

# Prescribed Wells Areas of the South East Confined aquifer

## 2016 Groundwater level and salinity status report



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ISBN 978-1-925668-02-5

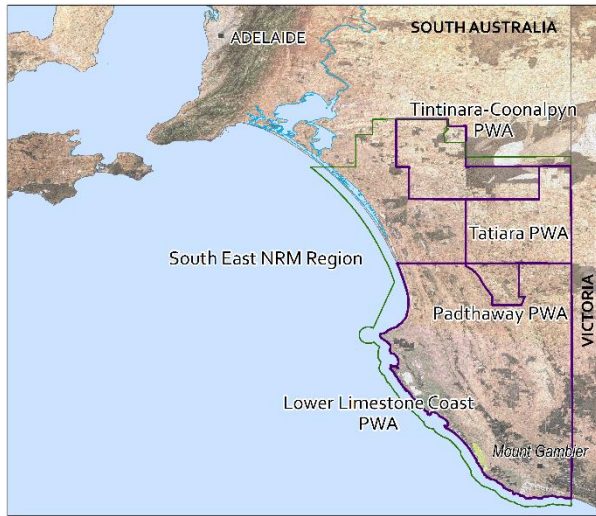
#### *Preferred way to cite this publication*

DEWNR (2017). *Prescribed Wells Areas of the South East confined aquifer 2016 Groundwater level and salinity status report*, Government of South Australia, Department of Environment, Water and Natural Resources, Adelaide.

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# Regional setting



There are four prescribed wells areas (PWAs) in the South East Natural Resources Management Region (NRM) of South Australia: Tintinara–Coonalpyn; Tatiara; Padthaway; and Lower Limestone Coast. Groundwater in these PWAs is prescribed under the South Australia’s *Natural Resources Management Act 2004*. Water allocation plans for each PWA provide for the sustainable use of the groundwater resources.

The PWAs of the South East are underlain by sediments of the Murray and Gambier Basins that form: (1) an unconfined aquifer comprising various Quaternary and Tertiary calcareous sandstones and limestones; and (2) an underlying confined Tertiary aquifer comprising non-calcareous quartz sand. In the Tintinara–Coonalpyn PWA, the confined aquifer consists of Murray Basin sediments—the fossiliferous limestone and marl of the Buccleuch Formation on the coastal plain and the Renmark Group in the highlands (Fig. 5). Across the Tatiara PWA, the

confined aquifer primarily consists of the Renmark Group, as the Buccleuch Formation is relatively thin. In the Lower Limestone Coast PWA, the confined aquifer is comprised of the Dilwyn Formation of the Gambier Basin, which is the equivalent of the Renmark Group in the Murray Basin. The Dilwyn Formation is generally thin or absent in the Padthaway PWA.

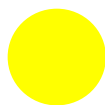
Groundwater in the confined aquifer is recharged around the topographic highs of the Dundas Plateau in Victoria (Fig. 5). From there, the groundwater flows radially westward and southward to the coast and northward to the Murray River. Artesian conditions exist in the west, particularly in the Kingston area, and along the southern coast (Fig. 5).

Although the confined aquifer does not receive direct recharge from local rainfall, the intensity and timing of rainfall and related variations in rates of groundwater extraction may have an effect on groundwater pressure levels in the confined aquifer. For example, if the South East NRM Region experiences above-average rainfall, this may result in less groundwater being extracted from the confined aquifer for irrigation, and therefore groundwater pressure levels may increase. Conversely, below-average rainfall may result in increased rates of groundwater extraction and groundwater pressure levels may fall to lower levels.

# 2016 Status

The Prescribed Wells Areas of the South East confined aquifer have been assigned a yellow status for 2016:

## 2016 Status



Minor adverse trends have been observed over the past five years

The 2016 status for the South East confined aquifer is based on:

- most monitoring wells (55%) show a five-year trend of declining groundwater pressure levels.

### Rainfall

The Mount Gambier Aero rainfall station (BoM Station 26021), located around 8 km north of Mount Gambier (Fig. 1), recorded 636 mm of rain in the 2015–16 water-use year, which is 85 mm (12%) lower than the long-term average annual rainfall of 721 mm and 45 mm (7%) less than the five-year average of 681 mm (Figs 1 and 2). Rainfall patterns across the South East NRM region suggest a general drying trend over the long term (Fig. 1). In the 2015–16 water-use year, monthly rainfall data show that only May and June recorded above-average monthly rainfall when compared with their respective long-term monthly averages. Notably, October and December registered rainfall less than one-third their respective long-term monthly average rainfall (Fig. 2).

Keith rainfall station (BoM station 25507), which is located in the west of the Tatiara PWA (Fig. 1), recorded 385 mm of rainfall in the 2015–16 water-use year. This is 76 mm (16%) lower than the long-term average annual rainfall of 461 mm (1900–2016), but 16 mm (4%) greater than the five-year average annual rainfall of 369 mm (Figs 1 and 3). Trends of declining rainfall are evident when compared to the long term (Fig. 1). In the 2015–16 water-use year, monthly rainfall data show that January, February, March and November recorded above-average rainfall when compared with their long-term averages. Notably, March, October and December registered rainfall less than one-third their respective long-term monthly average rainfall (Fig. 3).

### Water use

Licensed groundwater extractions (excluding stock and domestic use) from the confined aquifer totalled 28 225 ML<sup>1</sup> in 2015–16, which is commensurate with the previous water-use year, but 20% greater than the five-year average annual extraction (Fig. 4). This volume of extraction represents 37% of the total allocation limit for the confined aquifer and accounts for 6% of the total licensed extractions from all aquifers within the four South East PWAs.

Licensed groundwater extractions from the confined aquifer in the Lower Limestone Coast, Tatiara and Tintinara–Coonalpyn PWAs totalled 20 167 ML (71%), 392 ML (1%) and 7666 ML (28%), respectively. The confined aquifer is largely absent within the Padthaway PWA.

### Groundwater pressure levels

Over the five years to 2016, 49% of monitoring wells in the Lower Limestone Coast PWA are quite variable, showing declining trends at rates ranging between 0.02 and 0.07 m/y with a median of 0.05 m/y. Notably, 30% of wells recorded their lowest groundwater pressure levels on record in 2016. The declining trends in pressure levels are localised between Lucindale and Naracoorte and between south of Penola and Mount Gambier. A trend of rising pressure levels is observed in 20% of monitoring wells at rates ranging between 0.02 and 0.9 m/y with a median of 0.03 m/y. The remaining 30% of wells show stable pressure levels (Fig. 5).

Within the Tintinara–Coonalpyn PWA, 69% of monitoring wells show a five-year trend of declining pressure levels at rates ranging between 0.07 and 1.3 m/y with a median of 0.04 m/y. Notably, 30% of wells recorded their lowest groundwater pressure levels on record in 2016. A trend of rising pressure levels is observed in 22% of monitoring wells, at median rate of 0.24 m/y (Fig. 5). Near the township of Coonalpyn, two wells (one of which is an irrigation bore) show declining trends of 4.8 and 5.0 m/y and these declines are the likely result of localised pumping effects from the irrigation well during the extraction season.

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<sup>1</sup> The licensed groundwater use for the 2015–16 water-use year is based on the best data available as of April 2017 and could be subject to change, as some of extraction volumes may be in the process of being verified.

Across the two remaining PWAs, most monitoring wells showing declining trends in pressure levels at a median rate of 0.07 m/y; 50% of wells recorded their lowest groundwater pressure levels on record in 2016.

It should be remembered that pressure level trends are driven by both extraction and the process of hydrostatic loading or a combination of both.

### **Groundwater salinity**

Confined aquifer monitoring data indicate that little change in groundwater salinity has occurred over the longer term. Most monitoring wells (92%) show salinity less than 1500 mg/L in 2016 (Fig. 6). Of the three wells that exceed 1500 mg/L, two are located in the Tintinara–Coonalpyn PWA showing salinities of 2618 and 4031 mg/L, and a third well at the western margin of the Padthaway PWA shows a salinity of 3109 mg/L. For the five year period to 2016, all wells analysed showed a stable groundwater salinity trend (Fig. 7).

# More information

To determine the status of the confined aquifer for 2016 in the South East PWAs, the trends in groundwater level and salinity over the past five years (2012 to 2016, inclusive) were analysed, in contrast to the year-to-year assessments that have been used in past *Groundwater level and salinity status reports*. Please visit the [Frequently Asked Questions](#) on the *Water Resource Assessments* page on WaterConnect for a detailed explanation of the new method of status assessment.

To view descriptions for all status symbols, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view the *Tintinara–Coonalpyn, Tatiara, Lower Limestone Coast and Padthaway PWAs Groundwater Level and Salinity Status Reports 2011*, which includes background information on hydrogeology, location of rainfall stations and relevant groundwater-dependent ecosystems, please visit the *Water Resource Assessments* page on [WaterConnect](#).

To view or download groundwater level and salinity data from monitoring wells within the South East PWAs, please visit [Groundwater Data](#) on WaterConnect.

For further details about the South East PWAs, please see the relevant water allocation plans on the Natural Resources South East [website](#).

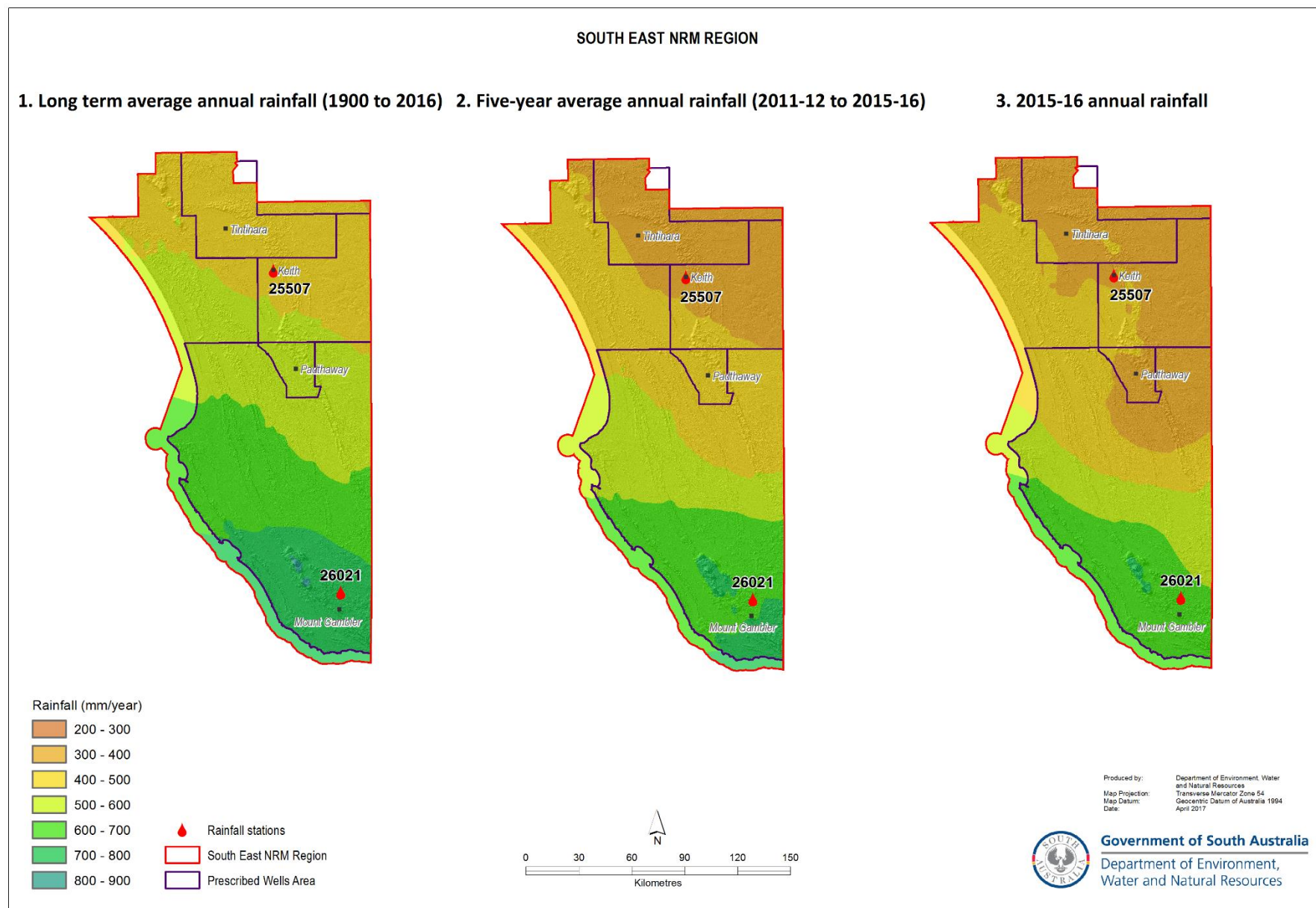


Figure 1. (1) Long-term and (2) five-year average annual rainfall, and (3) annual rainfall for the 2015–16 water-use year in the South East NRM Region<sup>2</sup>

<sup>2</sup> Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at [www.longpaddock.qld.gov.au/silo](http://www.longpaddock.qld.gov.au/silo).

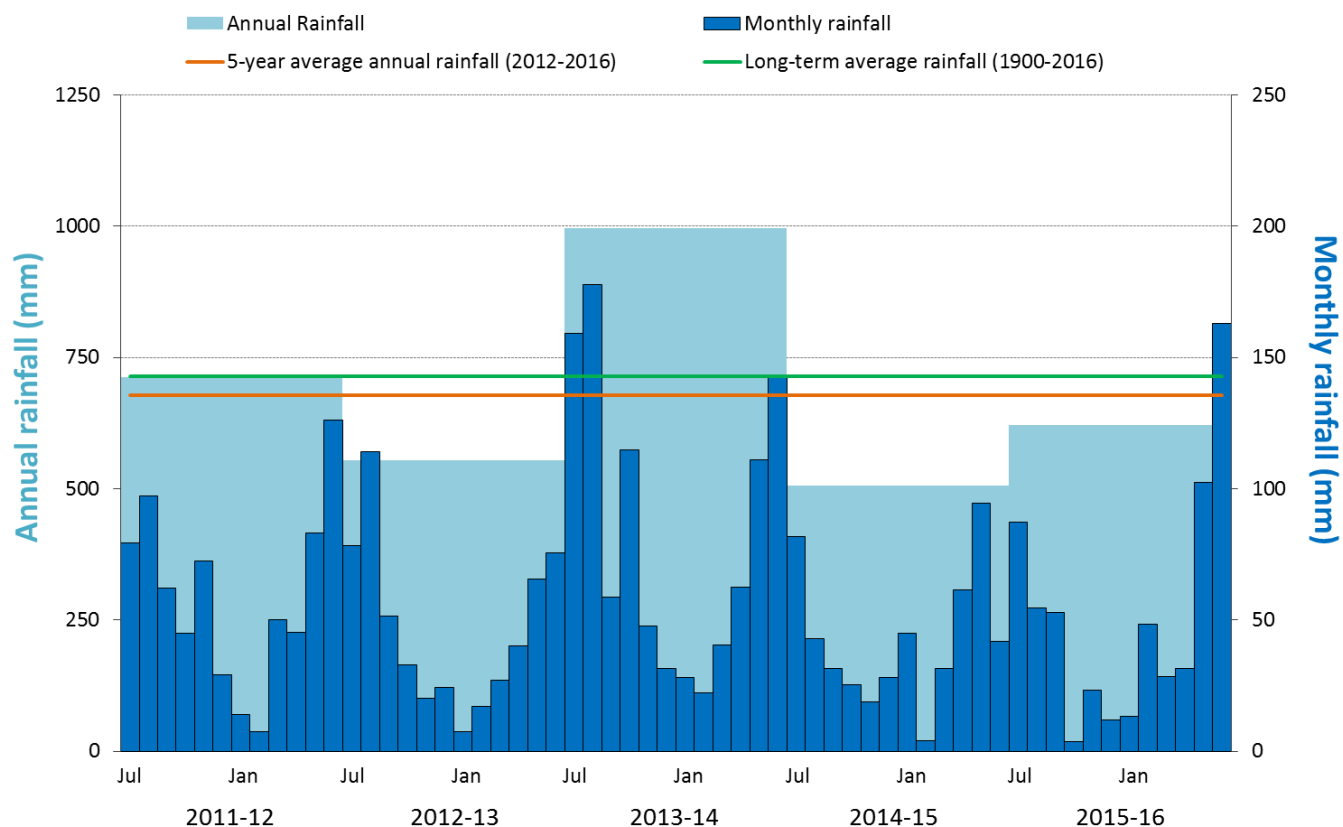


Figure 2. Annual (July–June) and monthly rainfall for the past five-years water-use, and the five-year and long-term average annual rainfall recorded at Mount Gambier Aero (BoM Station 26021)<sup>3</sup>

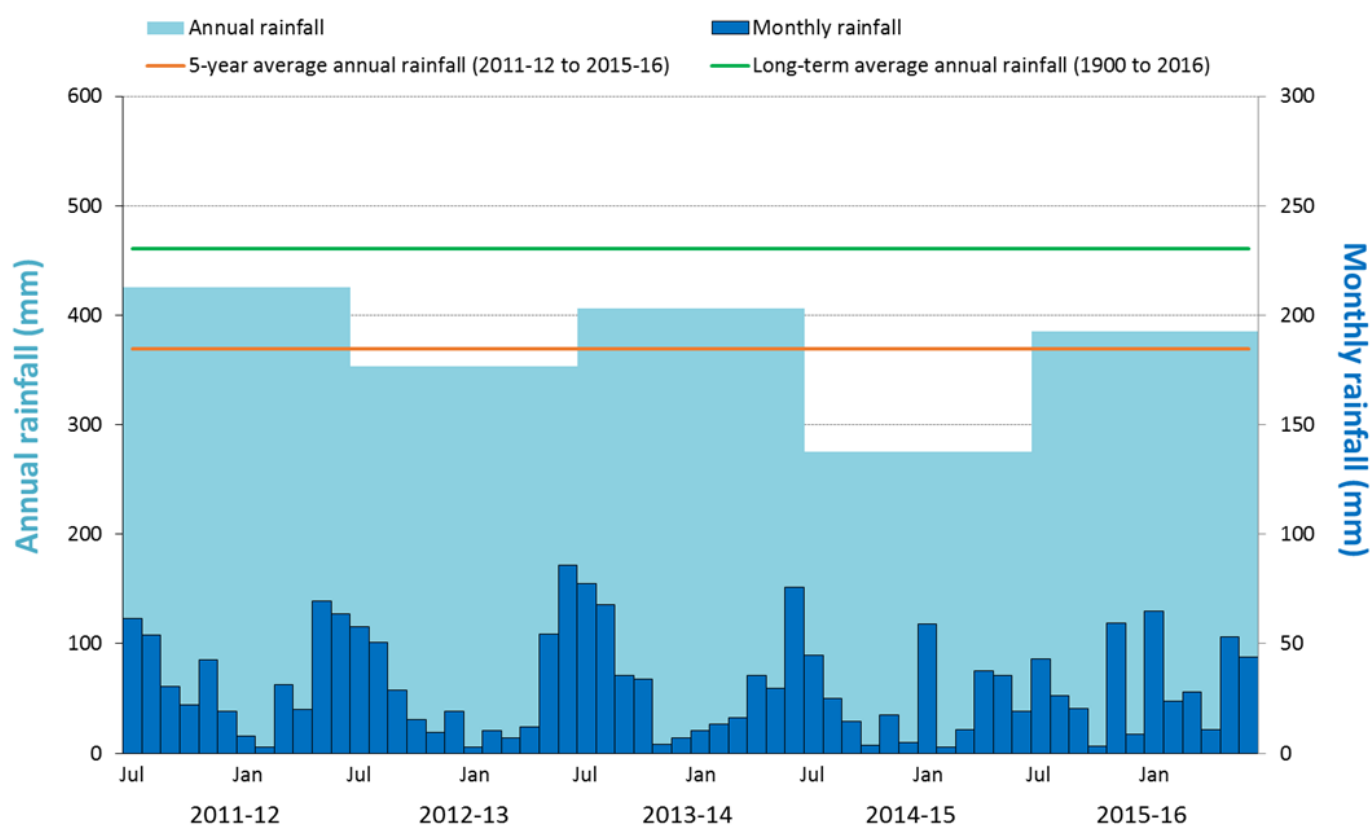


Figure 3. Annual (July–June) and monthly rainfall for the past five-years water-use, and the five-years and long-term average annual rainfall recorded at Keith (BoM Station 25507)<sup>3</sup>

<sup>3</sup> Rainfall data used in this report is sourced from the SILO Patched Point Dataset, which uses original Bureau of Meteorology daily rainfall measurements and is available online at [www.longpaddock.qld.gov.au/silo](http://www.longpaddock.qld.gov.au/silo).



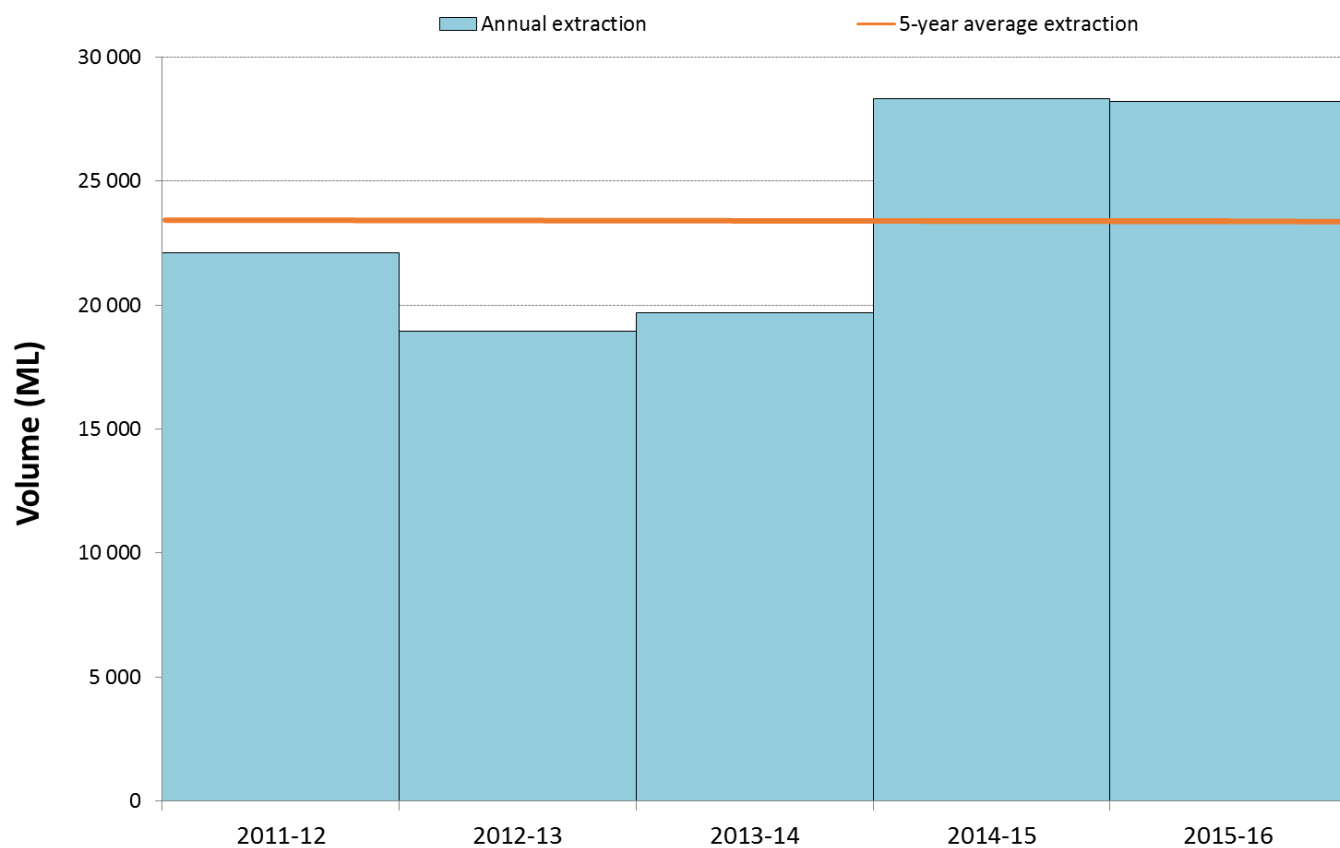


Figure 4. Licensed groundwater extraction volumes<sup>4</sup> for the past five-years water-use years, for the confined aquifer (South East PWAs)

<sup>4</sup> The licensed groundwater use for the 2015–16 water-use year is based on the best data available as of April 2017 and could be subject to change, as some of extraction volumes may be in the process of being verified.

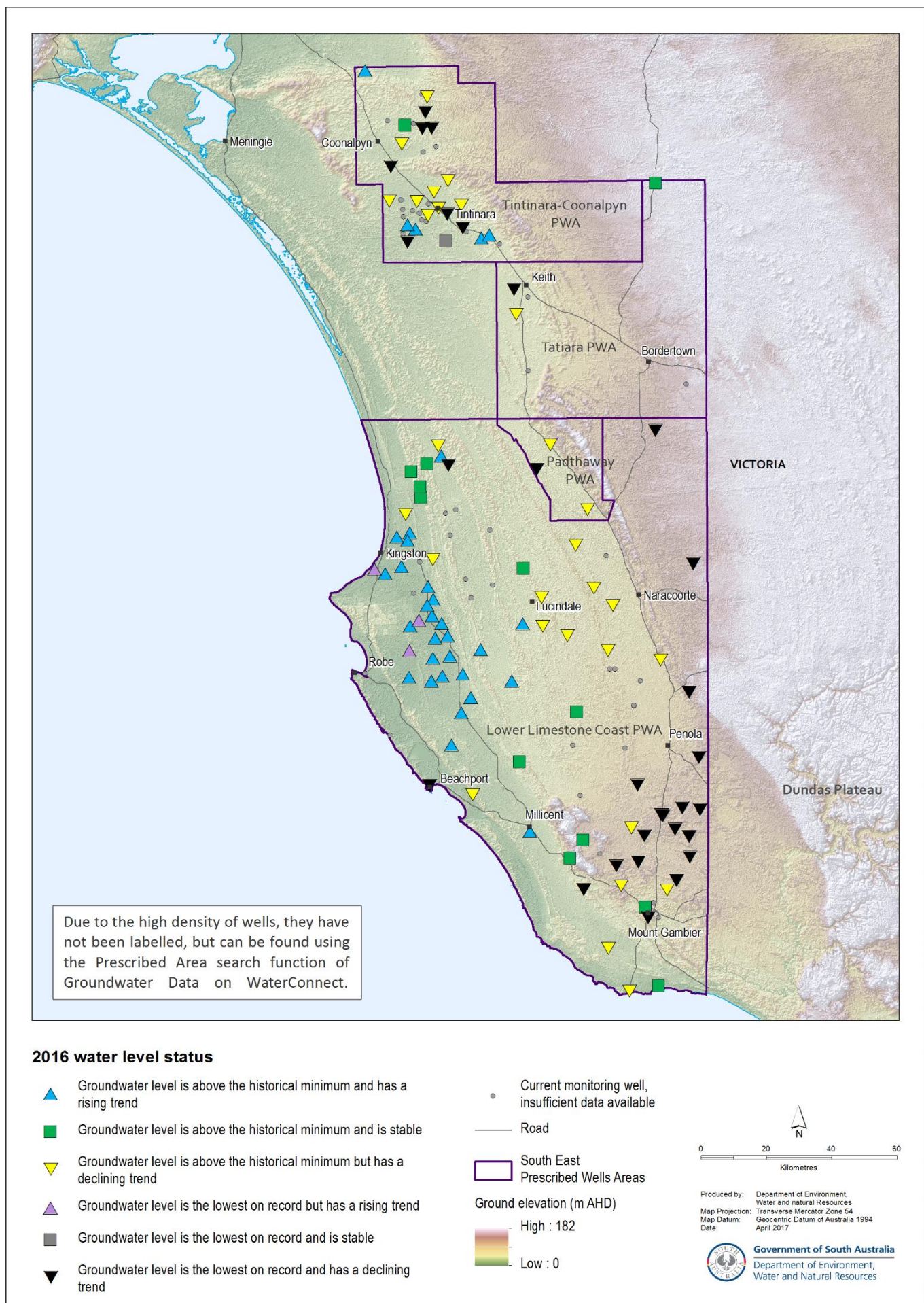


Figure 5. 2016 status of groundwater levels in the confined aquifer (South East PWAs), based on five-year trend from 2012 to 2016



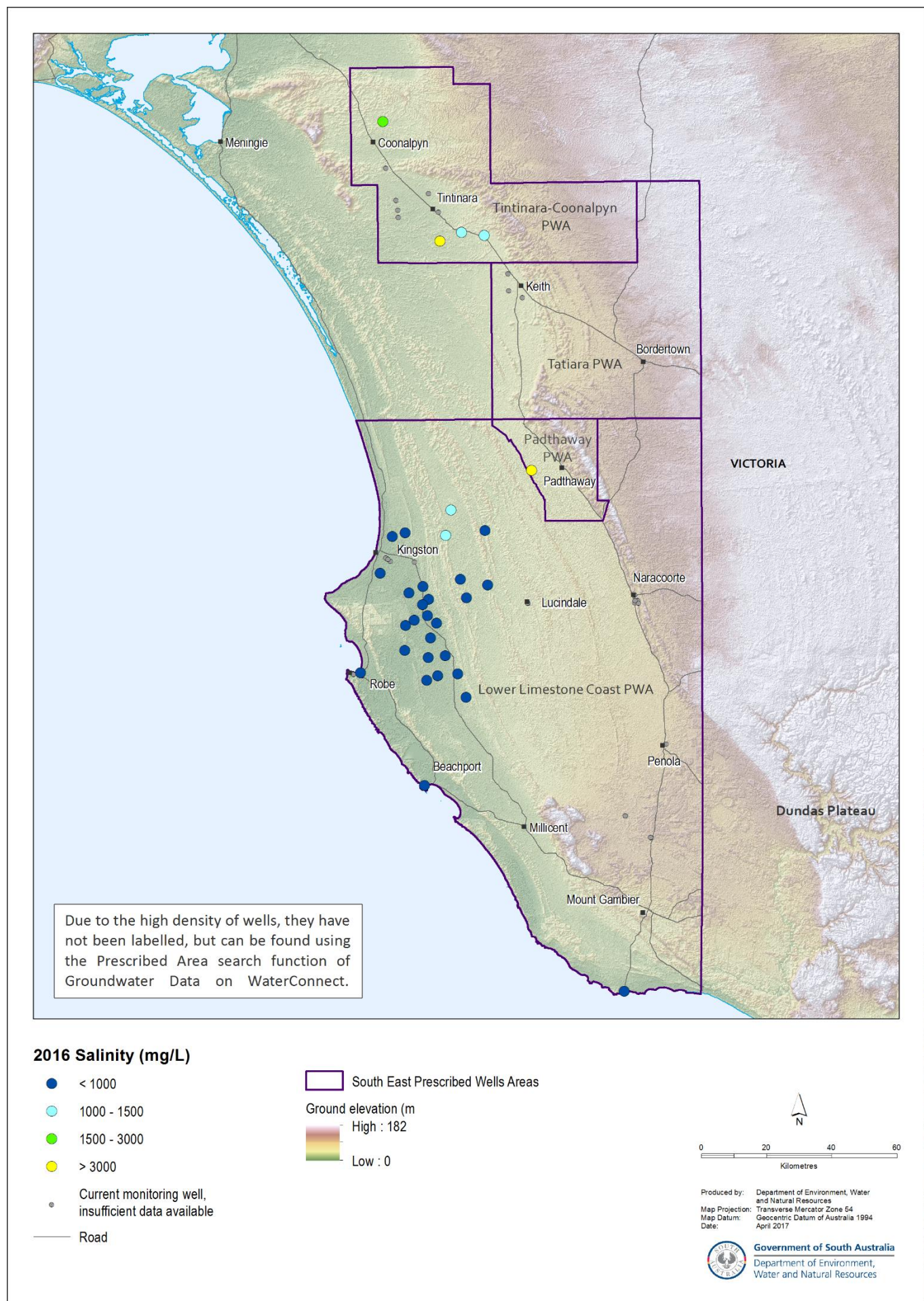
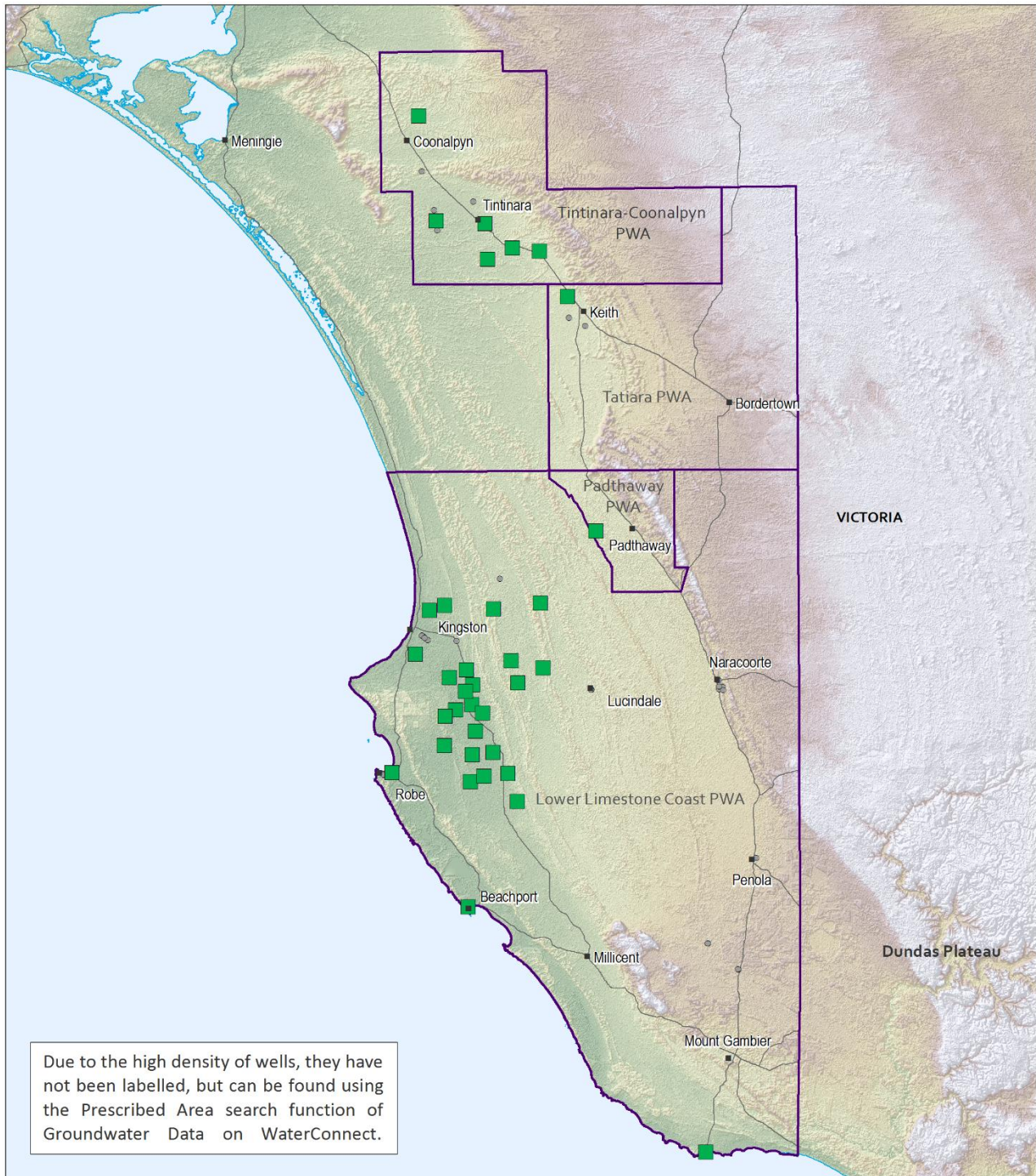


Figure 6. 2016 groundwater salinity in the confined aquifer (South East PWAs)

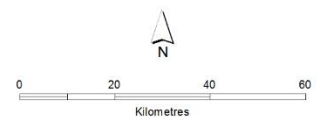




#### 2016 salinity status

- ▼ Decreasing salinity trend
- Stable salinity
- ▲ Rising salinity trend
- Current monitoring well, insufficient data available
- Road

- South East Prescribed Wells Areas
- Ground elevation (m)
- High : 182
- Low : 0



Produced by: Department of Environment, Water and Natural Resources  
 Map Projection: Transverse Mercator Zone 54  
 Map Datum: Geocentric Datum of Australia 1994  
 Date: April 2017



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Figure 7. 2016 status of groundwater salinity in the confined aquifer (South East PWAs), based on five-year trend from 2012 to 2016





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Published 2017 | FIS 94502

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