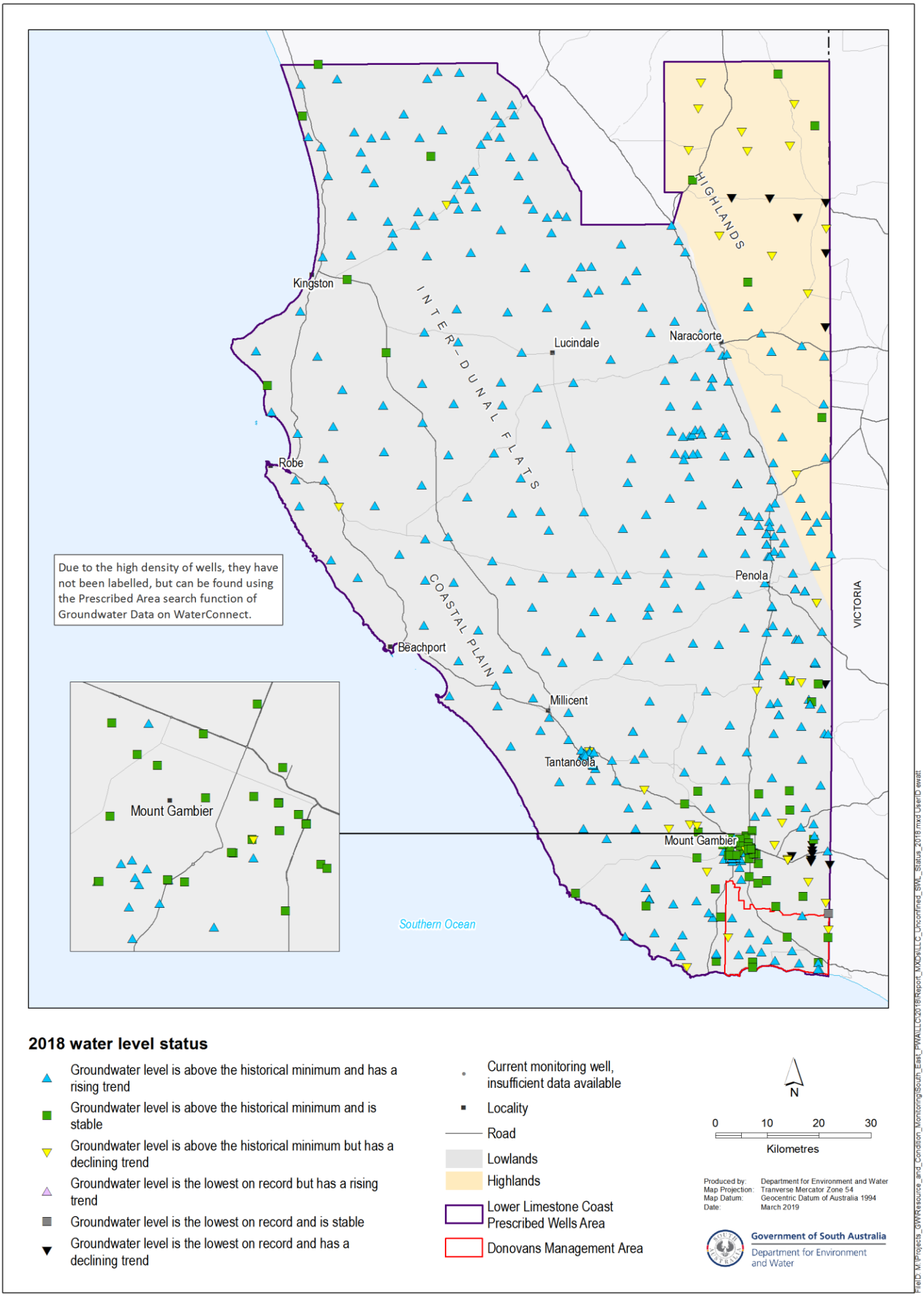


Figure 4. Five-year trends (2014–18) in groundwater levels: unconfined aquifer

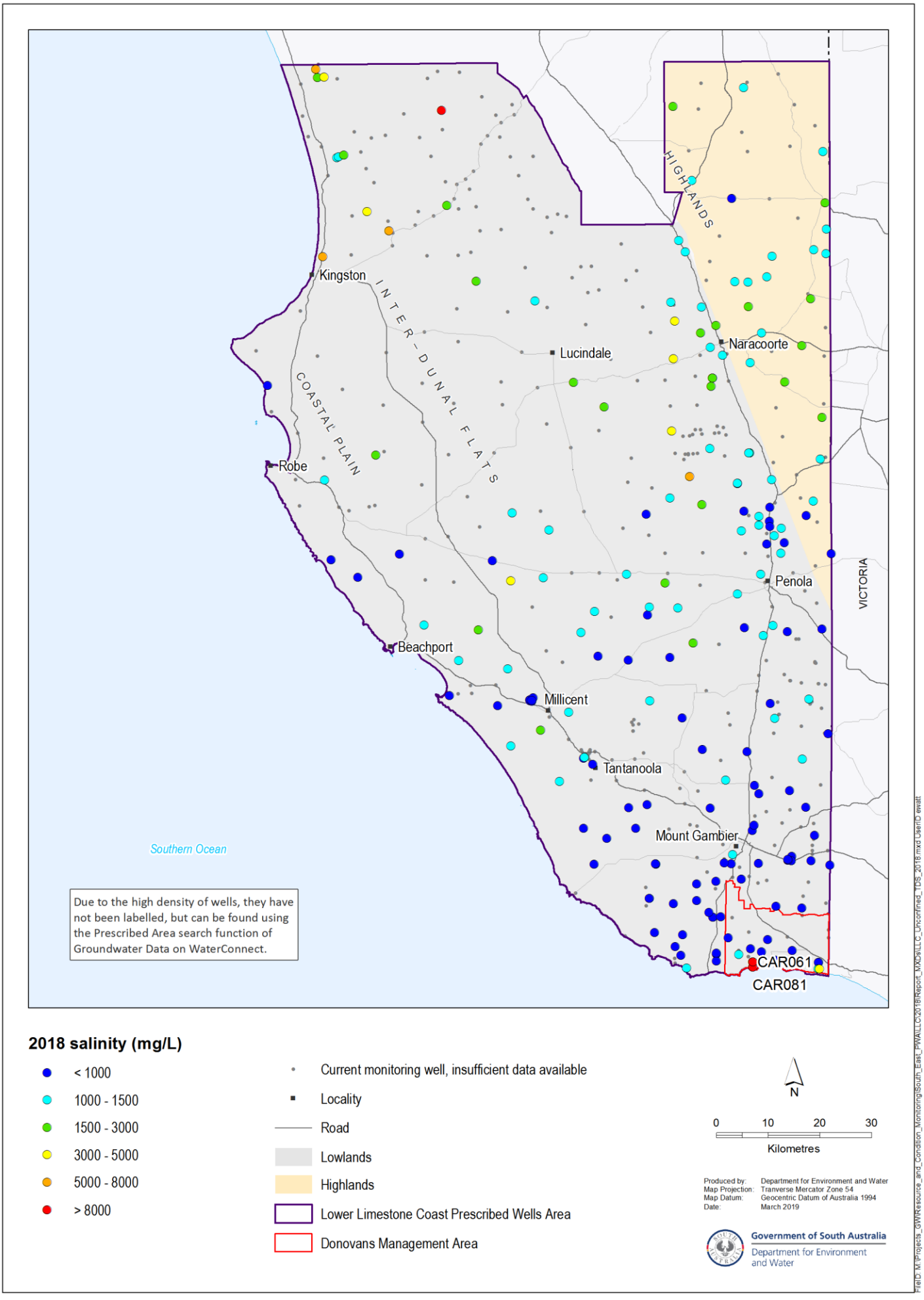


Figure 5. 2018 groundwater salinities: unconfined aquifer

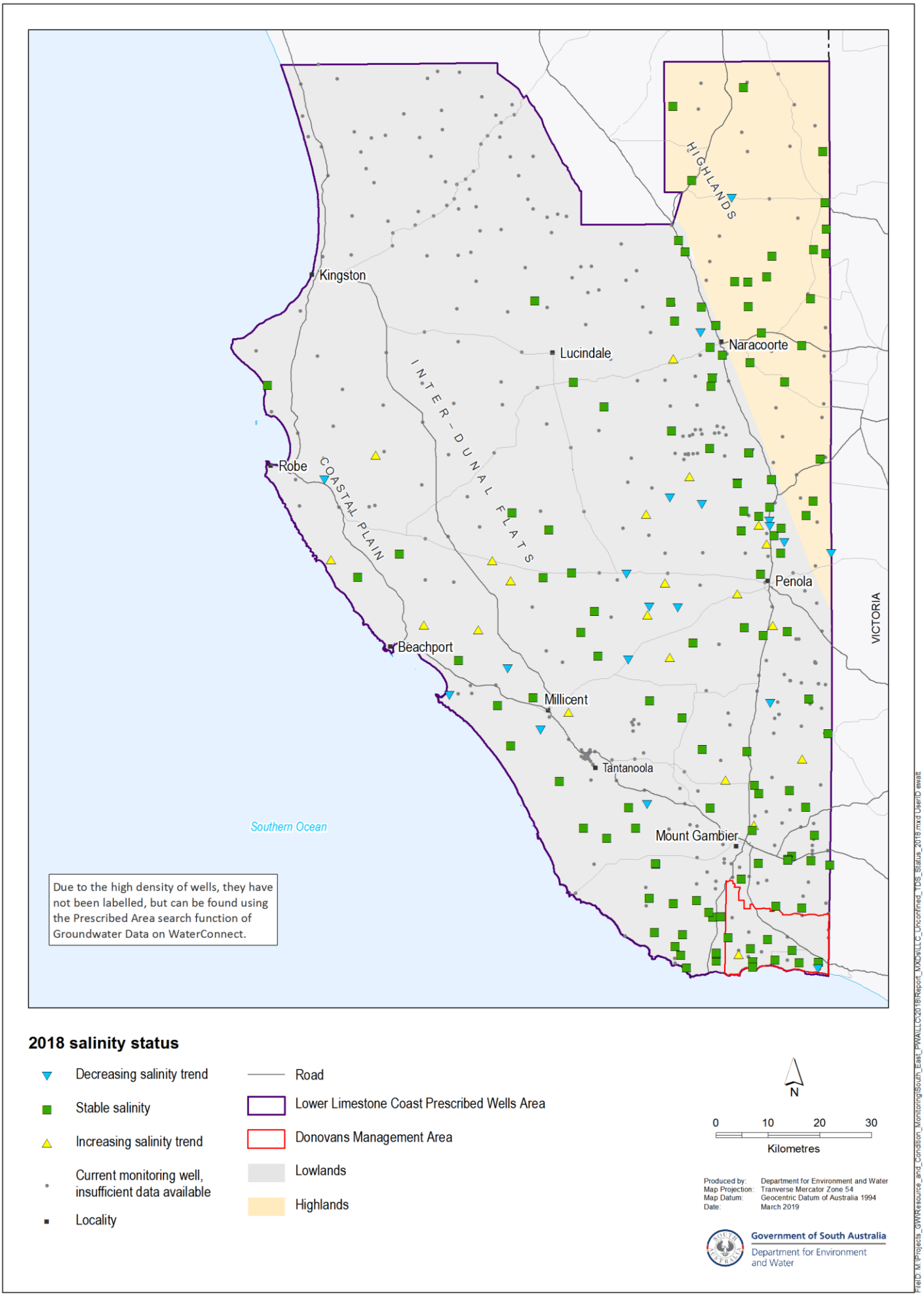


Figure 6. Five-year trends (2014–18) in groundwater salinities: unconfined aquifer

More information

To determine the status of the unconfined aquifer of the Lower Limestone Coast PWA 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 level 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/.

The status of the confined groundwater resource is published in a separate report *Prescribed Wells Areas of the South East confined aquifer 2018 Groundwater level and salinity status report*. Please visit the Water Resource Assessments page on WaterConnect to view this report.

To view the *Lower Limestone Coast 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 Lower Limestone Coast PWA, please visit the *Groundwater Data* page under the Data Systems tab on WaterConnect.

For further details on the Lower Limestone Coast PWA, please see the *Lower Limestone Coast 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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Head Office
81-95 Waymouth St
ADELAIDE SA 5000

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

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